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H. O. No. 214

TABLES OF COMPUTED  
ALTITUDE AND AZIMUTH

Latitudes 60° to 69°, inclusive



Vol. VII

UNITED STATES NAVY DEPARTMENT  
HYDROGRAPHIC OFFICE





BUBBLE SEXTANT CORRECTION TO OBSERVED ALTITUDE OF SUN OR STAR FOR REFRACTION AND PARALLAX

Observed Altitude	Sun's Correction	Star's Correction
6 30	-7.8	-7.9
6 40	7.6	7.7
6 50	7.4	7.6
7 0	7.3	7.4
7 10	7.1	7.2
7 20	-7.0	-7.1
7 30	6.8	7.0
7 40	6.7	6.8
7 50	6.5	6.7
8 0	6.4	6.6
8 10	-6.3	-6.4
8 20	6.2	6.3
8 30	6.1	6.2
8 40	5.9	6.1
8 50	5.8	6.0
9 0	-5.7	-5.9
9 20	5.5	5.7
9 40	5.3	5.5
10 0	-5.2	-5.3
10 20	5.0	5.2
10 40	-4.9	-5.0
11 0	4.7	4.9
11 30	4.5	4.7
12 0	4.3	4.5
12 30	4.1	4.3
13 0	-4.0	-4.1
13 30	3.8	4.0
14 0	3.7	3.8
15 0	3.4	3.6
16 0	3.2	3.3
17 0	-3.0	-3.1
18 0	2.8	3.0
19 0	2.7	2.8
20 0	2.5	2.6
21 0	2.4	2.5
22 0	-2.3	-2.4
24 0	2.0	2.2
26 0	1.9	2.0
28 0	1.7	1.8
30 0	1.6	1.7
32 0	-1.4	-1.6
34 0	1.3	1.4
36 0	1.2	1.3
38 0	1.1	1.2
40 0	1.0	1.2
45 0	-0.9	-1.0
50 0	0.7	0.8
55 0	0.6	0.7
60 0	0.5	0.6
65 0	0.4	0.5
70 0	-0.3	-0.4
75 0	0.2	0.3
80 0	0.1	0.2
85 0	-0.1	-0.1
90 0	0.0	0.0

Obs. Altitude	Horizontal Parallax								Obs. Altitude	Horizontal Parallax							
	54'	55'	56'	57'	58'	59'	60'	61'		54'	55'	56'	57'	58'	59'	60'	61'
5.5	+44.6	+45.6	+46.6	+47.6	+48.6	+49.6	+50.6	+51.6	46	+36.6	+37.3	+38.0	+38.7	+39.4	+40.1	+40.8	+41.5
6.0	45.2	46.2	47.2	48.2	49.2	50.2	51.2	52.2	47	35.9	36.6	37.3	38.0	38.7	39.4	40.0	40.7
6.5	45.8	46.8	47.8	48.8	49.7	50.7	51.7	52.7	48	35.3	35.9	36.6	37.3	37.9	38.6	39.3	40.0
7.0	46.2	47.2	48.2	49.2	50.2	51.2	52.2	53.2	49	34.6	35.2	35.9	36.6	37.2	37.9	38.5	39.2
7.5	46.6	47.6	48.6	49.6	50.6	51.6	52.6	53.6	50	33.9	34.5	35.2	35.8	36.5	37.1	37.8	38.4
8.0	+46.9	+47.9	+48.9	+49.9	+50.9	+51.9	+52.9	+53.9	51	+33.2	+33.8	+34.5	+35.1	+35.7	+36.4	+37.0	+37.6
8.5	47.2	48.2	49.2	50.2	51.2	52.2	53.2	54.2	52	32.5	33.1	33.7	34.3	35.0	35.6	36.2	36.8
9.0	47.5	48.5	49.4	50.4	51.4	52.4	53.4	54.4	53	31.8	32.4	33.0	33.6	34.2	34.8	35.4	36.0
9.5	47.7	48.7	49.7	50.6	51.6	52.6	53.6	54.6	54	31.1	31.6	32.2	32.8	33.4	34.0	34.6	35.2
10.0	47.9	48.9	49.9	50.8	51.8	52.8	53.8	54.8	55	30.3	30.9	31.5	32.0	32.6	33.2	33.8	34.3
11	+48.2	+49.2	+50.1	+51.1	+52.1	+53.1	+54.1	+55.1	56	+29.6	+30.1	+30.7	+31.2	+31.8	+32.4	+32.9	+33.5
12	48.4	49.4	50.3	51.3	52.3	53.3	54.2	55.2	57	28.8	29.3	29.9	30.4	31.0	31.5	32.1	32.6
13	48.5	49.5	50.4	51.4	52.4	53.4	54.4	55.3	58	28.0	28.5	29.1	29.6	30.2	30.7	31.2	31.7
14	48.6	49.6	50.5	51.5	52.5	53.4	54.4	55.4	59	27.2	27.7	28.3	28.8	29.3	29.8	30.3	30.8
15	48.6	49.6	50.5	51.5	52.5	53.4	54.4	55.4	60	26.4	26.9	27.5	28.0	28.5	29.0	29.5	29.9
16	+48.6	+49.5	+50.5	+51.5	+52.4	+53.4	+54.3	+55.3	61	+25.6	+26.1	+26.6	+27.1	+27.6	+28.1	+28.6	+29.0
17	48.5	49.5	50.4	51.4	52.3	53.3	54.3	55.2	62	24.8	25.3	25.8	26.3	26.7	27.2	27.7	28.1
18	48.4	49.4	50.3	51.3	52.2	53.2	54.1	55.1	63	24.0	24.5	24.9	25.4	25.9	26.3	26.8	27.2
19	48.3	49.2	50.2	51.1	52.1	53.0	54.0	54.9	64	23.2	23.7	24.1	24.5	25.0	25.4	25.8	26.3
20	48.1	49.0	50.0	50.9	51.9	52.8	53.8	54.7	65	22.4	22.8	23.2	23.7	24.1	24.5	24.9	25.4
21	+47.9	+48.8	+49.8	+50.7	+51.7	+52.6	+53.5	+54.5	66	+21.5	+22.0	+22.4	+22.8	+23.2	+23.6	+24.0	+24.4
22	47.7	48.6	49.6	50.5	51.4	52.3	53.3	54.2	67	20.7	21.1	21.5	21.9	22.3	22.7	23.0	23.4
23	47.5	48.4	49.3	50.2	51.1	52.0	53.0	53.9	68	19.8	20.2	20.6	21.0	21.4	21.7	22.1	22.5
24	47.2	48.1	49.0	49.9	50.8	51.7	52.7	53.6	69	19.0	19.4	19.7	20.1	20.4	20.8	21.1	21.5
25	46.9	47.8	48.7	49.6	50.5	51.4	52.3	53.2	70	18.1	18.5	18.8	19.2	19.5	19.8	20.2	20.5
26	+46.6	+47.5	+48.4	+49.3	+50.2	+51.1	+52.0	+52.9	71	+17.3	+17.6	+17.9	+18.2	+18.6	+18.9	+19.2	+19.5
27	46.2	47.1	48.0	48.9	49.8	50.7	51.6	52.5	72	16.4	16.7	17.0	17.3	17.6	17.9	18.2	18.5
28	45.9	46.8	47.6	48.5	49.4	50.3	51.2	52.1	73	15.5	15.8	16.1	16.4	16.7	17.0	17.3	17.5
29	45.5	46.4	47.2	48.1	49.0	49.9	50.8	51.6	74	14.6	14.9	15.2	15.4	15.7	16.0	16.3	16.5
30	45.1	46.0	46.8	47.7	48.6	49.4	50.3	51.2	75	13.7	14.0	14.2	14.5	14.8	15.0	15.3	15.5
31	+44.7	+45.6	+46.4	+47.3	+48.1	+49.0	+49.8	+50.7	76	+12.8	+13.1	+13.3	+13.5	+13.8	+14.0	+14.3	+14.5
32	44.3	45.1	46.0	46.8	47.7	48.5	49.4	50.2	77	11.9	12.2	12.4	12.6	12.8	13.1	13.3	13.5
33	43.8	44.7	45.5	46.3	47.2	48.0	48.8	49.7	78	11.0	11.2	11.4	11.6	11.9	12.1	12.3	12.5
34	43.4	44.2	45.0	45.8	46.7	47.5	48.3	49.2	79	10.1	10.3	10.5	10.7	10.9	11.1	11.3	11.5
35	42.9	43.7	44.5	45.3	46.2	47.0	47.8	48.6	80	9.2	9.4	9.6	9.7	9.9	10.1	10.2	10.4
36	+42.4	+43.2	+44.0	+44.8	+45.6	+46.4	+47.2	+48.0	81	+ 8.3	+ 8.5	+ 8.6	+ 8.8	+ 8.9	+ 9.1	+ 9.2	+ 9.4
37	41.9	42.7	43.5	44.3	45.1	45.9	46.6	47.4	82	7.4	7.5	7.6	7.8	8.0	8.1	8.2	8.4
38	41.3	42.1	42.9	43.7	44.5	45.3	46.0	46.8	83	6.5	6.6	6.7	6.8	7.0	7.1	7.2	7.3
39	40.8	41.6	42.3	43.1	43.9	44.7	45.4	46.2	84	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3
40	40.2	41.0	41.8	42.5	43.3	44.1	44.8	45.6	85	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.2
41	+39.7	+40.4	+41.2	+41.9	+42.7	+43.4	+44.2	+44.9	86	+ 3.7	+ 3.8	+ 3.8	+ 3.9	+ 4.0	+ 4.0	+ 4.1	+ 4.2
42	39.1	39.8	40.6	41.3	42.0	42.8	43.5	44.3	87	2.8	2.8	2.9	2.9	3.0	3.0	3.1	3.1
43	38.5	39.2	39.9	40.7	41.4	42.1	42.9	43.6	88	1.8	1.9	1.9	2.0	2.0	2.0	2.1	2.1
44	37.9	38.6	39.3	40.0	40.7	41.5	42.2	42.9	89	+ 0.9	+ 0.9	+ 1.0	+ 1.0	+ 1.0	+ 1.0	+ 1.0	+ 1.0
45	+37.2	+37.9	+38.6	+39.4	+40.1	+40.8	+41.5	+42.2	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



H. O. Publication No. 214

*U.S. Hydrographic Office*

# TABLES OF COMPUTED ALTITUDE AND AZIMUTH

Latitudes 60° to 69°, inclusive

Vol. VII



UNITED STATES NAVY DEPARTMENT  
HYDROGRAPHIC OFFICE

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STATUTES OF AUTHORIZATION

There shall be a Hydrographic Office attached to the Bureau of Navigation in the Navy Department for the improvement of the means for navigating safely the vessels of the Navy and of the mercantile marine by providing, under the authority of the Secretary of the Navy, accurate and cheap nautical charts, sailing directions, navigators, and manuals of instructions for the use of all vessels of the United States, and for the benefit and use of navigators generally. (R. S. 431.)

The Secretary of the Navy is authorized to cause to be prepared, at the Hydrographic Office attached to the Bureau of Navigation in the Navy Department, maps, charts, and nautical books relating to and required in navigation, and to publish and furnish them to navigators at the cost of printing and paper, and to purchase the plates and copyrights of such existing maps, charts, navigators, sailing directions, and instructions as he may consider necessary, and when he may deem it expedient to do so, and under such regulations and instructions as he may prescribe. (R. S. 432.)

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### PREFACE

These tables consist essentially of tabulated solutions of the astronomical triangle, so arranged as to yield the mariner his computed altitude and azimuth by inspection.

The scheme of precomputing such values for ready use is a long established one. It is in the scope, arrangement, and convenience of interpolation, developed in the Division of Research of the Hydrographic Office, that these tables are unique.

The tables are applicable equally to sights of the sun, moon, planets, and navigational stars; and inasmuch as they are designed for use in connection with celestial bodies of declinations both of same name as, and contrary name to the latitude, they apply to both northern and southern hemispheres.

For greater convenience in use, the values for only 10 degrees of latitude are included in each volume of the publication.

GEORGE S. BRYAN,  
*Captain, U. S. Navy,*  
*Hydrographer.*

## H. O. No. 214

# TABLES OF COMPUTED ALTITUDE AND AZIMUTH

### *Description of the Tables*

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

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

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

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

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

$\Delta d$  represents the change in altitude due to a change of 1' of arc of declination.

$\Delta t$  represents the change in altitude due to a change of 1' of arc of hour angle.

$\Delta L$  represents the change in altitude due to a change of 1' of arc of latitude. A special table on pages 262-3 gives the corrections for minutes of latitude.

There are three principal processes used for finding line of position with these tables, namely—

- (1) Assuming both latitude and longitude, using only the  $\Delta d$  correction.
- (2) Assuming latitude with the D. R. longitude, using the  $\Delta d$  and  $\Delta t$  corrections.
- (3) Working from the D. R. position, using the  $\Delta d$ ,  $\Delta t$ , and  $\Delta L$  corrections.

### (1) SOLUTION FOR LINE OF POSITION, USING $\Delta d$ CORRECTION

This is the primary method for which the tables were originally designed. The solution is short and simple.

The tables are entered with arguments of nearest whole degree of latitude, nearest whole or half degree of declination, and nearest whole degree of hour angle. Alt.,  $\Delta d$ , and Az. are taken from the body of the tables.

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

The altitude (Alt.) obtained from the tables is correct for the values with which the tables are entered; but since the exact declination of the body will usually differ from the tabulated declination, a correction to the altitude must be made for this difference. For example, if the exact declination of a star is  $57^{\circ} 33' 1''$  and the table is entered with a declination of  $57^{\circ} 30'$ , the declination difference is  $3' 1''$ . Since  $\Delta d$  represents the change in altitude due to a change of 1' of arc of declination, if  $\Delta d$  is multiplied by the declination difference, the correction to the altitude for declination difference is obtained. When this correction is applied to the tabulated altitude (Alt.) the altitude thus obtained is the correct calculated altitude for arguments of whole degree of latitude, whole degree of hour angle, and the exact declination of the body.

In order to obviate the necessity of multiplying  $\Delta d$  by the declination difference to obtain the correction, a multiplication table on the back cover pages automatically indicates by inspection this entire operation. The multiplication table is entered with arguments,  $\Delta d$  at the side, and the declination difference at the top. The correction to the altitude for declination difference is taken from the body of the table. The multiplication table is so arranged that it may be entered at the top with both whole numbers and tenths. For example, using  $\Delta d$ , 65, and declination difference  $6' 4''$ , the multiplication table is entered with 65 at the side and  $6'$  at the top, the correction is  $3' 9''$ ; with 65 at the side and  $0' 4''$  at the top the correction is  $0' 3''$ ; the total correction to the altitude for declination difference being  $3' 9'' + 0' 3'' = 4' 2''$ .

By glancing at the values of altitude for adjoining tabulated declinations between which the exact declination lies, it may be determined whether the altitude is increasing or decreasing as the tabulated declination approaches the exact declination. The correction is applied to the tabulated altitude, plus if the altitude is increasing, and minus if the altitude is decreasing. Watch the plus or minus signs for  $\Delta d$ , and apply correctly. The multiplier  $\Delta d$  must never be interpolated.

When the  $\Delta d$  correction is made to the tabulated altitude the sight must be plotted from an assumed position as follows:

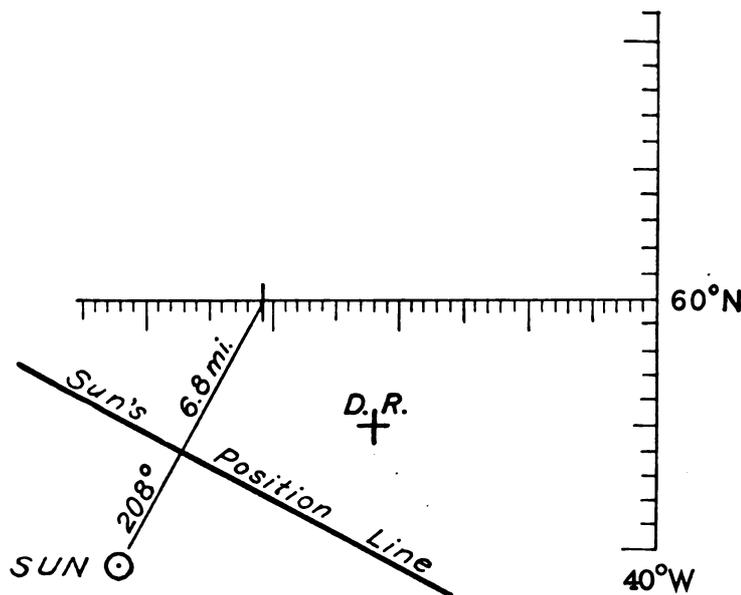
Latitude.—The whole degree with which the tables were entered.

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

**Example 1.**—At sea, September 30, 1940, in dead reckoning position, Lat.  $59^{\circ} 55' 0''$  N., Long.  $40^{\circ} 22' 0''$  W., the navigator of the U. S. S. *Colorado* observed the lower limb of the sun for line of position as follows: Sextant altitude,  $24^{\circ} 04' 7''$ ; I. C.,  $+1' 2''$ ; watch,  $2^h 11^m 01^s$ ; C-W,  $2^h 01^m 05^s$ ; chronometer, fast  $0^m 06^s$ ; height of eye, 40 feet.

Watch.....	14 <sup>h</sup> 11 <sup>m</sup> 01 <sup>s</sup>	Hs.....	24° 04' 7"	I. C.....	+1' 2"
C-W.....	2 01 05	Corr.....	+9. 0	Alt. C.....	+14. 0
Chronometer.....	16 12 06	Ho.....	24 13. 7	Ht. eye C.....	-6. 2
C. C.....	-06			Correction.....	+9. 0
G. C. T.....	16 12 00	Declination $2^{\circ} 54' 8''$ S. (from Nautical Almanac).			
G. H. A. for 16 <sup>h</sup> .....	62° 30' 9"				
Corr. for 12 <sup>m</sup> .....	3 00. 0				
G. H. A.....	65 30. 9 W.				
Longitude.....	40 30. 9 W.	(Assumed to give whole degree of L. H. A.)			
L. H. A.....	25 00. 0 W.				
Latitude.....	60 00. 0 N.	(Assume nearest whole degree of latitude.)			
Declination.....	2 54. 8 S.	(Enter table with lat. $60^{\circ}$ , L. H. A. $25^{\circ}$ , and declination $3^{\circ}$ , contrary name to latitude.)			

	<i>Alt.</i>	$\Delta d$	<i>Az.</i>
	$24^{\circ} 01' 8''$	+97	$152^{\circ} 5'$
Ad correction for $5' 2''$ .....	+5. 1		(Zn) $208^{\circ}$
Hc.....	24 06. 9		
Ho.....	24 13. 7		
Alt. Int.....	6.8 miles toward N. $152^{\circ} 5'$ W. ( $208^{\circ}$ ).		



**NOTE.**—Plus 97 is obtained from the  $\Delta d$  column abreast *Alt.* in the tables. The value 5.1 (corr. for  $5' 2''$  dec.) is obtained at a glance from the multiplication table on back cover pages, using  $5' 2''$  declination difference at top of page and .97 at side of page as arguments.

The value 5.1 is additive because, as the tabulated declination ( $3^{\circ}$ ) approaches the exact declination of the body ( $2^{\circ} 54' 8''$ ) the altitude is increasing.

The tabulated azimuth is reckoned from the elevated pole of the observer toward the west when the body is setting or west of the meridian, and requires no correction.

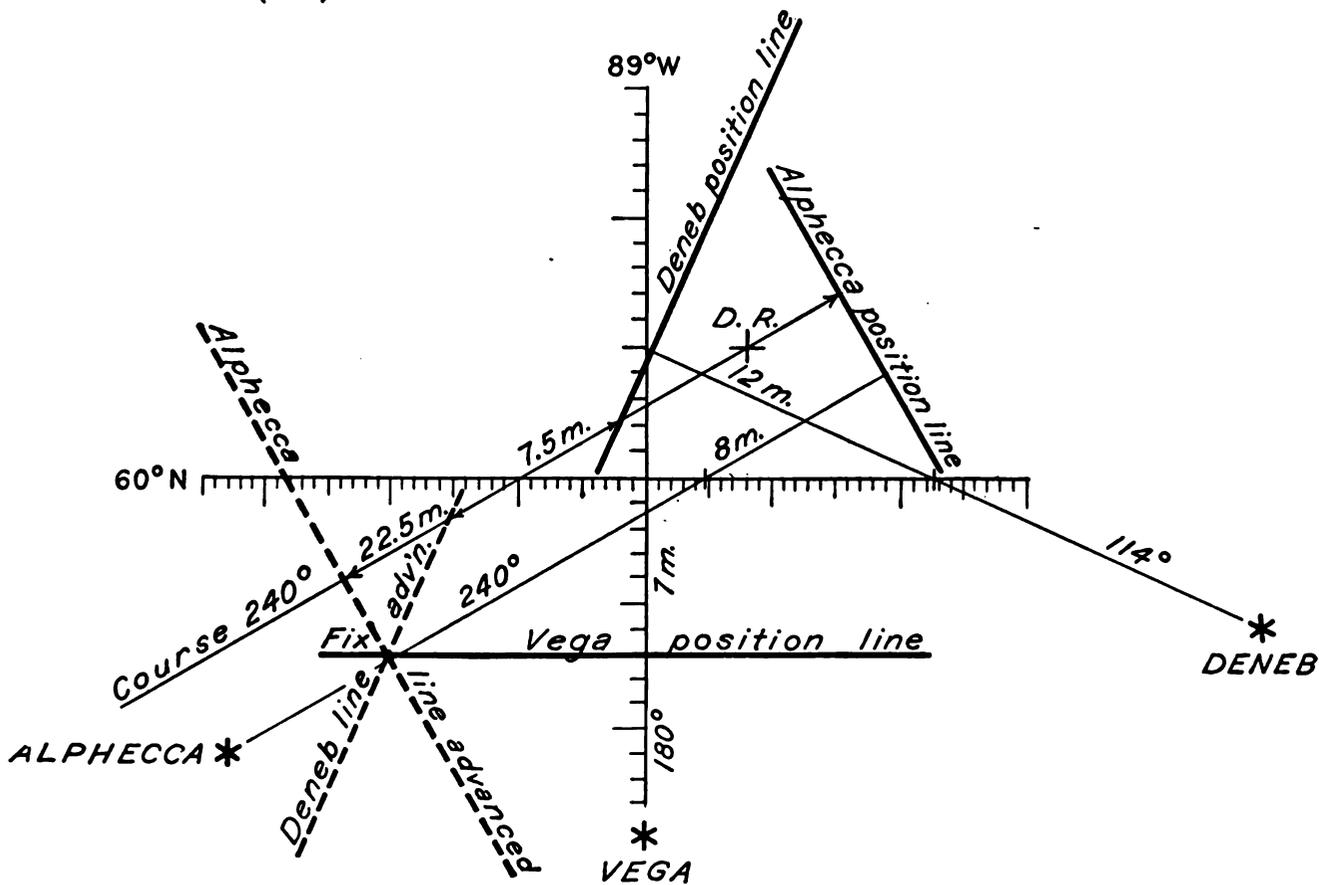
The sight is plotted from the nearest whole degree of latitude ( $60^{\circ}$  N.), and the assumed longitude ( $40^{\circ} 30' 9''$  W.).

**Example 2.**—During evening twilight, October 18, 1940, a plane was in dead reckoning position, Lat.  $60^{\circ} 05' 0''$  N., Long.  $88^{\circ} 52' 0''$  W., true course  $240^{\circ}$ , ground speed 90 knots, when the navigator observed, with a bubble octant (I. C.  $0' 0''$ ), the following stars for line of position:

Star	G. C. T.	Declination	Obs. altitude (Hs)
Alphecca.....	$22^{\text{h}} 26^{\text{m}} 50^{\text{s}}$	$26^{\circ} 55' 0''$ N.	$46^{\circ} 12' 9''$
Deneb.....	$22 36 52$	$45 04.5$ N.	$65 40.6$
Vega.....	$22 41 53$	$38 44.1$ N.	$68 51.5$

Required the fix at the observation of star Vega.

ALPHECCA			DENEB			VEGA		
G. C. T.....	$22^{\text{h}} 26^{\text{m}} 50^{\text{s}}$		$22^{\text{h}} 36^{\text{m}} 52^{\text{s}}$		$22^{\text{h}} 41^{\text{m}} 53^{\text{s}}$			
G. H. A. for $0^{\text{h}}$ G. C. T.	$153^{\circ} 17.4$		$76^{\circ} 28.4$		$107^{\circ} 35.9$			
Corr. for $22^{\text{h}} 26^{\text{m}} 50^{\text{s}}$ ....	$337 37.8$	Corr. for $22^{\text{h}} 36^{\text{m}} 52^{\text{s}}$ ..	$340 08.7$	Corr. for $22^{\text{h}} 41^{\text{m}} 53^{\text{s}}$ ..	$341 24.2$			
G. H. A.....	$130 55.2$ W.		$56 37.1$ W.		$89 00.1$ W.			
Longitude.....	$88 55.2$ W.		$88 37.1$ W.		$89 00.1$ W.			
L. H. A.....	$42$ W.		$32$ E.		$0$			
Latitude.....	$60$ N.		$60$ N.		$60$ N.			
Declination.....	$26 55.0$ N.		$45 04.5$ N.		$38 44.1$ N.			
Alt.	$\Delta d$	Az.	Alt.	$\Delta d$	Az.	Alt.	$\Delta d$	Az.
$46^{\circ} 24' 3''$	$-87$	$120^{\circ} 2'$	$65^{\circ} 48.7'$	$+76$	$113^{\circ} 9'$	$68^{\circ} 30' 0''$	$+1.0$	$180^{\circ}$
$\Delta d$ corr. $5' 0''$ ....	$-4.4$		$\Delta d$ corr. $4' 5''$ ....	$+3.4$		$\Delta d$ corr. $14' 1''$ ..	$+14.1$	
Hc.....	$46 19.9$		Hc.....	$65 52.1$		Hc.....	$68 44.1$	
Ho.....	$46 11.9$		Ho.....	$65 40.1$		Ho.....	$68 51.1$	
Alt. Int..	$8.0$ miles away from $N. 120^{\circ} W.$ ( $240^{\circ}$ ).		Alt. Int..	$12.0$ miles away from $114^{\circ}$ .		Alt. Int..	$7.0$ miles toward $180^{\circ}$ .	



Plot Alphecca from Lat.  $60^{\circ}$  N., Long.  $88^{\circ} 55' 2''$  W.  
 Plot Deneb from Lat.  $60^{\circ}$  N., Long.  $88^{\circ} 37' 1''$  W.  
 Plot Vega from Lat.  $60^{\circ}$  N., Long.  $89^{\circ} 00' 1''$  W.  
 The time elapsed between Alphecca and Vega sights is  $15^{\text{m}}$ , or ground speed equal to 22.5 miles.  
 The time elapsed between Deneb and Vega sights is  $5^{\text{m}}$ , or ground speed equal to 7.5 miles.  
 The position or fix of plane is Lat.  $59^{\circ} 53' N.$ , Long.  $89^{\circ} 20' W.$   
 The observation of star Vega is a meridian altitude.

(2) SOLUTION FOR LINE OF POSITION, USING BOTH  $\Delta d$  AND  $\Delta t$  CORRECTIONS

If the navigator desires to plot the sight from his dead reckoning longitude (and the nearest whole degree of latitude to his dead reckoning latitude) it may be done by applying an additional correction to the altitude for hour angle difference, as follows:

Since the exact local hour angle of the body will usually differ from the tabulated whole degree of hour angle found in the tables, a correction to the altitude for this difference may be made, thus allowing the sight to be plotted from the dead reckoning longitude, and the nearest whole degree of latitude. For example, if the exact hour angle of a star is  $20^{\circ} 10'2$  and the tables are entered with an hour angle of  $20^{\circ}$ , the hour angle difference is  $10'2$ .

Since  $\Delta t$  represents the change in altitude due to a change of  $1'$  of arc of hour angle, if  $\Delta t$  is multiplied by the hour angle difference the correction for hour angle difference is obtained. When this correction, together with the  $\Delta d$  correction, is applied to the tabulated altitude, the value thus obtained is the correct computed altitude for arguments of whole degree of latitude, the exact hour angle, and the exact declination of the body.

When successive  $\Delta t$  values have large differences in numerical value always interpolate forward from the lower entering hour angle, but never interpolate backward from the nearest entering hour angle.

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

By glancing at the values of altitude for tabulated hour angles between which the exact hour angle lies, it may be determined whether the altitude is increasing or decreasing as the tabulated hour angle approaches the exact hour angle. The correction is applied to the tabulated altitude, plus if the altitude is increasing, and minus if the altitude is decreasing.

The use of  $\Delta t$  is not in general recommended when the altitude of the observed body is greater than  $80^{\circ}$ .

When both the  $\Delta d$  and the  $\Delta t$  corrections have been made to the tabulated altitude, the sight is plotted from the following position:

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

Longitude.—The dead reckoning longitude.

**Example 3.**—At sea, September 21, 1940, during evening twilight, in dead reckoning position, Lat.  $60^{\circ} 05'3$  S., Long.  $20^{\circ} 30'0$  W., the navigator of the U. S. S. *Honolulu* observed the star Fomalhaut, bearing eastward, for line of position as follows: Sextant altitude,  $35^{\circ} 00'0$ ; I. C.,  $-1'5$ ; watch,  $6^h 06^m 10^s$ ; C-W,  $1^h 22^m 05^s$ ; chronometer, fast  $10^s$ ; height of eye, 44 feet.

Watch.....	18 <sup>h</sup> 06 <sup>m</sup> 10 <sup>s</sup>	Hs.....	35° 00'0	I. C.....	-1'5
C-W.....	1 22 05	Corr.....	-9.4	Alt. Corr.....	-1.4
Chronometer.....	19 28 15	Ho.....	34° 50'6	Ht. Eye C....	-6.5
C. C.....	-10			Corr.....	-9.4
G. C. T.....	19 28 05	Declination $29^{\circ} 56'1$ S. (from Nautical Almanac).			
G. H. A. for 0 <sup>h</sup> .....	16° 07'0				
Corr. for 19 <sup>h</sup> 28 <sup>m</sup> 05 <sup>s</sup> .....	292 49.3				
G. H. A.....	308 56.3 W.				
or.....	51 03.7 E.				
Longitude.....	20 30.0 W.				
L. H. A.....	71 33.7 E.				
Latitude.....	60° S. (Assume nearest whole degree.)				
Declination.....	29 56.1 S. (Enter table with lat. $60^{\circ}$ , dec. $30^{\circ}$ , same name as latitude.)				

		<i>Alt.</i>	$\Delta d$	$\Delta t$	<i>Az.</i>
		35° 01'7	-82	-50	89°6
$\Delta d$ correction for 3'9 declination.....	-3'2				
$\Delta t$ correction for 33.7 H. A.....	-16.9				
Total correction.....	-20.1	-20.1			

Hc.....	34 41.6
Ho.....	34 50.6

Alt. Int..... 9.0 miles toward S.  $89'6$  E. ( $090^{\circ}$ ).

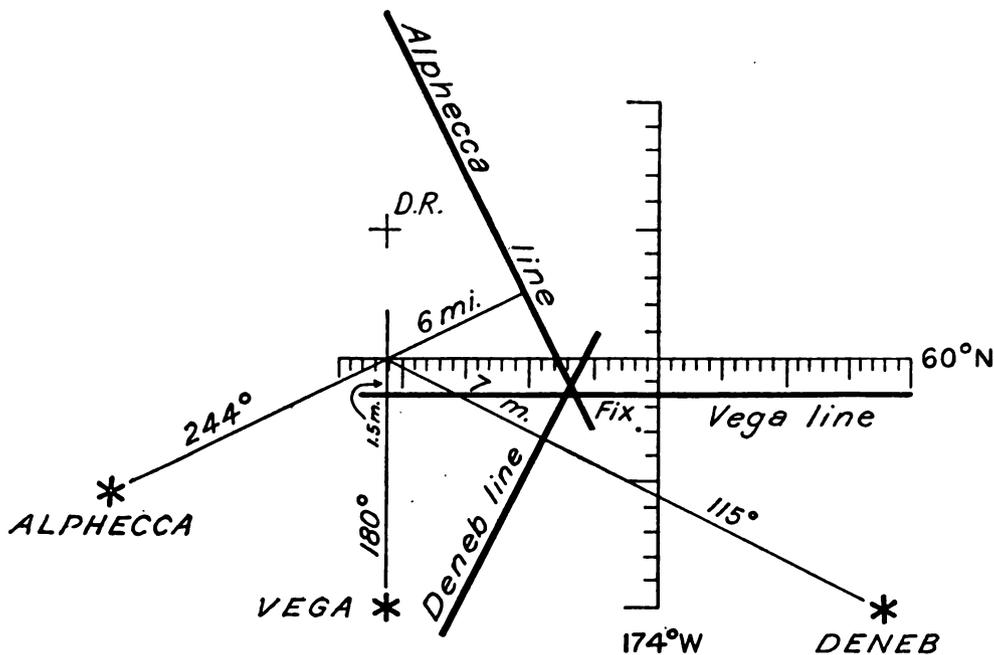
**Example 4.**—At sea, October 1, 1940, during evening twilight, in dead reckoning position, Lat.  $60^{\circ} 05' 0''$  N., Long.  $174^{\circ} 21' 1''$  W., the navigator of a steamship obtained nearly simultaneous observations of three stars for a fix of position as follows:

Star	G. C. T.	Declination	True altitude (Ho.)
Vega.....	5 <sup>h</sup> 29 <sup>m</sup> 12 <sup>s</sup> (Oct. 2)	$38^{\circ} 44' 1''$ N.	$68^{\circ} 45' 6''$
Alphecca.....	5 30 12 (Oct. 2)	$26^{\circ} 55' 1''$ N.	44 29.7
Deneb.....	5 31 00 (Oct. 2)	$45^{\circ} 04' 5''$ N.	66 35.4

VEGA		ALPHECCA		DENE B	
G. H. A. for 0 <sup>h</sup> G. C. T.	$91^{\circ} 49' 6''$		$137^{\circ} 31' 2''$		$60^{\circ} 42' 1''$
Corr. for 5 <sup>h</sup> 29 <sup>m</sup> 12 <sup>s</sup>	82 31.5	Corr. for 5 <sup>h</sup> 30 <sup>m</sup> 12 <sup>s</sup>	82 46.6	Corr. for 5 <sup>h</sup> 31 <sup>m</sup> 00 <sup>s</sup>	82 58.6
G. H. A.	$174^{\circ} 21' 1''$ W.		$220^{\circ} 17' 8''$ W.		$143^{\circ} 40' 7''$ W.
Longitude	$174^{\circ} 21' 1''$ W.		$174^{\circ} 21' 1''$ W.		$174^{\circ} 21' 1''$ W.
L. H. A.	0		$45^{\circ} 56' 7''$ W.		$30^{\circ} 40' 4''$ E.
Latitude	$60^{\circ}$ N.		$60^{\circ}$ N.		$60^{\circ}$ N.
Declination	$38^{\circ} 44' 1''$ N.		$26^{\circ} 55' 1''$ N.		$45^{\circ} 04' 5''$ N.

	Alt.	$\Delta d$	Az.		Alt.	$\Delta d$	$\Delta t$	Az.		Alt.	$\Delta d$	$\Delta t$	Az.
	$68^{\circ} 30' 0''$	+1.0	$180^{\circ}$		$44^{\circ} 38' 4''$	-86	+45	$115^{\circ} 7''$		$66^{\circ} 16' 0''$	+77	+45	$115^{\circ} 2''$
Ad corr. for 14' 1"	+14.1			$\Delta d$ corr. for 4' 9"	-4.2				$\Delta d$ corr. for 4' 5"	+3.5			
Hc.....	$68^{\circ} 44' 1''$			$\Delta t$ corr. for 3' 3"	+1.5				$\Delta t$ corr. for 19' 6"	+8.9			
Ho.....	$68^{\circ} 45' 6''$			Total corr...	-2.7				Total corr...	+12.4			
Alt. Int...	1.5 miles			Hc.....	$44^{\circ} 35' 7''$				Hc.....	$66^{\circ} 28' 4''$			
	toward $180^{\circ}$ .			Ho.....	$44^{\circ} 29' 7''$				Ho.....	$66^{\circ} 35' 4''$			
				Alt. Int...	6.0 miles away				Alt. Int...	7.0 miles toward			
					from N. $116^{\circ}$ W.					$115^{\circ}$ .			
					( $244^{\circ}$ ).								

The three sights are plotted from the nearest whole degree of latitude ( $60^{\circ}$  N.), and the dead reckoning longitude  $174^{\circ} 21' 1''$  W. The position of the vessel is then plotted in Lat.  $59^{\circ} 58' 5''$  N; Long.  $174^{\circ} 07' 7''$  W.



### (3) SOLUTION FOR POSITION LINE FROM THE DEAD RECKONING POSITION USING $\Delta d$ , $\Delta t$ , AND $\Delta L$

If the navigator desires to plot the sight from the dead reckoning position, in addition to the  $\Delta d$  and  $\Delta t$  corrections, a correction to the altitude for latitude (called the  $\Delta L$  correction) must be made. It will be necessary to correct either backward or forward for as much as 30' difference in latitude between the integral degree of latitude with which the table is entered and the dead reckoning latitude. At the end of this book will be found a  $\Delta L$  multiplication table from which corrections for odd minutes of latitude may be taken directly by inspection. The values in this table are the product of the  $\Delta L$  value times the odd minutes of latitude. The value  $\Delta L$  is the natural cosine of the azimuth, so that it is only necessary to know the azimuth of observation and the difference of latitude between dead reckoning position and integral latitude of table, as arguments for entry. In working from the dead reckoning position, corrections are made for  $\Delta d$  and  $\Delta t$  exactly as shown in the previous examples.

The L. H. A. for the dead reckoning longitude is found by applying the dead reckoning longitude to the G. H. A. Choose the integral tabular degree of latitude nearest to the dead reckoning latitude.

With selected integral degree of latitude, the L. H. A., and declination as arguments, take from the main table Alt.,  $\Delta d$ ,  $\Delta t$ , and Az. With the arguments azimuth and the difference of latitude between the dead reckoning position and the tabulated latitude of table, take the correction for latitude directly by inspection from the  $\Delta L$  multiplication table at the back of the book.

When the dead reckoning latitude is greater than the selected tabulated latitude, the correction from the  $\Delta L$  multiplication table is *minus*, but when the dead reckoning latitude is less than the tabulated latitude, the correction is *plus* providing the tabulated Az. is greater than  $90^\circ$ . Opposite corrections from the above are made when the Az. is less than  $90^\circ$ .

**Example 5.**—At sea, November 3, 1940, during evening twilight, in dead reckoning position, Lat.  $60^\circ 14'S.$ , Long.  $140^\circ 10'0 E.$ , simultaneous observations were taken of the star Nunki, sextant altitude,  $37^\circ 59'4$ , and of the star Achernar, sextant altitude,  $68^\circ 45'0$ ; I. C.,  $-1.5$ ; watch,  $7^h 59^m 10^s$ ; C-W,  $2^h 39^m 20^s$ ; chronometer, fast  $20^s$ ; height of eye, 40 feet. Find the position lines.

Watch.....	19 <sup>h</sup> 59 <sup>m</sup> 10 <sup>s</sup>	Nunki, declination.....	26° 22'2 S.
C-W.....	2 39 20	Achernar, declination..	57 32.3 S.
<hr/>			
Chronometer.....	10 38 30		
C. C.....	-20		
<hr/>			
G. C. T.....	10 38 10		

NUNKI		ACHERNAR	
G. H. A. for 0 <sup>h</sup> .....	119° 12'2	G. H. A. for 0 <sup>h</sup> .....	18° 12'9
Correction for 10 <sup>h</sup> 38 <sup>m</sup> 10 <sup>s</sup> .....	159 58.7	Correction for 10 <sup>h</sup> 38 <sup>m</sup> 10 <sup>s</sup> .....	159 58.7
<hr/>			
G. H. A.....	279 10.9 W.	G. H. A.....	178 11.6 W.
or.....	80 49.1 E.	or.....	181 48.4 E.
Longitude.....	140 10.0 E.	Longitude.....	140 10.0 E.
<hr/>			
L. H. A.....	59 20.9 W.	L. H. A.....	41 38.4 E.
Latitude.....	60 14.0 S.	Latitude.....	60 14.0 S.
Declination.....	26 22.2 S.	Declination.....	57 32.3 S.

	Alt.	$\Delta d$	$\Delta t$	Az.		Alt.	$\Delta d$	$\Delta t$	Az.
	38° 05'3	-84	-49	102°9		68° 26'5	+41	+49	78°1
$\Delta d$ corr. for 7'8.....	-6'6				$\Delta d$ corr. for 2'3.....	+0'9			
$\Delta t$ corr. for 20'9.....	-10.2				$\Delta t$ corr. for 21'6.....	+10.6			
$\Delta L$ corr. for 14'0.....	-3.1				$\Delta L$ corr. for 14'0.....	+2.9			
<hr/>					<hr/>				
Total correction.....	-19.9	-19.9			Total correction.....	+14.4	+14.4		
<hr/>					<hr/>				
Hc.....	37 45.4				Hc.....	68 40.9			
Ho.....	37 50.4				Ho.....	68 36.9			
<hr/>					<hr/>				
Alt. Int....	5.0 miles toward				Alt. Int....	4.0 miles away from			
	S. $103^\circ W.$ ( $283^\circ$ ).					S. $78^\circ E.$ ( $102^\circ$ ).			

From dead reckoning position, Lat.  $60^\circ 14'0 S.$ , Long.  $140^\circ 10'0 E.$ , lay down bearing of the star Nunki  $283^\circ$ , and the bearing of the star Achernar  $102^\circ$ . From the dead reckoning position plot 5.0 miles toward the star Nunki and 4.0 miles away from the star Achernar, then draw both position lines perpendicular to their respective azimuths.

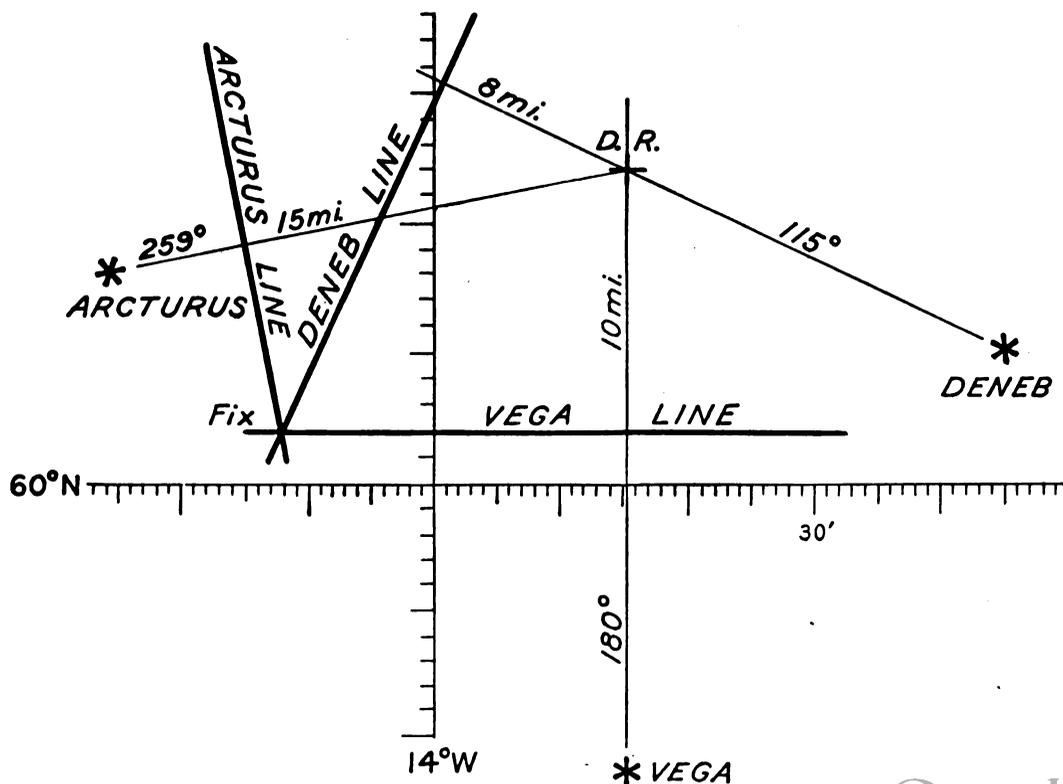
**Example 6.**—At sea, October 10, 1940, during evening twilight, a vessel was in dead reckoning position, Lat.  $60^{\circ} 12' 0''$  N., Long.  $13^{\circ} 44' 9''$  W., when the navigator obtained nearly simultaneous observations of the following stars:

Star	G. C. T.	Declination	True altitude (Ho.)
Vega.....	18 <sup>h</sup> 13 <sup>m</sup> 09 <sup>s</sup>	38° 44.1 N.	68° 42.1
Arcturus.....	18 13 59	19 29.6 N.	29 05.2
Deneb.....	18 14 12	45 04.5 N.	66 10.1

VEGA		ARCTURUS		DENEb	
G. H. A. for 0 <sup>h</sup> G. C. T.....	99° 42.7		165° 12.6		68° 35.2
Corr. for 18 <sup>h</sup> 13 <sup>m</sup> 09 <sup>s</sup> .....	274 02.2	Corr. for 18 <sup>h</sup> 13 <sup>m</sup> 59 <sup>s</sup> .....	274 14.7	Corr. for 18 <sup>h</sup> 14 <sup>m</sup> 12 <sup>s</sup> ..	274 17.9
G. H. A.....	373 44.9 W.		439 27.3 W.		342 53.1 W.
or.....	13 44.9 W.		79 27.3 W.		17 06.9 E.
D. R. Longitude.....	13 44.9 W.		13 44.9 W.		13 44.9 W.
L. H. A.....	0		65 42.4 W.		30 51.8 E.
Latitude.....	60 12.0 N.		60 12.0 N.		60 12.0 N.
Declination.....	38 44.1 N.		19 29.6 N.		45 04.5 N.

Alt.	$\Delta d$	Az.	Alt.	$\Delta d$	$\Delta t$	Az.	Alt.	$\Delta d$	$\Delta t$	Az.
68° 30' 0	+1.0	180°	28° 44.2	-85	+49	100° 9	66° 16' 0	+77	+45	115° 2
$\Delta d$ corr. for 14.1.....	+14.1	$\Delta d$ corr. for 0.4.....	-0.3	$\Delta d$ corr. for 4.5.....	+3.5					
$\Delta L$ corr. for 12.0.....	-12.0	$\Delta t$ corr. for 17.6.....	+8.6	$\Delta t$ corr. for 8.2.....	+3.7					
Hc.....	68 32.1	$\Delta L$ corr. for 12.0.....	-2.3	Total corr..	+2.1					
Ho.....	68 42.1	Total corr..	+6.0	Hc.....	66 18.1					
Alt. Int... 10.0 miles toward 180°.		Hc.....	28' 50.2	Ho.....	66 10.1					
		Ho.....	29 05.2	Alt. Int.. 15.0 miles toward N. 101° W. (259°).						
		Alt. Int.. 8.0 miles away from 115°.								

The three sights are plotted from the dead reckoning position and the vessel's "FIX" is found to be in latitude  $60^{\circ} 02' N.$ , longitude  $14^{\circ} 12' 3'' W.$



### STAR IDENTIFICATION

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

Combine the H. A. with the longitude to determine the G. H. A. of the star, or with the L. S. T. to obtain its R. A. Enter the Nautical Almanac with the declination and G. H. A., or the declination and R. A., and identify the star.

**Example 7.**—At sea, at dawn, September 21, 1940, in dead reckoning position, Lat.  $60^{\circ} 25' 2''$  S., Long.  $80^{\circ} 15' 0''$  W., an unknown star was observed bearing S.  $98^{\circ}$  E. (true): Sextant altitude,  $55^{\circ} 52' 9''$ ; I. C.,  $0' 0''$ ; height of eye, 36 feet; G. C. T.,  $11^h 07^m 12^s$ . Identify the star.

#### SOLUTION

Enter star identification table with approximate value of arguments Az.  $98^{\circ}$  and altitude  $56^{\circ}$  and take out:

<i>Dec.</i>		<i>H. A.</i>			
$43^{\circ}$ S.		$49^{\circ}$ E. or $3^h 16^m$ E.			
<i>To obtain G. H. A.</i>			<i>To obtain R. A.</i>		
Longitude.....	$80^{\circ} 15' 0''$ W.	G. C. T.....	$11^h 07^m$		
L. H. A.....	$49 00.0$ E.	(R. A. M. S. + $12^h$ )	$23 59$		
			<hr/>		
G. H. A.....	$31 15.0$ W.	G. S. T.....	$11 06$		
or.....	$391 15.0$ W. (for G. C. T. $11^h 07^m 12^s$ )	Longitude W.....	$5 21$		
N. A. correction....	$167 15.4$ W. (for $11^h 07^m 12^s$ )				
			<hr/>		
G. H. A.....	$223 59.6$ W. (for $0^h$ G. C. T.)	L. S. T.....	$5 45$		
			L. H. A.....	$3 16$ E.	
			<hr/>		
			R. A.....	$9 01$	

Enter the Nautical Almanac with the approximate declination  $43^{\circ}$  S., and G. H. A.  $223^{\circ} 59' 6''$  W. (Sept. 21) or R. A.  $9^h 01^m$ , and the star sought is Al Suhail.

### GREAT CIRCLE SAILING

Enter that section of the tables corresponding to the latitude of departure and find that declination column which is headed by a value nearest to the latitude of destination. From this column, and opposite that H. A. argument nearest the difference in longitude between the departure and the destination, extract the tabulated values of altitude (alt.),  $\Delta d$ ,  $\Delta t$ , and azimuth (az.), and solve for Hc.

Subtract the value of altitude (Hc) from  $90^{\circ}$  and convert the resultant into minutes of arc to obtain the Great Circle Distance in miles. The azimuth becomes the Great Circle Course and is measured from the elevated pole, east or west, to the destination.

**Example 8.**—Find the initial course and the distance between Bergen, Norway, and Seattle, Wash.

<i>Departure</i>		<i>Destination</i>	
Lat....	$60^{\circ} 24' 0''$ N.	Lat....	$47^{\circ} 36' 0''$ N.
Long..	$5^{\circ} 18' 0''$ E.	Long..	$122^{\circ} 20' 0''$ W.

#### SOLUTION

Diff. long.  $127^{\circ} 38'$ ; latitude of departure  $60^{\circ} 24' N.$ ; latitude of destination  $47^{\circ} 36' N.$   
Enter table with latitude  $60^{\circ}$ ; H. A.  $127^{\circ}$ ; declination  $47^{\circ}$  (same name as latitude).

	<i>Alt.</i>	<i><math>\Delta d</math></i>	<i><math>\Delta t</math></i>	<i>Az.</i>
	$25^{\circ} 21' 0''$	$+90$	$-30$	$37^{\circ} 1'$
$\Delta d$ corr. for $36'$ .....	$+32.4$			
$\Delta t$ corr. for $38'$ .....	$-11.4$			
$\Delta L$ corr. for $24'$ .....	$+19.2$			
		<hr/>		
Total correction.....	$+40.2$	$+40.2$		
		<hr/>		
Hc.....	$26 01.2$			
(Subtract)....	$90 00.0$			
		<hr/>		
Zenith distance.....	$63 58.8$	$= 3,838.8$ nautical miles, Great Circle Distance.		
Initial Great Circle Course N. $37^{\circ} 1'$ W.				

In those cases where the various arguments used cannot be found within these tables, resort must be had to other means without the tables, for finding a solution.

DECLINATION SAME NAME AS LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'	
	Alt.	Az.														
00	30 00.0	1.00 180.0	30 30.0	1.00 180.0	31 00.0	1.00 180.0	31 30.0	1.00 180.0	32 00.0	1.00 180.0	32 30.0	1.00 180.0	33 00.0	1.00 180.0	33 30.0	1.00 180.0
1	29 59.7	1.00 178.8	30 29.7	1.00 178.8	30 59.7	1.00 178.8	31 29.7	1.00 178.8	31 59.7	1.00 178.8	32 29.7	1.00 178.8	32 59.7	1.00 178.8	33 29.7	1.00 178.8
2	29 58.8	1.00 177.7	30 28.8	1.00 177.7	30 58.8	1.00 177.7	31 28.8	1.00 177.7	31 58.8	1.00 177.7	32 28.8	1.00 177.7	32 58.8	1.00 177.7	33 28.8	1.00 177.7
3	29 57.3	1.00 176.5	30 27.3	1.00 176.5	30 57.3	1.00 176.5	31 27.3	1.00 176.5	31 57.3	1.00 176.5	32 27.3	1.00 176.5	32 57.3	1.00 176.5	33 27.3	1.00 176.5
4	29 55.2	1.00 175.4	30 25.1	1.00 175.4	30 55.1	1.00 175.3	31 25.1	1.00 175.3	31 55.1	1.00 175.3	32 25.0	1.00 175.3	32 55.0	1.00 175.2	33 25.0	1.00 175.2
05	29 52.5	1.00 174.2	30 22.4	1.00 174.2	30 52.4	1.00 174.2	31 22.3	1.00 174.1	31 52.3	1.00 174.1	32 22.3	1.00 174.1	32 52.2	1.00 174.0	33 22.2	1.00 174.0
6	29 49.1	1.00 173.1	30 19.1	1.00 173.0	30 49.0	1.00 173.0	31 19.0	1.00 173.0	31 48.9	1.00 172.9	32 18.9	1.00 172.9	32 48.8	1.00 172.9	33 18.7	1.00 172.8
7	29 45.2	1.00 171.9	30 15.1	1.00 171.9	30 45.1	1.00 171.8	31 15.0	1.00 171.8	31 44.9	1.00 171.8	32 14.8	1.00 171.7	32 44.8	1.00 171.7	33 14.7	1.00 171.6
8	29 40.7	1.00 170.8	30 10.5	1.00 170.7	30 40.5	1.00 170.7	31 10.4	1.00 170.6	31 40.3	1.00 170.6	32 10.2	1.00 170.5	32 40.1	1.00 170.5	33 10.0	1.00 170.4
9	29 35.6	1.00 169.6	30 05.5	1.00 169.6	30 35.4	1.00 169.5	31 05.2	1.00 169.5	31 35.1	1.00 169.4	32 05.0	1.00 169.4	32 34.9	1.00 169.3	33 04.7	1.00 169.3
10	29 29.9	1.00 168.5	29 59.8	99 10 168.4	30 29.6	99 10 168.4	30 59.5	99 10 168.3	31 29.3	99 10 168.3	31 59.2	99 10 168.2	32 29.0	99 10 168.1	32 58.8	99 10 168.1
1	29 23.6	99 11 167.3	29 53.5	99 12 167.3	30 23.3	99 12 167.2	30 53.1	99 12 167.2	31 22.9	99 12 167.1	31 52.7	99 12 167.0	32 22.5	99 12 167.0	32 52.3	99 12 166.9
2	29 16.8	99 12 166.2	29 46.6	99 12 166.1	30 16.4	99 13 166.1	30 46.1	99 13 166.0	31 15.9	99 13 165.9	31 45.7	99 13 165.9	32 15.5	99 13 165.8	32 45.2	99 13 165.7
3	29 09.3	99 13 165.1	29 39.1	99 13 165.0	30 08.8	99 13 164.9	30 38.6	99 14 164.8	31 08.3	99 14 164.8	31 38.1	99 14 164.7	32 07.8	99 14 164.6	32 37.5	99 14 164.5
4	29 01.3	99 14 163.9	29 31.0	99 14 163.9	30 00.7	99 14 163.8	30 30.5	99 14 163.7	31 00.2	99 15 163.6	31 29.9	99 15 163.5	31 59.5	99 15 163.4	32 29.2	99 15 163.4
15	28 52.7	99 15 162.8	29 22.4	99 15 162.7	29 52.1	99 15 162.6	30 21.9	99 15 162.6	30 51.4	99 16 162.5	31 21.1	99 16 162.4	31 50.7	99 16 162.3	32 20.4	99 16 162.2
6	28 43.6	99 16 161.7	29 13.2	99 16 161.6	29 42.8	99 16 161.5	30 12.5	99 16 161.4	30 42.1	99 16 161.3	31 11.7	99 16 161.2	31 41.3	99 16 161.1	32 10.9	99 16 161.0
7	28 33.9	99 17 160.6	29 03.5	99 17 160.5	29 33.0	99 17 160.4	30 02.6	99 17 160.3	30 32.2	99 17 160.2	31 01.7	99 18 160.1	31 31.3	99 18 160.0	32 00.9	99 18 159.9
8	28 23.6	99 18 159.4	28 53.2	99 18 159.3	29 22.7	99 18 159.2	29 52.2	99 18 159.1	30 21.7	99 18 159.0	30 51.2	99 18 158.9	31 20.7	99 18 158.8	31 50.2	99 18 158.7
9	28 12.8	99 19 158.3	28 42.3	99 19 158.2	29 11.8	99 19 158.1	29 41.2	99 19 158.0	30 10.7	99 19 157.9	30 40.2	99 19 157.8	31 09.6	99 19 157.7	31 39.1	99 20 157.6
20	28 01.5	99 20 157.2	28 30.9	99 20 157.1	29 00.3	99 20 157.0	29 29.7	99 20 156.9	29 59.1	99 20 156.8	30 28.6	99 20 156.6	30 57.9	99 20 156.5	31 27.3	99 20 156.4
1	27 49.6	99 21 156.1	28 18.9	99 21 156.0	28 48.3	99 21 155.9	29 17.7	99 21 155.7	29 47.0	99 21 155.6	30 16.4	99 21 155.5	30 45.7	99 21 155.4	31 15.1	99 21 155.3
2	27 37.1	99 22 155.0	28 06.5	99 22 154.9	28 35.8	99 22 154.7	29 05.1	99 22 154.6	29 34.4	99 22 154.5	30 03.7	99 22 154.4	30 33.0	99 22 154.3	31 02.2	99 22 154.1
3	27 24.2	99 23 153.9	27 53.5	99 23 153.8	28 22.7	99 23 153.6	28 52.0	99 23 153.5	29 21.2	99 23 153.4	29 50.4	99 23 153.3	30 19.7	99 23 153.1	30 48.9	99 23 153.0
4	27 10.7	99 23 152.8	27 39.9	99 23 152.7	28 09.1	99 23 152.5	28 38.3	99 24 152.4	29 07.5	99 24 152.3	29 36.7	99 24 152.1	30 05.8	99 24 152.0	30 35.0	99 24 151.9
25	26 56.8	99 24 151.7	27 25.9	99 24 151.6	27 55.0	99 24 151.4	28 24.2	99 24 151.3	28 53.3	99 25 151.2	29 22.4	99 25 151.0	29 51.5	99 25 150.9	30 20.6	99 25 150.7
6	26 42.3	99 25 150.6	27 11.4	99 25 150.5	27 40.5	99 25 150.3	28 09.5	99 25 150.2	28 38.6	99 25 150.1	29 07.6	99 26 149.9	29 36.6	99 26 149.8	30 05.7	99 26 149.6
7	26 27.3	99 26 149.5	26 56.3	99 26 149.4	27 25.4	99 26 149.2	27 54.4	99 26 149.1	28 23.3	99 26 149.0	28 52.3	99 26 148.8	29 21.3	99 26 148.7	29 50.3	99 27 148.5
8	26 11.9	99 27 148.5	26 40.8	99 27 148.3	27 09.8	99 27 148.2	27 38.7	99 27 148.0	28 07.6	99 27 147.9	28 36.5	99 27 147.7	29 05.4	99 27 147.6	29 34.3	99 27 147.4
9	25 55.9	99 27 147.4	26 24.8	99 27 147.2	26 53.7	99 28 147.1	27 22.6	99 28 146.9	27 51.4	99 28 146.8	28 20.3	99 28 146.6	28 49.1	99 28 146.5	29 17.9	99 28 146.3
30	25 39.5	99 28 146.3	26 08.4	99 28 146.2	26 37.2	99 28 146.0	27 06.0	99 28 145.8	27 34.7	99 29 145.7	28 03.5	99 29 145.5	28 32.3	99 29 145.4	29 01.0	99 29 145.2
1	25 22.7	99 29 145.2	25 51.4	99 29 145.1	26 20.2	99 29 144.9	26 49.0	99 29 144.8	27 17.6	99 29 144.6	27 46.3	99 29 144.4	28 15.0	99 30 144.3	28 43.7	99 30 144.1
2	25 05.3	99 30 144.2	25 34.0	99 30 144.0	26 02.7	99 30 143.9	26 31.3	99 30 143.7	27 00.0	99 30 143.5	27 28.6	99 30 143.4	27 57.0	99 30 143.2	28 25.9	99 30 143.0
3	24 47.6	99 30 143.1	25 16.2	99 30 143.0	25 44.8	99 31 142.8	26 13.4	99 31 142.6	26 41.9	99 31 142.5	27 10.5	99 31 142.3	27 39.1	99 31 142.1	28 07.6	99 31 141.9
4	24 29.3	99 31 142.1	24 57.9	99 31 141.9	25 26.4	99 31 141.7	25 54.9	99 31 141.6	26 23.4	99 32 141.4	26 51.9	99 32 141.2	27 20.4	99 32 141.0	27 48.9	99 32 140.9
35	24 10.7	99 32 141.0	24 39.2	99 32 140.9	25 07.6	99 32 140.7	25 36.1	99 32 140.5	26 04.5	99 32 140.3	26 32.9	99 32 140.2	27 01.3	99 32 140.0	27 29.7	99 33 139.8
6	23 51.6	99 33 140.0	24 20.0	99 33 139.8	24 48.4	99 33 139.7	25 16.8	99 33 139.5	25 45.2	99 33 139.3	26 13.5	99 33 139.1	26 41.8	99 33 138.9	27 10.2	99 33 138.7
7	23 32.1	99 34 139.0	24 00.5	99 34 138.8	24 28.8	99 34 138.6	24 57.1	99 34 138.4	25 25.4	99 34 138.2	25 53.7	99 34 138.1	26 21.9	99 34 137.9	26 50.2	99 34 137.7
8	23 12.2	99 34 137.9	23 40.5	99 34 137.8	24 08.7	99 34 137.6	24 37.0	99 34 137.4	25 05.2	99 34 137.2	25 33.4	99 34 137.0	26 01.6	99 34 136.8	26 29.8	99 34 136.6
9	22 51.9	99 34 136.9	23 20.1	99 34 136.7	23 48.3	99 34 136.5	24 16.5	99 34 136.4	24 44.6	99 34 136.2	25 12.8	99 34 136.0	25 40.9	99 34 135.8	26 09.0	99 34 135.6
40	22 31.3	99 35 135.9	22 59.4	99 35 135.7	23 27.5	99 35 135.5	23 55.6	99 35 135.3	24 23.7	99 35 135.1	24 51.7	99 35 134.9	25 19.8	99 35 134.8	25 47.8	99 35 134.6
1	22 10.2	99 36 134.9	22 38.2	99 36 134.7	23 06.3	99 36 134.5	23 34.3	99 36 134.3	24 02.3	99 36 134.1	24 30.3	99 36 133.9	24 58.3	99 36 133.7	25 26.2	99 36 133.5
2	21 48.8	99 36 133.9	22 16.7	99 36 133.7	22 44.7	99 36 133.5	23 12.6	99 36 133.3	23 40.6	99 36 133.1	24 08.5	99 36 132.9	24 36.4	99 36 132.7	25 04.3	99 36 132.5
3	21 27.0	99 37 132.9	21 54.9	99 37 132.7	22 22.8	99 37 132.5	22 50.6	99 37 132.3	23 18.5	99 37 132.1	23 46.3	99 37 131.9	24 14.2	99 37 131.7	24 42.0	99 37 131.5
4	21 04.8	99 38 131.9	21 32.6	99 38 131.7	22 00.5	99 38 131.5	22 28.3	99 38 131.3	22 56.1	99 38 131.1	23 23.8	99 38 130.9	23 51.6	99 38 130.7	24 19.3	99 38 130.5
45	20 42.3	99 38 130.9	21 10.1	99 38 130.7	21 37.8	99 38 130.5	22 05.5	99 38 130.3	22 33.3	99 38 130.1	23 01.0	99 38 129.9	23 28.7	99 38 129.7	23 56.3	99 38 129.4
6	20 19.4	99 39 129.9	20 47.1	99 39 129.7	21 14.8	99 39 129.5	21 42.5	99 39 129.3	22 10.1	99 39 129.1	22 37.8	99 39 128.9	23 05.4	99 39 128.7	23 33.0	99 39 128.4
7	19 56.3	99 39 128.9	20 23.9	99 39 128.7	20 51.5	99 39 128.5	21 19.1	99 39 128.3	21 46.7	99 3						

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
00	30 00.0	180.0	29 30.0	180.0	29 00.0	180.0	28 30.0	180.0	28 00.0	180.0	27 30.0	180.0	27 00.0	180.0	26 30.0	180.0	00
1	29 59.7	178.8	29 29.7	178.9	28 59.7	178.9	28 29.7	178.9	27 59.7	178.9	27 29.7	178.9	26 59.7	178.9	26 29.7	178.9	1
2	29 58.8	177.7	29 28.8	177.7	28 58.8	177.7	28 28.8	177.7	27 58.8	177.7	27 28.8	177.7	26 58.8	177.7	26 28.8	177.7	2
3	29 57.3	176.5	29 27.3	176.6	28 57.3	176.6	28 27.3	176.6	27 57.3	176.6	27 27.3	176.6	26 57.4	176.6	26 27.4	176.6	3
4	29 55.2	175.4	29 25.2	175.4	28 55.2	175.4	28 25.2	175.5	27 55.3	175.5	27 25.3	175.5	26 55.3	175.5	26 25.3	175.5	4
05	29 52.5	174.2	29 22.5	174.3	28 52.5	174.3	28 22.6	174.3	27 52.6	174.3	27 22.6	174.4	26 52.7	174.4	26 22.7	174.4	05
6	29 49.1	173.1	29 19.2	173.1	28 49.2	173.2	28 19.3	173.2	27 49.4	173.2	27 19.4	173.2	26 49.5	173.2	26 19.5	173.3	6
7	29 45.2	171.9	29 15.3	172.0	28 45.4	172.0	28 15.4	172.0	27 45.5	172.1	27 15.6	172.1	26 45.7	172.1	26 15.7	172.2	7
8	29 40.7	170.8	29 10.8	170.8	28 40.9	170.9	28 11.0	170.9	27 41.1	171.0	27 11.2	171.0	26 41.3	171.1	26 11.4	171.1	8
9	29 35.6	169.6	29 05.7	169.7	28 35.9	169.7	28 06.0	169.8	27 36.1	169.8	27 06.2	169.9	26 36.3	169.9	26 06.4	170.0	9
10	29 29.9	168.5	29 00.1	168.5	28 30.2	168.6	28 00.4	168.7	27 30.5	168.7	27 00.7	168.8	26 30.8	168.8	26 00.9	168.9	10
1	29 23.6	167.3	28 53.8	167.4	28 24.0	167.5	27 54.2	167.5	27 24.4	167.6	26 54.5	167.7	26 24.7	167.7	25 54.9	167.8	1
2	29 16.8	166.2	28 47.0	166.3	28 17.2	166.3	27 47.4	166.4	27 17.6	166.5	26 47.8	166.5	26 18.0	166.6	25 48.2	166.7	2
3	29 09.3	165.1	28 39.6	165.1	28 09.8	165.2	27 40.1	165.3	27 10.3	165.4	26 40.6	165.4	26 10.8	165.5	25 41.0	165.6	3
4	29 01.3	164.0	28 31.6	164.0	28 01.9	164.1	27 32.2	164.2	27 02.5	164.2	26 32.7	164.3	26 03.0	164.4	25 33.3	164.5	4
15	28 52.7	162.8	28 23.1	162.9	27 53.4	163.0	27 23.7	163.1	26 54.0	163.1	26 24.4	163.2	25 54.8	163.3	25 25.0	163.4	15
6	28 43.6	161.7	28 14.0	161.8	27 44.3	161.9	27 14.7	161.9	26 45.1	162.0	26 15.4	162.1	25 45.8	162.2	25 16.0	162.3	6
7	28 33.9	160.6	28 04.3	160.6	27 34.7	160.7	27 05.1	160.8	26 35.5	160.9	26 05.9	161.0	25 36.3	161.1	25 06.7	161.2	7
8	28 23.6	159.4	27 54.1	159.5	27 24.5	159.6	26 55.0	159.7	26 25.5	159.8	25 55.9	159.9	25 26.3	160.0	24 56.8	160.1	8
9	28 12.8	158.3	27 43.3	158.4	27 13.8	158.5	26 44.3	158.6	26 14.8	158.7	25 45.3	158.8	25 15.8	158.9	24 46.3	159.0	9
20	28 01.5	157.2	27 32.0	157.3	27 02.6	157.4	26 33.1	157.5	26 03.7	157.6	25 34.2	157.7	25 04.8	157.8	24 35.3	157.9	20
1	27 49.6	156.1	27 20.2	156.2	26 50.8	156.3	26 21.4	156.4	25 52.0	156.5	25 22.6	156.6	24 53.2	156.8	24 23.8	156.9	1
2	27 37.1	155.0	27 07.8	155.1	26 38.5	155.2	26 09.2	155.3	25 39.8	155.5	25 10.5	155.6	24 41.1	155.7	24 11.8	155.8	2
3	27 24.2	153.9	26 54.9	154.0	26 25.7	154.1	25 56.4	154.3	25 27.1	154.4	24 57.8	154.5	24 28.5	154.6	23 59.2	154.7	3
4	27 10.7	152.8	26 41.5	152.9	26 12.3	153.0	25 43.1	153.2	25 13.9	153.3	24 44.6	153.4	24 15.4	153.5	23 46.1	153.7	4
25	26 56.8	151.7	26 27.6	151.8	25 58.5	152.0	25 29.3	152.1	25 00.1	152.2	24 31.0	152.4	24 01.7	152.5	23 32.6	152.6	25
6	26 42.3	150.6	26 13.2	150.7	25 44.1	150.9	25 15.0	151.0	24 45.9	151.2	24 16.8	151.3	23 47.7	151.4	23 18.5	151.5	6
7	26 27.3	149.5	25 58.3	149.7	25 29.3	149.8	25 00.2	149.9	24 31.2	150.1	24 02.1	150.2	23 33.1	150.4	23 04.0	150.5	7
8	26 11.9	148.5	25 42.9	148.6	25 13.9	148.7	24 45.0	148.9	24 16.0	149.0	23 47.0	149.2	23 18.0	149.3	22 49.0	149.4	8
9	25 55.9	147.4	25 27.0	147.5	24 58.1	147.7	24 29.2	147.8	24 00.3	148.0	23 31.4	148.1	23 02.4	148.3	22 33.5	148.4	9
30	25 39.5	146.3	25 10.7	146.5	24 41.9	146.6	24 13.0	146.8	23 44.2	146.9	23 15.3	147.1	22 46.4	147.2	22 17.6	147.4	30
1	25 22.7	145.2	24 53.9	145.4	24 25.1	145.6	23 56.4	145.7	23 27.6	145.9	22 58.8	146.0	22 30.0	146.2	22 01.1	146.3	1
2	25 05.3	144.2	24 36.6	144.3	24 07.9	144.5	23 39.2	144.7	23 10.5	144.8	22 41.8	145.0	22 13.0	145.1	21 44.3	145.3	2
3	24 47.6	143.1	24 18.9	143.3	23 50.3	143.5	23 21.7	143.6	22 53.0	143.8	22 24.3	143.9	21 55.7	144.1	21 27.0	144.3	3
4	24 29.3	142.1	24 00.8	142.3	23 32.2	142.4	23 03.6	142.6	22 35.1	142.8	22 06.5	142.9	21 37.9	143.1	21 09.1	143.2	4
35	24 10.7	141.0	23 42.2	141.2	23 13.7	141.4	22 45.2	141.7	22 16.5	141.9	21 48.2	142.1	21 19.5	142.2	20 51.1	142.2	35
6	23 51.6	140.0	23 23.2	140.2	22 54.8	140.4	22 26.3	140.5	21 57.9	140.7	21 29.4	140.9	21 01.0	141.0	20 32.5	141.2	6
7	23 32.1	139.0	23 03.8	139.2	22 35.4	139.3	22 07.1	139.5	21 38.7	139.7	21 10.3	139.9	20 41.9	140.0	20 13.5	140.2	7
8	23 12.2	137.9	22 44.0	138.1	22 15.7	138.3	21 47.4	138.5	21 19.1	138.7	20 50.8	138.8	20 22.4	139.0	19 54.1	139.2	8
9	22 51.9	136.9	22 23.7	137.1	21 55.5	137.3	21 27.3	137.5	20 59.1	137.7	20 30.8	137.8	20 02.5	138.0	19 34.3	138.2	9
40	22 31.3	135.9	22 03.1	136.1	21 35.0	136.3	21 06.8	136.5	20 38.7	136.6	20 10.5	136.8	19 42.3	137.0	19 14.1	137.2	40
1	22 10.2	134.9	21 42.1	135.1	21 14.1	135.3	20 46.0	135.5	20 17.9	135.6	19 49.8	135.8	19 21.6	136.0	18 53.5	136.2	1
2	21 48.3	133.9	21 20.8	134.1	20 52.8	134.3	20 24.7	134.5	19 56.7	134.7	19 28.7	134.8	19 00.6	135.0	18 32.6	135.2	2
3	21 27.0	132.9	20 59.0	133.1	20 31.1	133.3	20 03.2	133.5	19 35.2	133.7	19 07.2	133.9	18 39.2	134.1	18 11.2	134.3	3
4	21 04.8	131.9	20 36.9	132.1	20 09.1	132.3	19 41.2	132.5	19 13.3	132.7	18 45.4	132.9	18 17.5	133.1	17 49.6	133.3	4
45	20 42.3	130.9	20 14.5	131.1	19 46.7	131.3	19 18.9	131.5	18 51.1	131.7	18 23.2	131.9	17 55.4	132.1	17 27.5	132.3	45
6	20 19.4	129.9	19 51.7	130.1	19 24.0	130.3	18 56.3	130.5	18 28.5	130.7	18 00.7	130.9	17 33.0	131.1	17 05.2	131.3	6
7	19 56.3	128.9	19 28.6	129.1	19 01.0	129.3	18 33.3	129.5	18 05.6	129.7	17 37.9	129.9	17 10.2	130.1	16 42.5	130.3	7
8	19 32.8	127.9	19 05.2	128.2	18 37.6	128.4	18 10.0	128.6	17 42.4	128.8	17 14.7	129.0	16 47.1	129.2	16 19.4	129.4	8
9	19 09.0	127.0	18 41.4	127.2	18 13.9	127.4	17 46.4	127.6	17 18.8	127.8	16 51.3	128.0	16 23.7	128.2	15 56.1	128.4	9
50	18 44.8	126.0	18 17.4	126.2	17 49.9	126.4	17 22.5	126.6	16 55.0	126.9	16 27.5	127.1	16 00.0	127.3	15 32.4	127.5	50
1	18 20.4	125.0	17 53.0	125.3	17 25.6	125.5	16 58.2	125.7	16 30.8	125.9	16 03.4	126.1	15 35.9	126.3	15 08.5	126.5	1
2	17 55.7	124.1	17 28.4	124.3	17 01.1	124.5	16 33.7	124.7	16 06.4	124.9	15 39.0	125.1	15 11.6	125.3	14 44.2	125.5	2
3	17 30.7	123.1	17 03.5	123.3	16 36.2	123.5	16 08.9	123.7	15 41.6	123.9	15 14.3	124.1	14 47.0	124.3	14 19.7	124.5	3
4	17 05.5	122.2	16 38.3	122.4	16 11.1	122.6	15 43.9	122.8	15 16.6	123.1	14 49.4	123.3	14 22.1	123.5	13 54.9	123.7	4
55	16 39.9	121.2	16 12.8	121.5	15 45.7	121.7	15 18.5	121.9	14 51.4	122.1	14 24.2	122.3	13 57.0	122.6	13 29.8	122.8	55
6	16 14.2	120.3	15 47.1</														

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.															
00	34 00.0	1.001 180.0	34 30.0	1.001 180.0	35 00.0	1.001 180.0	35 30.0	1.001 180.0	36 00.0	1.001 180.0	36 30.0	1.001 180.0	37 00.0	1.001 180.0	37 30.0	1.001 180.0	00
1	33 59.7	1.002 178.8	34 29.7	1.002 178.8	34 59.7	1.002 178.8	35 29.7	1.002 178.8	35 59.7	1.002 178.8	36 29.7	1.002 178.8	36 59.7	1.002 178.8	37 29.7	1.002 178.8	1
2	33 58.7	1.003 177.6	34 28.7	1.003 177.6	34 58.7	1.003 177.6	35 28.7	1.003 177.6	35 58.7	1.003 177.6	36 28.7	1.003 177.6	36 58.7	1.003 177.6	37 28.7	1.003 177.6	2
3	33 57.2	1.004 176.4	34 27.2	1.004 176.4	34 57.2	1.004 176.4	35 27.2	1.004 176.4	35 57.2	1.004 176.4	36 27.2	1.004 176.4	36 57.2	1.004 176.4	37 27.2	1.004 176.4	3
4	33 55.0	1.005 175.2	34 24.9	1.005 175.2	34 54.9	1.005 175.1	35 24.9	1.005 175.1	35 54.9	1.005 175.1	36 24.8	1.005 175.1	36 54.8	1.005 175.0	37 24.8	1.005 175.0	4
05	33 52.1	1.006 174.0	34 22.1	1.006 174.0	34 52.1	1.006 173.9	35 22.0	1.006 173.9	35 52.0	1.006 173.9	36 21.9	1.006 173.8	36 51.9	1.006 173.8	37 21.8	1.006 173.8	05
6	33 48.7	1.007 172.8	34 18.6	1.007 172.8	34 48.6	1.007 172.7	35 18.5	1.007 172.7	35 48.4	1.007 172.6	36 18.4	1.007 172.6	36 48.3	1.007 172.6	37 18.2	1.007 172.5	6
7	33 44.6	1.008 171.6	34 14.5	1.008 171.5	34 44.4	1.008 171.5	35 14.4	1.008 171.5	35 44.3	1.008 171.4	36 14.2	1.008 171.4	36 44.1	1.008 171.3	37 14.0	1.008 171.3	7
8	33 39.9	1.009 170.4	34 09.8	1.009 170.3	34 39.7	1.009 170.3	35 09.6	1.009 170.2	35 39.5	1.009 170.2	36 09.4	1.009 170.1	36 39.3	1.009 170.1	37 09.1	1.009 170.0	8
9	33 34.6	1.010 169.2	34 04.5	1.010 169.1	34 34.3	1.010 169.1	35 04.2	1.010 169.0	35 34.1	1.010 169.0	36 03.9	1.010 168.9	36 33.8	1.010 168.9	37 03.6	1.010 168.8	9
10	33 28.7	99 11 168.0	33 58.5	99 11 168.0	34 28.3	99 11 167.9	34 58.2	99 11 167.8	35 28.0	99 11 167.8	35 57.8	99 11 167.7	36 27.7	99 11 167.6	36 57.5	99 11 167.6	10
1	33 22.1	99 12 166.8	33 51.9	99 12 166.8	34 21.7	99 12 166.7	34 51.5	99 12 166.6	35 21.3	99 12 166.5	35 51.1	99 12 166.5	36 20.9	99 12 166.4	36 50.7	99 12 166.3	1
2	33 15.0	99 13 165.6	33 44.8	99 13 165.6	34 14.5	99 13 165.5	34 44.3	99 13 165.4	35 14.0	99 13 165.3	35 43.8	99 13 165.3	36 13.6	99 13 165.2	36 43.3	99 13 165.1	2
3	33 07.3	99 14 164.5	33 37.0	99 14 164.4	34 06.7	99 14 164.3	34 36.4	99 14 164.2	35 06.1	99 14 164.1	35 35.9	99 14 164.0	36 05.6	99 14 164.0	36 35.3	99 14 163.9	3
4	32 58.9	99 15 163.3	33 28.6	99 15 163.2	33 58.3	99 15 163.1	34 28.0	99 15 163.0	34 57.6	99 15 162.9	35 27.3	99 15 162.8	35 57.0	99 15 162.7	36 26.6	99 15 162.7	4
15	32 50.0	99 16 162.1	33 19.6	99 16 162.0	33 49.3	99 16 161.9	34 19.9	99 16 161.8	34 48.5	99 16 161.7	35 18.2	99 16 161.6	35 47.8	99 16 161.5	36 17.4	99 16 161.4	15
6	32 40.5	99 17 160.9	33 10.1	99 17 160.8	33 39.7	99 17 160.7	34 09.3	99 17 160.6	34 38.8	99 17 160.5	35 08.4	99 17 160.4	35 38.0	99 17 160.3	36 07.5	99 17 160.2	6
7	32 30.4	98 18 159.8	32 59.9	98 18 159.7	33 29.5	98 18 159.6	33 59.0	98 18 159.5	34 28.5	98 18 159.3	34 58.1	98 18 159.2	35 27.6	98 18 159.1	35 57.1	98 18 159.0	7
8	32 19.7	98 19 158.6	32 49.2	98 19 158.5	33 18.7	98 19 158.4	33 48.2	98 19 158.3	34 17.7	98 19 158.2	34 47.7	98 19 158.0	35 16.6	98 19 157.9	35 46.1	98 19 157.8	8
9	32 08.5	98 20 157.4	32 38.0	98 20 157.3	33 07.4	98 20 157.2	33 36.8	98 20 157.1	34 06.2	98 20 157.0	34 35.6	98 20 156.9	35 05.0	98 20 156.7	35 34.4	98 20 156.6	9
20	31 56.7	98 21 156.3	32 26.1	98 21 156.2	32 55.5	98 21 156.1	33 24.9	98 21 155.9	33 54.2	98 21 155.8	34 23.6	98 21 155.7	34 52.9	98 21 155.6	35 22.2	98 21 155.4	20
1	31 44.4	98 22 155.1	32 13.7	98 22 155.0	32 43.0	98 22 154.9	33 12.3	98 22 154.8	33 41.6	98 22 154.6	34 10.9	98 22 154.5	34 40.2	98 22 154.4	35 09.5	98 22 154.2	1
2	31 31.5	98 22 154.0	32 00.8	98 22 153.9	32 30.0	98 22 153.7	32 59.3	98 22 153.6	33 28.5	98 22 153.5	33 57.7	98 22 153.3	34 27.0	98 22 153.2	34 56.2	98 22 153.1	2
3	31 18.1	98 23 152.9	31 47.3	98 23 152.7	32 16.5	98 23 152.6	32 45.7	98 23 152.5	33 14.8	98 23 152.3	33 44.0	98 23 152.2	34 13.2	98 23 152.0	34 42.3	98 23 151.9	3
4	31 04.1	98 24 151.7	31 33.3	98 24 151.6	32 02.4	98 24 151.4	32 31.5	98 24 151.3	33 00.6	98 24 151.2	33 29.7	98 24 151.0	33 58.8	98 24 150.9	34 27.9	98 24 150.7	4
25	30 49.7	98 25 150.6	31 18.7	98 25 150.5	31 47.8	98 25 150.3	32 16.9	98 25 150.2	32 45.9	98 25 150.0	33 14.9	98 25 149.9	33 44.0	98 25 149.7	34 13.0	98 25 149.6	25
6	30 34.7	98 26 149.5	31 03.7	98 26 149.3	31 32.7	98 26 149.2	32 01.7	98 26 149.0	32 30.7	98 26 148.9	33 08.6	98 26 148.7	33 28.6	98 26 148.6	33 57.5	98 26 148.4	6
7	30 19.2	98 27 148.4	30 48.1	98 27 148.2	31 17.1	98 27 148.0	31 46.0	98 27 147.9	32 14.9	98 27 147.7	32 43.8	98 27 147.6	33 12.7	98 27 147.4	33 41.5	98 27 147.3	7
8	30 03.2	98 27 147.2	30 32.1	98 28 147.1	31 00.9	98 28 146.9	31 29.8	98 28 146.8	31 58.6	98 28 146.6	32 27.4	98 28 146.4	32 56.3	98 28 146.3	33 25.0	98 28 146.1	8
9	29 46.7	98 28 146.1	30 15.5	98 28 146.0	30 44.3	98 28 145.8	31 13.1	98 28 145.6	31 41.9	98 28 145.5	32 10.6	98 28 145.3	32 39.4	98 28 145.1	33 08.1	98 28 145.0	9
30	29 29.8	98 29 145.0	29 58.5	98 29 144.9	30 27.2	98 29 144.7	30 55.9	98 29 144.5	31 24.6	98 30 144.4	31 53.3	98 30 144.2	32 22.0	98 30 144.0	32 50.6	98 30 143.8	30
1	29 12.4	98 30 143.9	29 41.0	98 30 143.8	30 09.7	98 30 143.6	30 38.3	98 30 143.4	31 06.9	98 30 143.3	31 35.5	98 30 143.1	32 04.1	98 31 142.9	32 32.7	98 31 142.7	1
2	28 54.5	98 31 142.9	29 23.1	98 31 142.7	29 51.6	98 31 142.5	30 20.2	98 31 142.3	30 48.7	98 31 142.1	31 17.3	98 31 142.0	31 45.8	98 31 141.8	32 14.3	98 31 141.6	2
3	28 36.1	98 31 141.8	29 04.6	98 31 141.6	29 33.1	98 31 141.4	30 01.6	98 31 141.2	30 30.1	98 31 141.0	30 58.6	98 31 140.9	31 27.0	98 31 140.7	31 55.4	98 31 140.5	3
4	28 17.3	98 32 140.7	28 45.8	98 32 140.5	29 14.2	98 32 140.3	29 42.6	98 32 140.1	30 11.0	98 32 140.0	30 39.4	98 32 139.8	31 07.8	98 32 139.6	31 36.1	98 32 139.4	4
35	27 58.1	98 33 139.6	28 26.5	98 33 139.4	28 54.8	98 33 139.2	29 23.2	98 33 139.1	29 51.5	98 33 138.9	30 19.8	98 33 138.7	30 48.1	98 33 138.5	31 16.4	98 33 138.3	35
6	27 38.5	98 33 138.6	28 06.8	98 34 138.4	28 35.0	98 34 138.2	29 03.3	98 34 138.0	29 31.6	98 34 137.8	29 59.8	98 34 137.6	30 28.0	98 34 137.4	30 56.2	98 34 137.2	6
7	27 18.4	98 34 137.5	27 46.6	98 34 137.3	28 14.8	98 34 137.1	28 43.0	98 34 136.9	29 11.2	98 34 136.7	29 39.3	98 34 136.5	30 07.5	98 34 136.3	30 35.6	98 34 136.1	7
8	26 57.9	98 35 136.4	27 26.1	98 35 136.2	27 54.2	98 35 136.1	28 22.3	98 35 135.9	28 50.4	98 35 135.7	29 18.5	98 35 135.5	29 46.6	98 35 135.2	30 14.6	98 35 135.0	8
9	26 37.1	98 35 135.4	27 05.1	98 35 135.2	27 33.2	98 35 135.0	28 01.2	98 35 134.8	28 29.3	98 35 134.6	28 57.3	98 35 134.4	29 25.2	98 35 134.2	29 53.2	98 35 134.0	9
40	26 15.8	98 36 134.4	26 43.8	98 36 134.2	27 11.8	98 36 134.0	27 39.8	98 36 133.7	28 07.7	98 37 133.5	28 35.6	98 37 133.3	29 03.5	98 37 133.1	29 31.4	98 37 132.9	40
1	25 54.2	98 37 133.3	26 22.1	98 37 133.1	26 50.0	98 37 132.9	27 17.9	98 37 132.7	27 45.8	98 37 132.5	28 13.6	98 37 132.3	28 41.5	98 37 132.1	29 09.3	98 37 131.9	1
2	25 32.2	98 37 132.3	26 00.0	98 37 132.1	26 27.8	98 38 131.9	26 55.7	98 38 131.7	27 23.5	98 38 131.5	27 51.2	98 38 131.2	28 19.0	98 38 131.0	28 46.7	98 38 130.8	2
3	25 09.8	98 38 131.3	25 37.6	98 38 131.1	26 05.3	98 38 130.8	26 33.1	98 38 130.6	27 00.8	98 38 130.4	27 28.5	98 38 130.2	27 56.2	98 38 130.0	28 23.9	98 38 129.8	3
4	24 47.1	98 38 130.2	25 15.8	98 39 130.0	25 42.5	98 39 129.8	26 10.1	98 39 129.6	26 37.8	98 39 129.4	27 05.4	98 39 129.2	27 33.0	98 39 129.0	28 00.6	98 39 128.7	4
45	24 24.0	98 39 129.2	24 51.6	98 39 129.0	25 19.3	98 39 128.8	25 46.9	98 39 128.6	26 14.4	98 39 128.4	26 42.0	98 40 128.2	27 09.5	98 40 127.9	27 37.1	98 40	

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.															
00	26 00.0	1.00 180.0	25 30.0	1.00 180.0	25 00.0	1.00 180.0	24 30.0	1.00 180.0	24 00.0	1.00 180.0	23 30.0	1.00 180.0	23 00.0	1.00 180.0	22 30.0	1.00 180.0	00
1	25 59.7	1.001 178.9	25 29.7	1.001 178.9	24 59.7	1.001 178.9	24 29.7	1.001 178.9	23 59.7	1.001 178.9	23 29.7	1.001 178.9	22 59.7	1.001 178.9	22 29.7	1.001 178.9	1
2	25 58.8	1.002 177.8	25 28.8	1.002 177.8	24 58.8	1.002 177.8	24 28.8	1.002 177.8	23 58.8	1.002 177.8	23 28.8	1.002 177.8	22 58.8	1.002 177.8	22 28.8	1.002 177.8	2
3	25 57.4	1.003 176.7	25 27.4	1.003 176.7	24 57.4	1.003 176.7	24 27.4	1.003 176.7	23 57.4	1.003 176.7	23 27.4	1.003 176.7	22 57.5	1.003 176.8	22 27.5	1.003 176.8	3
4	25 55.4	1.004 175.6	25 25.4	1.004 175.6	24 55.4	1.004 175.6	24 25.4	1.004 175.6	23 55.4	1.004 175.6	23 25.4	1.004 175.6	22 55.5	1.004 175.7	22 25.5	1.004 175.7	4
05	25 52.7	1.005 174.5	25 22.8	1.005 174.5	24 52.8	1.005 174.5	24 22.8	1.005 174.5	23 52.9	1.005 174.6	23 22.9	1.005 174.6	22 53.0	1.005 174.6	22 23.0	1.005 174.6	05
6	25 49.6	1.006 173.3	25 19.6	1.006 173.3	24 49.7	1.006 173.3	24 19.7	1.006 173.3	23 49.8	1.006 173.5	23 19.8	1.006 173.5	22 49.9	1.006 173.5	22 19.9	1.006 173.6	6
7	25 45.8	1.007 172.2	25 15.9	1.007 172.2	24 45.9	1.007 172.2	24 16.0	1.007 172.2	23 46.1	1.007 172.4	23 16.1	1.007 172.4	22 46.2	1.007 172.5	22 16.3	1.007 172.5	7
8	25 41.5	1.008 171.1	25 11.5	1.008 171.1	24 41.6	1.008 171.1	24 11.7	1.008 171.1	23 41.8	1.008 171.3	23 11.9	1.008 171.3	22 42.0	1.008 171.4	22 12.1	1.008 171.4	8
9	25 36.6	1.009 170.0	25 06.7	1.009 170.0	24 36.8	1.009 170.0	24 06.9	1.009 170.2	23 37.0	1.009 170.2	23 07.1	1.009 170.3	22 37.2	1.009 170.3	22 07.3	1.009 170.4	9
10	25 31.1	1.010 168.9	25 01.2	1.010 168.9	24 31.4	1.010 168.9	24 01.5	1.010 169.0	23 31.6	1.010 169.1	23 01.8	1.010 169.2	22 31.9	1.010 169.2	22 02.0	1.010 169.3	10
1	25 25.0	99 11 167.8	24 55.2	99 11 167.9	24 25.4	99 11 168.0	23 55.5	99 11 168.1	23 25.7	99 11 168.1	22 55.9	99 11 168.1	22 26.0	99 11 168.2	21 56.2	99 11 168.2	1
2	25 18.4	99 12 166.7	24 48.6	99 12 166.8	24 18.8	99 12 166.9	23 49.0	99 12 166.9	23 19.2	99 12 167.0	22 49.4	99 12 167.0	22 19.6	99 12 167.1	21 49.8	99 12 167.2	2
3	25 11.3	99 13 165.6	24 41.5	99 13 165.7	24 11.7	99 13 165.8	23 42.0	99 13 165.8	23 12.2	99 13 165.9	22 42.4	99 13 166.0	22 12.6	99 13 166.0	21 42.9	99 13 166.1	3
4	25 03.6	99 14 164.5	24 33.8	99 14 164.6	24 04.1	99 14 164.7	23 34.4	99 14 164.8	23 04.6	99 14 164.8	22 34.9	99 14 164.9	22 05.1	99 14 165.0	21 35.4	99 14 165.1	4
15	24 55.3	99 15 163.5	24 25.6	99 15 163.5	23 55.9	99 15 163.6	23 26.2	99 15 163.7	22 56.5	99 15 163.8	22 26.8	99 15 163.8	21 57.1	99 15 163.9	21 27.4	99 15 164.0	15
6	24 46.5	99 16 162.4	24 16.8	99 16 162.5	23 47.2	99 16 162.5	23 17.5	99 16 162.6	22 47.8	99 16 162.7	22 18.2	99 16 162.8	21 48.5	99 16 162.9	21 18.8	99 16 163.0	6
7	24 37.1	99 16 161.3	24 07.5	99 16 161.4	23 37.9	99 16 161.5	23 08.3	99 16 161.6	22 38.7	99 16 161.6	22 09.0	99 16 161.7	21 39.4	99 16 161.8	21 09.8	99 16 161.9	7
8	24 27.2	99 17 160.2	23 57.7	99 17 160.3	23 28.1	99 17 160.4	22 58.5	99 17 160.5	22 28.9	99 17 160.6	21 59.4	99 17 160.7	21 29.8	99 17 160.8	21 00.2	99 17 160.8	8
9	24 16.8	98 18 159.1	23 47.3	98 18 159.2	23 17.8	98 18 159.3	22 48.2	98 18 159.4	22 18.7	98 18 159.5	21 49.2	98 18 159.6	21 19.6	98 18 159.7	20 50.1	98 18 159.8	9
20	24 05.9	98 19 158.1	23 36.4	98 19 158.2	23 06.9	98 19 158.3	22 37.4	98 19 158.4	22 07.9	98 19 158.5	21 38.5	98 19 158.6	21 09.0	98 19 158.7	20 39.5	98 19 158.8	20
1	23 54.4	98 20 157.0	23 25.0	98 20 157.1	22 55.5	98 20 157.2	22 26.1	98 20 157.3	21 56.7	98 20 157.4	21 27.2	98 20 157.5	20 57.8	98 19 157.6	20 28.4	98 19 157.7	1
2	23 42.4	98 21 155.9	23 13.0	98 21 156.0	22 43.6	98 21 156.1	22 14.3	98 21 156.2	21 44.9	98 20 156.4	21 15.5	98 20 156.5	20 46.1	98 20 156.6	20 16.7	98 20 156.7	2
3	23 29.9	98 22 154.8	23 00.6	98 22 155.0	22 31.3	98 22 155.1	22 01.9	98 21 155.2	21 32.6	98 21 155.3	21 03.3	98 21 155.4	20 33.9	98 21 155.5	20 04.6	98 21 155.6	3
4	23 16.9	98 22 153.8	22 47.6	98 22 153.9	22 18.4	98 22 154.0	21 49.1	98 22 154.1	21 19.8	98 22 154.3	20 50.5	98 22 154.4	20 21.3	98 22 154.5	19 52.0	98 22 154.6	4
25	23 03.4	97 23 152.7	22 34.2	97 23 152.9	22 05.0	97 23 153.0	21 35.8	97 23 153.1	21 06.6	97 23 153.2	20 37.3	97 23 153.3	20 08.1	97 23 153.5	19 38.9	97 23 153.6	25
6	22 49.4	97 24 151.7	22 20.3	97 24 151.8	21 51.1	97 24 151.9	21 22.0	97 24 152.1	20 52.8	97 24 152.2	20 23.6	97 24 152.3	19 54.5	97 24 152.4	19 25.3	97 24 152.6	6
7	22 34.9	97 25 150.6	22 05.8	97 25 150.8	21 36.8	97 25 150.9	21 07.7	97 25 151.0	20 38.7	97 25 151.2	20 09.5	97 25 151.3	19 40.3	97 25 151.4	19 11.2	97 25 151.5	7
8	22 20.0	97 26 149.6	21 51.0	97 26 149.7	21 21.9	97 26 149.9	20 52.9	97 26 150.0	20 23.9	97 26 150.1	19 54.8	97 26 150.3	19 25.8	97 26 150.4	18 56.7	97 26 150.5	8
9	22 04.6	97 26 148.5	21 35.6	97 26 148.7	21 06.6	97 26 148.8	20 37.7	97 26 149.0	20 08.7	97 26 149.1	19 39.7	97 26 149.2	19 10.7	97 26 149.4	18 41.7	97 26 149.5	9
30	21 48.7	96 27 147.5	21 19.8	96 27 147.6	20 50.9	96 27 147.8	20 22.0	96 27 147.9	19 53.0	96 27 148.1	19 24.1	96 27 148.2	18 55.2	96 27 148.4	18 26.2	96 27 148.5	30
1	21 32.3	96 28 146.5	21 03.5	96 28 146.6	20 34.6	96 28 146.8	20 05.8	96 28 146.9	19 36.9	96 28 147.1	19 08.1	96 27 147.2	18 39.2	96 27 147.3	18 10.3	96 27 147.5	1
2	21 15.6	96 29 145.4	20 46.8	96 29 145.6	20 18.0	96 29 145.7	19 49.2	96 29 145.9	19 20.4	96 29 146.0	18 51.6	96 29 146.2	18 22.8	96 29 146.3	17 54.0	96 29 146.5	2
3	20 58.3	96 29 144.4	20 29.6	96 29 144.6	20 00.9	96 29 144.7	19 32.2	96 29 144.9	19 03.4	96 29 145.0	18 34.7	96 29 145.2	18 06.0	96 29 145.3	17 37.2	96 29 145.5	3
4	20 40.6	96 30 143.4	20 12.0	96 30 143.6	19 43.3	96 30 143.7	19 14.7	96 30 143.9	18 46.0	96 30 144.0	18 17.4	96 30 144.2	17 48.7	96 30 144.3	17 20.0	96 30 144.5	4
35	20 22.5	96 31 142.4	19 53.9	96 31 142.5	19 25.4	96 31 142.7	18 56.8	96 31 142.9	18 28.2	96 30 143.0	17 59.6	96 30 143.2	17 31.0	96 30 143.3	17 02.4	96 30 143.5	35
6	20 04.0	96 32 141.4	19 35.5	96 31 141.5	19 07.0	96 31 141.7	18 38.5	96 31 141.9	18 10.0	96 31 142.0	17 41.4	96 31 142.2	17 12.9	96 31 142.2	16 44.3	96 31 142.5	6
7	19 45.1	96 32 140.4	19 16.6	96 32 140.5	18 48.2	96 32 140.7	18 19.7	96 32 140.9	17 51.3	96 32 141.0	17 22.8	96 32 141.2	16 54.3	96 32 141.4	16 25.9	96 31 141.5	7
8	19 25.7	96 33 139.4	18 57.4	96 33 139.5	18 29.0	96 33 139.7	18 00.6	96 33 139.9	17 32.2	96 33 140.0	17 03.8	96 33 140.2	16 35.4	96 33 140.4	16 07.0	96 33 140.6	8
9	19 06.0	96 34 138.4	18 37.4	96 33 138.5	18 09.4	96 33 138.7	17 41.1	96 33 138.9	17 12.8	96 33 139.1	16 44.4	96 33 139.2	16 16.1	96 33 139.4	15 47.7	96 33 139.6	9
40	18 45.9	96 34 137.4	18 17.6	96 34 137.6	17 49.4	96 34 137.7	17 21.2	96 34 137.9	16 52.9	96 34 138.1	16 24.7	96 34 138.3	15 56.4	96 34 138.4	15 28.1	96 33 138.6	40
1	18 25.4	96 35 136.4	17 57.2	96 35 136.6	17 29.0	96 35 136.7	17 00.9	96 35 136.9	16 32.7	96 34 137.1	16 04.5	96 34 137.3	15 36.3	96 34 137.5	15 08.1	96 34 137.6	1
2	18 04.5	96 35 135.4	17 36.4	96 35 135.6	17 08.3	96 35 135.8	16 40.2	96 35 136.0	16 12.1	96 35 136.1	15 44.0	96 35 136.3	15 15.8	96 35 136.5	14 47.7	96 35 136.7	2
3	17 43.2	96 36 134.4	17 15.2	96 36 134.6	16 47.2	96 36 134.8	16 19.2	96 36 135.0	15 51.1	96 36 135.2	15 23.0	96 36 135.3	14 55.0	96 36 135.5	14 26.9	96 36 135.7	3
4	17 21.6	96 37 133.4	16 53.7	96 36 133.6	16 25.7	96 36 133.8	15 57.8	96 36 134.0	15 29.8	96 36 134.2	15 01.8	96 36 134.4	14 33.8	96 36 134.6	14 05.8	96 36 134.8	4
45	16 59.7	96 37 132.5	16 31.8	96 37 132.7	16 03.9	96 37 132.9	15 36.0	96 37 133.0	15 08.1	96 37 133.2	14 40.2	96 37 133.4	14 12.2	96 36 133.6	13 44.3	96 36	

DECLINATION SAME NAME AS LATITUDE

Lat. 60°

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 00 to 90 degrees.

Vertical text on the left margin: 2 2 2 2 3 3 3 3 4 4 5 5 6 6 7 7 8 8 9 J F A A J J A S C N T

Vertical text on the right margin: H.A. 91 2 3 4 5 6 7 8 9

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Az.															
00	22 00.0	1.00 180.0	21 30.0	1.00 180.0	21 00.0	1.00 180.0	20 30.9	1.00 180.0	20 00.9	1.00 180.0	19 30.9	1.00 180.0	19 00.9	1.00 180.0	18 30.9	1.00 180.0	00
1	21 59.7	1.00 178.9	21 29.7	1.00 178.9	20 59.7	1.00 178.9	20 29.7	1.00 178.9	19 59.7	1.00 179.0	19 29.7	1.00 179.0	18 59.7	1.00 179.0	18 29.7	1.00 179.0	1
2	21 58.9	1.02 177.9	21 28.9	1.02 177.9	20 58.9	1.02 177.9	20 28.9	1.02 177.9	19 58.9	1.02 177.9	19 28.9	1.02 177.9	18 58.9	1.02 177.9	18 28.9	1.02 177.9	2
3	21 57.5	1.03 176.8	21 27.5	1.03 176.8	20 57.5	1.03 176.8	20 27.5	1.03 176.8	19 57.5	1.03 176.9	19 27.5	1.03 176.9	18 57.6	1.03 176.9	18 27.6	1.03 176.9	3
4	21 55.5	1.04 175.7	21 25.6	1.04 175.8	20 55.6	1.04 175.8	20 25.6	1.04 175.8	19 55.6	1.04 175.8	19 25.6	1.04 175.8	18 55.7	1.04 175.8	18 25.7	1.04 175.9	4
05	21 53.0	1.05 174.7	21 23.0	1.05 174.7	20 53.1	1.05 174.7	20 23.1	1.05 174.7	19 53.1	1.05 174.8	19 23.2	1.05 174.8	18 53.2	1.05 174.8	18 23.2	1.05 174.8	05
6	21 49.9	1.06 173.6	21 20.0	1.06 173.6	20 50.0	1.06 173.7	20 20.0	1.06 173.7	19 50.0	1.06 173.7	19 20.2	1.06 173.7	18 50.2	1.06 173.8	18 20.3	1.06 173.8	6
7	21 46.3	1.07 172.5	21 16.4	1.07 172.6	20 46.5	1.07 172.6	20 16.5	1.07 172.6	19 46.6	1.07 172.7	19 16.6	1.07 172.7	18 46.7	1.07 172.7	18 16.8	1.07 172.8	7
8	21 42.2	1.08 171.5	21 12.2	1.08 171.5	20 42.3	1.08 171.5	20 12.4	1.08 171.6	19 42.5	1.08 171.6	19 12.6	1.08 171.7	18 42.6	1.08 171.7	18 12.7	1.08 171.7	8
9	21 37.4	1.09 170.4	21 07.5	1.09 170.5	20 37.6	1.09 170.5	20 07.7	1.09 170.5	19 37.8	1.09 170.6	19 08.0	1.09 170.6	18 38.1	1.09 170.7	18 08.2	1.09 170.7	9
10	21 32.2	1.10 169.3	21 02.3	1.10 169.4	20 32.4	1.10 169.4	20 02.5	1.10 169.5	19 32.7	1.10 169.5	19 02.8	1.10 169.6	18 32.9	1.10 169.6	18 03.0	1.10 169.7	10
1	21 26.3	1.11 168.3	20 56.5	1.11 168.3	20 26.7	1.11 168.4	19 56.8	1.11 168.5	19 27.0	1.11 168.5	18 57.1	1.11 168.6	18 27.3	1.11 168.6	17 57.4	1.11 168.7	1
2	21 20.0	1.12 167.2	20 50.2	1.12 167.3	20 20.3	1.12 167.3	19 50.5	1.12 167.4	19 20.7	1.12 167.5	18 50.9	1.12 167.5	18 21.1	1.12 167.6	17 51.3	1.12 167.6	2
3	21 13.1	1.13 166.2	20 43.3	1.13 166.2	20 13.5	1.13 166.3	19 43.7	1.13 166.4	19 13.9	1.13 166.4	18 44.2	1.13 166.5	18 14.4	1.13 166.6	17 44.6	1.13 166.6	3
4	21 05.6	1.14 165.1	20 35.9	1.14 165.2	20 06.1	1.14 165.3	19 36.4	1.14 165.3	19 06.6	1.14 165.4	18 36.9	1.14 165.5	18 07.1	1.14 165.5	17 37.4	1.14 165.6	4
15	20 57.7	1.15 164.1	20 28.0	1.15 164.1	19 58.2	1.15 164.2	19 28.5	1.15 164.3	18 58.8	1.15 164.4	18 29.1	1.15 164.4	17 59.4	1.15 164.5	17 29.7	1.15 164.6	15
6	20 49.2	1.16 163.0	20 19.5	1.16 163.1	19 49.8	1.16 163.2	19 20.1	1.16 163.3	18 50.5	1.16 163.3	18 20.8	1.16 163.4	17 51.1	1.16 163.5	17 21.4	1.16 163.6	6
7	20 40.2	1.17 162.0	20 10.5	1.17 162.1	19 40.9	1.17 162.1	19 11.2	1.17 162.2	18 41.6	1.17 162.3	18 12.0	1.17 162.4	17 42.3	1.17 162.5	17 12.7	1.17 162.6	7
8	20 30.6	1.18 160.9	20 01.0	1.18 161.0	19 31.4	1.18 161.1	19 01.8	1.18 161.2	18 32.2	1.18 161.3	18 02.6	1.18 161.4	17 33.0	1.18 161.5	17 03.4	1.18 161.6	8
9	20 20.5	1.19 159.9	19 51.0	1.19 160.0	19 21.5	1.19 160.1	18 51.9	1.19 160.2	18 22.3	1.19 160.3	17 52.8	1.19 160.3	17 23.2	1.19 160.4	16 53.7	1.19 160.5	9
20	19 10.0	1.20 158.8	19 00.0	1.20 158.9	18 40.0	1.20 159.0	18 10.0	1.20 159.1	17 50.0	1.20 159.2	17 20.0	1.20 159.3	16 50.0	1.20 159.4	16 20.0	1.20 159.5	20
1	19 58.9	1.21 157.8	19 29.5	1.21 157.9	19 00.0	1.21 158.0	18 30.5	1.21 158.1	18 01.1	1.21 158.2	17 31.6	1.21 158.3	17 02.1	1.21 158.4	16 32.7	1.21 158.5	1
2	19 47.3	1.22 156.8	19 17.9	1.22 156.9	18 48.5	1.22 157.0	18 19.1	1.22 157.1	17 49.7	1.22 157.2	17 20.3	1.22 157.3	16 50.9	1.22 157.4	16 21.4	1.22 157.5	2
3	19 35.2	1.23 155.8	19 05.9	1.23 155.9	18 36.5	1.23 156.0	18 07.2	1.23 156.1	17 37.8	1.23 156.2	17 08.5	1.23 156.3	16 39.1	1.23 156.4	16 09.7	1.23 156.5	3
4	19 22.7	1.24 154.7	18 53.4	1.24 154.8	18 24.1	1.24 155.0	17 54.8	1.24 155.1	17 25.5	1.24 155.2	16 56.2	1.24 155.3	16 26.8	1.24 155.4	15 57.5	1.24 155.5	4
25	19 09.6	1.25 153.7	18 40.4	1.25 153.8	18 11.1	1.25 153.9	17 41.9	1.25 154.1	17 12.6	1.25 154.2	16 43.4	1.25 154.3	16 14.1	1.25 154.4	15 44.9	1.25 154.5	25
6	18 56.1	1.26 152.7	18 26.9	1.26 152.8	17 57.7	1.26 152.9	17 28.5	1.26 153.0	16 59.3	1.26 153.2	16 30.1	1.26 153.3	16 00.9	1.26 153.4	15 31.7	1.26 153.5	6
7	18 42.1	1.27 151.7	18 13.0	1.27 151.8	17 43.8	1.27 151.9	17 14.7	1.27 152.0	16 45.6	1.27 152.2	16 16.4	1.27 152.3	15 47.3	1.27 152.4	15 18.1	1.27 152.5	7
8	18 27.6	1.28 150.7	17 58.6	1.28 150.8	17 29.5	1.28 150.9	17 00.4	1.28 151.0	16 31.3	1.28 151.2	16 02.2	1.28 151.3	15 33.1	1.28 151.4	15 04.0	1.28 151.5	8
9	18 12.7	1.29 149.6	17 43.7	1.29 149.8	17 14.7	1.29 149.9	16 45.6	1.29 150.0	16 16.6	1.29 150.2	15 47.6	1.29 150.3	15 18.6	1.29 150.4	14 49.5	1.29 150.6	9
30	17 57.3	1.30 148.6	17 28.4	1.30 148.8	16 59.4	1.30 148.9	16 30.4	1.30 149.0	16 01.5	1.30 149.2	15 32.5	1.30 149.3	15 03.5	1.30 149.5	14 34.6	1.30 149.6	30
1	17 41.5	1.31 147.6	17 12.6	1.31 147.8	16 43.7	1.31 147.9	16 14.8	1.31 148.1	15 45.9	1.31 148.2	15 17.0	1.31 148.3	14 48.1	1.31 148.5	14 19.1	1.31 148.6	1
2	17 25.2	1.32 146.6	16 56.4	1.32 146.8	16 27.5	1.32 146.9	15 58.7	1.32 147.1	15 29.9	1.32 147.2	15 01.0	1.32 147.4	14 32.2	1.32 147.5	14 03.3	1.32 147.6	2
3	17 08.5	1.33 145.6	16 39.7	1.33 145.8	16 10.9	1.33 145.9	15 42.2	1.33 146.1	15 13.4	1.33 146.2	14 44.6	1.33 146.4	14 15.8	1.33 146.5	13 46.7	1.33 146.7	3
4	16 51.3	1.34 144.6	16 22.6	1.34 144.8	15 53.9	1.34 145.0	15 25.2	1.34 145.1	14 56.5	1.34 145.3	14 27.8	1.34 145.5	13 59.1	1.34 145.6	13 30.3	1.34 145.7	4
35	16 33.8	1.35 143.7	16 05.1	1.35 143.8	15 36.5	1.35 144.0	15 07.8	1.35 144.1	14 39.2	1.35 144.3	14 10.5	1.35 144.4	13 41.9	1.35 144.6	13 13.2	1.35 144.7	35
6	16 15.8	1.36 142.7	15 47.2	1.36 142.8	15 18.6	1.36 143.0	14 50.1	1.36 143.2	14 21.5	1.36 143.3	13 52.9	1.36 143.5	13 24.3	1.36 143.6	12 55.7	1.36 143.8	6
7	15 57.4	1.37 141.7	15 28.9	1.37 141.9	15 00.4	1.37 142.0	14 31.9	1.37 142.2	14 03.4	1.37 142.3	13 34.8	1.37 142.5	13 06.3	1.37 142.7	12 37.8	1.37 142.8	7
8	15 38.6	1.38 140.7	15 10.2	1.38 140.9	14 41.7	1.38 141.0	14 13.3	1.38 141.2	13 44.8	1.38 141.4	13 16.4	1.38 141.5	12 47.9	1.38 141.7	12 19.4	1.38 141.9	8
9	15 19.4	1.39 139.7	14 51.0	1.39 139.9	14 22.7	1.39 140.1	13 54.3	1.39 140.3	13 25.9	1.39 140.4	12 57.5	1.39 140.6	12 29.1	1.39 140.8	12 00.7	1.39 140.9	9
40	14 59.8	1.40 138.8	14 31.5	1.40 138.9	14 03.2	1.40 139.1	13 34.9	1.40 139.3	13 06.6	1.40 139.5	12 38.3	1.40 139.6	12 00.9	1.40 139.8	11 41.6	1.40 139.9	40
1	14 39.9	1.41 137.8	14 11.6	1.41 138.0	13 43.4	1.41 138.2	13 15.2	1.41 138.3	12 46.9	1.41 138.5	12 18.7	1.41 138.7	11 50.4	1.41 138.9	11 22.1	1.41 139.0	1
2	14 19.5	1.42 136.9	13 51.4	1.42 137.0	13 23.2	1.42 137.2	12 55.0	1.42 137.4	12 26.8	1.42 137.6	11 58.7	1.42 137.7	11 30.5	1.42 137.9	11 02.3	1.42 138.1	2
3	13 58.8	1.43 135.9	13 30.7	1.43 136.1	13 02.6	1.43 136.3	12 34.5	1.43 136.4	12 06.4	1.43 136.6	11 38.3	1.43 136.8	11 10.2	1.43 137.0	10 42.0	1.43 137.1	3
4	13 37.8	1.44 134.9	13 09.7	1.44 135.1	12 41.7	1.44 135.3	12 13.7	1.44 135.5	11 45.6	1.44 135.7	11 17.6	1.44 135.9	10 49.5	1.44 136.0	10 21.5	1.44 136.2	4
45	13 16.4	1.45 134.0	12 48.4	1.45 134.2	12 20.4	1.45 134.4	11 52.5	1.45 134.5	11 24.5	1.45 134.7	10 56.5	1.45 134.9	10 28.5	1.45 135.1	10 00.5	1.45 135.3	45
6	12 54.6	1.46 133.0	12 26.7	1.46 133.2	11 58.8	1.46 133.4	11 30.9	1.46 133.6	11 03.0	1.46 133.8	10 35.1	1.46 134.0	10 07.2	1.46 134.2	9 39.2	1.46 134.4	6
7	12 32.5	1.47 132.1	12 04.7	1.47 132.3	11 36.9												

Lat. 60°

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.		
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.			
00	42 00.0	1.001	180.0	42 30.0	1.001	180.0	43 00.0	1.001	180.0	43 30.0	1.001	180.0	44 00.0	1.001	180.0	44 30.0	1.001	180.0	00
1	41 59.7	1.002	178.7	42 29.7	1.002	178.7	42 59.7	1.002	178.7	43 29.6	1.002	178.7	43 59.6	1.002	178.6	44 29.6	1.002	178.6	1
2	41 58.6	1.003	177.4	42 28.6	1.003	177.4	42 58.6	1.003	177.3	43 28.6	1.003	177.3	43 58.6	1.003	177.3	44 28.6	1.003	177.3	2
3	41 56.9	1.004	176.1	42 26.9	1.004	176.0	42 56.9	1.004	176.0	43 26.8	1.004	176.0	43 56.8	1.004	175.9	44 26.8	1.004	175.9	3
4	41 54.5	1.005	174.7	42 24.5	1.005	174.7	42 54.4	1.005	174.6	43 24.4	1.005	174.6	43 54.4	1.005	174.6	44 24.3	1.005	174.6	4
5	41 51.4	1.006	173.4	42 21.3	1.006	173.3	42 51.3	1.006	173.3	43 21.2	1.006	173.3	43 51.2	1.006	173.2	44 21.1	1.006	173.2	05
6	41 47.6	1.007	172.1	42 17.5	1.007	172.1	42 47.5	1.007	172.0	43 17.4	1.007	171.9	43 47.3	1.007	171.9	44 17.2	1.007	171.8	6
7	41 43.2	1.008	170.8	42 13.1	1.008	170.8	42 43.0	1.008	170.7	43 12.9	1.008	170.6	43 42.8	1.008	170.5	44 12.7	1.008	170.5	7
8	41 38.0	1.010	169.5	42 07.9	1.010	169.4	42 37.8	1.010	169.3	43 07.6	1.010	169.2	43 37.5	1.010	169.2	44 07.4	1.010	169.1	8
9	41 32.2	0.999	168.2	42 02.1	0.999	168.1	42 31.9	0.999	168.1	43 01.7	0.999	168.0	43 31.6	0.999	167.9	44 01.4	0.999	167.8	9
10	41 25.8	0.999	166.9	41 55.6	0.999	166.8	42 25.4	0.999	166.7	42 55.2	0.999	166.7	43 24.9	0.999	166.6	43 54.7	0.999	166.5	10
1	41 18.9	0.999	165.6	41 48.4	0.999	165.5	42 18.2	0.999	165.4	42 47.9	0.999	165.4	43 17.7	0.999	165.3	43 47.4	0.999	165.2	1
2	41 10.9	0.999	164.3	41 40.6	0.999	164.2	42 10.3	0.999	164.1	42 40.0	0.999	164.0	43 09.7	0.999	163.9	43 39.4	0.999	163.8	2
3	41 02.4	0.999	163.0	41 32.1	0.999	162.9	42 01.8	0.999	162.8	42 31.4	0.999	162.7	43 01.1	0.999	162.6	43 30.7	0.999	162.5	3
4	40 53.4	0.999	161.7	41 23.0	0.999	161.6	41 52.6	0.999	161.5	42 22.2	0.999	161.4	42 51.8	0.999	161.3	43 21.4	0.999	161.2	4
15	40 43.7	0.999	160.5	41 13.2	0.999	160.4	41 42.8	0.999	160.3	42 12.3	0.999	160.2	42 41.8	0.999	160.1	43 10.9	0.999	159.9	15
6	40 33.3	0.998	159.2	41 02.8	0.998	159.1	41 32.3	0.998	159.0	42 01.8	0.998	158.9	42 31.3	0.998	158.8	43 00.7	0.998	158.6	6
7	40 22.4	0.998	158.0	40 51.8	0.998	157.8	41 21.2	0.998	157.7	41 50.7	0.998	157.6	42 20.1	0.998	157.4	42 49.5	0.998	157.3	7
8	40 10.8	0.998	156.7	40 40.2	0.998	156.6	41 09.6	0.998	156.4	41 38.9	0.998	156.3	42 08.3	0.998	156.1	42 37.6	0.998	155.9	8
9	39 58.6	0.998	155.4	40 28.0	0.998	155.3	40 57.3	0.998	155.2	41 26.5	0.998	155.0	41 55.8	0.998	154.9	42 25.1	0.998	154.7	9
20	39 45.9	0.997	154.2	40 15.1	0.997	154.1	40 44.4	0.997	153.9	41 13.6	0.997	153.8	41 42.8	0.997	153.6	42 12.0	0.997	153.5	20
1	39 32.5	0.997	153.0	40 01.7	0.997	152.8	40 30.9	0.997	152.7	41 00.0	0.997	152.5	41 29.2	0.997	152.3	41 58.3	0.997	152.2	1
2	39 18.6	0.997	151.7	39 47.7	0.997	151.6	40 16.8	0.997	151.4	40 45.9	0.997	151.3	41 14.9	0.997	151.1	41 44.0	0.997	150.9	2
3	39 04.1	0.997	150.5	39 33.0	0.997	150.3	40 02.2	0.997	150.2	40 31.2	0.997	150.0	41 00.1	0.997	149.8	41 29.1	0.997	149.7	3
4	38 49.1	0.997	149.3	39 18.2	0.997	149.1	39 47.0	0.997	148.9	40 15.9	0.997	148.8	40 44.8	0.997	148.6	41 13.7	0.997	148.4	4
25	38 33.5	0.997	148.1	39 02.4	0.997	147.9	39 31.2	0.997	147.7	40 00.1	0.997	147.6	40 28.9	0.997	147.4	40 57.7	0.997	147.2	25
6	38 17.4	0.997	146.9	38 46.2	0.997	146.7	39 14.9	0.997	146.5	39 43.7	0.997	146.3	40 12.5	0.997	146.2	40 41.2	0.997	146.0	6
7	38 00.7	0.997	145.7	38 29.4	0.997	145.5	38 58.1	0.997	145.3	39 26.8	0.997	145.1	39 55.5	0.997	144.9	40 24.1	0.997	144.7	7
8	37 43.5	0.997	144.5	38 12.2	0.997	144.3	38 40.8	0.997	144.1	39 09.6	0.997	143.9	39 38.0	0.997	143.7	40 06.6	0.997	143.5	8
9	37 25.9	0.997	143.3	37 54.4	0.997	143.1	38 23.0	0.997	142.9	38 51.5	0.997	142.7	39 20.0	0.997	142.5	39 48.5	0.997	142.3	9
30	37 07.7	0.997	142.2	37 36.2	0.997	142.0	38 04.7	0.997	141.8	38 33.1	0.997	141.6	39 01.5	0.997	141.4	39 29.9	0.997	141.2	30
1	36 49.1	0.997	141.0	37 17.5	0.997	140.8	37 45.8	0.997	140.6	38 14.2	0.997	140.4	38 42.5	0.997	140.2	39 10.8	0.997	140.0	1
2	36 30.0	0.997	139.8	36 58.3	0.997	139.6	37 26.6	0.997	139.4	37 54.8	0.997	139.2	38 23.1	0.997	139.0	38 51.3	0.997	138.8	2
3	36 10.4	0.997	138.7	36 38.6	0.997	138.5	37 06.8	0.997	138.3	37 35.0	0.997	138.1	38 03.2	0.997	137.8	38 31.3	0.997	137.6	3
4	35 50.4	0.997	137.6	36 18.5	0.997	137.4	36 46.6	0.997	137.1	37 14.7	0.997	136.9	37 42.8	0.997	136.7	38 10.9	0.997	136.5	4
35	35 29.9	0.997	136.4	35 58.0	0.997	136.2	36 26.0	0.997	136.0	36 54.0	0.997	135.8	37 22.0	0.997	135.6	37 50.0	0.997	135.3	35
6	35 09.0	0.997	135.3	35 37.0	0.997	135.1	36 05.0	0.997	134.9	36 32.9	0.997	134.6	37 00.8	0.997	134.4	37 28.7	0.997	134.2	6
7	34 47.7	0.997	134.2	35 15.6	0.997	134.0	35 43.5	0.997	133.8	36 11.4	0.997	133.5	36 39.2	0.997	133.3	37 07.0	0.997	133.1	7
8	34 26.0	0.997	133.1	34 53.8	0.997	132.9	35 21.6	0.997	132.6	35 49.4	0.997	132.4	36 17.1	0.997	132.2	36 44.9	0.997	131.9	8
9	34 03.9	0.997	132.0	34 31.7	0.997	131.8	34 59.4	0.997	131.5	35 27.1	0.997	131.3	35 54.7	0.997	131.1	36 22.3	0.997	130.8	9
40	33 41.4	0.997	130.9	34 09.1	0.997	130.7	34 36.7	0.997	130.4	35 04.3	0.997	130.2	35 31.9	0.997	130.0	35 59.5	0.997	129.7	40
1	33 18.6	0.997	129.8	33 46.3	0.997	129.6	34 13.7	0.997	129.4	34 41.2	0.997	129.1	35 08.7	0.997	128.9	35 36.2	0.997	128.6	1
2	32 55.4	0.997	128.8	33 22.9	0.997	128.5	33 50.3	0.997	128.3	34 17.8	0.997	128.0	34 45.2	0.997	127.8	35 12.6	0.997	127.5	2
3	32 31.8	0.997	127.7	32 59.2	0.997	127.5	33 26.6	0.997	127.2	33 54.0	0.997	127.0	34 21.3	0.997	126.7	34 48.6	0.997	126.5	3
4	32 07.9	0.997	126.6	32 35.2	0.997	126.4	33 02.6	0.997	126.2	33 29.9	0.997	125.9	33 57.1	0.997	125.7	34 24.3	0.997	125.4	4
45	31 43.7	0.997	125.5	32 10.9	0.997	125.3	32 38.2	0.997	125.1	33 05.4	0.997	124.8	33 32.6	0.997	124.6	33 59.7	0.997	124.3	45
6	31 19.1	0.997	124.6	31 46.3	0.997	124.4	32 13.5	0.997	124.1	32 40.9	0.997	123.8	33 07.7	0.997	123.5	33 34.8	0.997	123.3	6
7	30 54.3	0.997	123.5	31 21.4	0.997	123.3	31 48.5	0.997	123.0	32 15.6	0.997	122.8	32 42.6	0.997	122.5	33 09.6	0.997	122.3	7
8	30 29.1	0.997	122.5	30 56.1	0.997	122.2	31 23.2	0.997	122.0	31 50.2	0.997	121.7	32 17.1	0.997	121.5	32 44.1	0.997	121.2	8
9	30 03.6	0.997	121.5	30 30.6	0.997	121.2	30 57.6	0.997	121.0	31 24.5	0.997	120.7	31 51.4	0.997	120.4	32 18.3	0.997	120.2	9
50	29 37.9	0.997	120.5	30 04.8	0.997	120.2	30 31.7	0.997	119.9	31 08.6	0.997	119.7	31 25.4	0.997	119.4	31 52.2	0.997	119.2	50
1	29 11.9	0.997	119.4	29 38.8	0.997	119.2	30 05.6	0.997	118.9	30 32.4	0.997	118.7							



DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., 16° 00', 16° 30', 17° 00', 17° 30', 18° 00', 18° 30', 19° 00', 19° 30', and H.A. Each declination column contains two sub-columns: Alt. and Az. The table lists astronomical data for various declinations from 00 to 90 degrees.

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
00	1400.0	1.00 180.0	1330.0	1.00 180.0	1260.0	1.00 180.0	1190.0	1.00 180.0	1120.0	1.00 180.0	1050.0	1.00 180.0	980.0	1.00 180.0	910.0	1.00 180.0	00
1	1399.7	1.001 179.0	1329.7	1.001 179.0	1259.7	1.001 179.0	1189.7	1.001 179.0	1119.7	1.001 179.0	1049.7	1.001 179.0	979.7	1.001 179.0	909.7	1.001 179.0	1
2	1399.4	1.002 178.0	1329.4	1.002 178.0	1259.4	1.002 178.0	1189.4	1.002 178.0	1119.4	1.002 178.1	1049.4	1.002 178.1	979.4	1.002 178.1	909.4	1.002 178.1	2
3	1399.1	1.003 177.0	1329.1	1.003 177.0	1259.1	1.003 177.1	1189.1	1.003 177.1	1119.1	1.003 177.1	1049.1	1.003 177.1	979.1	1.003 177.1	909.1	1.003 177.1	3
4	1398.8	1.004 176.0	1328.8	1.004 176.1	1258.8	1.004 176.1	1188.8	1.004 176.1	1118.8	1.004 176.1	1048.8	1.004 176.1	978.8	1.004 176.1	908.8	1.004 176.1	4
5	1398.5	1.005 175.0	1328.5	1.005 175.1	1258.5	1.005 175.1	1188.5	1.005 175.1	1118.5	1.005 175.1	1048.5	1.005 175.1	978.5	1.005 175.2	908.5	1.005 175.2	5
6	1398.2	1.006 174.0	1328.2	1.006 174.1	1258.2	1.006 174.1	1188.2	1.006 174.1	1118.2	1.006 174.2	1048.2	1.006 174.2	978.2	1.006 174.2	908.2	1.006 174.2	6
7	1397.9	1.007 173.0	1327.9	1.007 173.1	1257.9	1.007 173.2	1187.9	1.007 173.2	1117.9	1.007 173.2	1047.9	1.007 173.2	977.9	1.007 173.2	907.9	1.007 173.2	7
8	1397.6	1.008 172.0	1327.6	1.008 172.1	1257.6	1.008 172.2	1187.6	1.008 172.2	1117.6	1.008 172.2	1047.6	1.008 172.2	977.6	1.008 172.2	907.6	1.008 172.2	8
9	1397.3	1.009 171.0	1327.3	1.009 171.1	1257.3	1.009 171.2	1187.3	1.009 171.2	1117.3	1.009 171.3	1047.3	1.009 171.3	977.3	1.009 171.3	907.3	1.009 171.3	9
10	1397.0	1.010 170.0	1327.0	1.010 169.2	1257.0	1.010 169.2	1187.0	1.010 169.3	1117.0	1.010 169.3	1047.0	1.010 169.3	977.0	1.010 169.4	907.0	1.010 169.4	10
11	1396.7	1.011 168.0	1326.7	1.011 168.2	1256.7	1.011 168.3	1186.7	1.011 168.3	1116.7	1.011 168.4	1046.7	1.011 168.4	976.7	1.011 168.5	906.7	1.011 168.5	11
12	1396.4	1.012 167.0	1326.4	1.012 167.2	1256.4	1.012 167.3	1186.4	1.012 167.3	1116.4	1.012 167.4	1046.4	1.012 167.4	976.4	1.012 167.5	906.4	1.012 167.5	12
13	1396.1	1.013 166.0	1326.1	1.013 166.2	1256.1	1.013 166.3	1186.1	1.013 166.4	1116.1	1.013 166.4	1046.1	1.013 166.5	976.1	1.013 166.6	906.1	1.013 166.6	13
14	1395.8	1.014 165.0	1325.8	1.014 165.3	1255.8	1.014 165.4	1185.8	1.014 165.5	1115.8	1.014 165.5	1045.8	1.014 165.6	975.8	1.014 165.7	905.8	1.014 165.7	14
15	1395.5	1.015 164.0	1325.5	1.015 164.3	1255.5	1.015 164.4	1185.5	1.015 164.5	1115.5	1.015 164.6	1045.5	1.015 164.6	975.5	1.015 164.7	905.5	1.015 164.7	15
16	1395.2	1.016 163.0	1325.2	1.016 163.3	1255.2	1.016 163.4	1185.2	1.016 163.5	1115.2	1.016 163.6	1045.2	1.016 163.6	975.2	1.016 163.7	905.2	1.016 163.7	16
17	1394.9	1.017 162.0	1324.9	1.017 162.4	1254.9	1.017 162.5	1184.9	1.017 162.5	1114.9	1.017 162.6	1044.9	1.017 162.6	974.9	1.017 162.7	904.9	1.017 162.7	17
18	1394.6	1.018 161.0	1324.6	1.018 161.5	1254.6	1.018 161.6	1184.6	1.018 161.6	1114.6	1.018 161.6	1044.6	1.018 161.6	974.6	1.018 161.7	904.6	1.018 161.7	18
19	1394.3	1.019 160.0	1324.3	1.019 160.4	1254.3	1.019 160.6	1184.3	1.019 160.6	1114.3	1.019 160.7	1044.3	1.019 160.7	974.3	1.019 160.8	904.3	1.019 160.8	19
20	1394.0	1.020 159.0	1324.0	1.020 159.5	1254.0	1.020 159.6	1184.0	1.020 159.6	1114.0	1.020 159.7	1044.0	1.020 159.7	974.0	1.020 159.8	904.0	1.020 159.8	20
21	1393.7	1.021 158.0	1323.7	1.021 158.5	1253.7	1.021 158.6	1183.7	1.021 158.6	1113.7	1.021 158.7	1043.7	1.021 158.7	973.7	1.021 158.8	903.7	1.021 158.8	21
22	1393.4	1.022 157.0	1323.4	1.022 157.5	1253.4	1.022 157.6	1183.4	1.022 157.6	1113.4	1.022 157.7	1043.4	1.022 157.7	973.4	1.022 157.8	903.4	1.022 157.8	22
23	1393.1	1.023 156.0	1323.1	1.023 156.6	1253.1	1.023 156.7	1183.1	1.023 156.7	1113.1	1.023 156.8	1043.1	1.023 156.8	973.1	1.023 156.9	903.1	1.023 156.9	23
24	1392.8	1.024 155.0	1322.8	1.024 155.6	1252.8	1.024 155.7	1182.8	1.024 155.7	1112.8	1.024 155.8	1042.8	1.024 155.8	972.8	1.024 155.9	902.8	1.024 155.9	24
25	1392.5	1.025 154.0	1322.5	1.025 154.7	1252.5	1.025 154.8	1182.5	1.025 154.8	1112.5	1.025 154.9	1042.5	1.025 154.9	972.5	1.025 155.0	902.5	1.025 155.0	25
26	1392.2	1.026 153.0	1322.2	1.026 153.7	1252.2	1.026 153.8	1182.2	1.026 153.8	1112.2	1.026 153.9	1042.2	1.026 153.9	972.2	1.026 154.0	902.2	1.026 154.0	26
27	1391.9	1.027 152.0	1321.9	1.027 152.8	1251.9	1.027 152.9	1181.9	1.027 152.9	1111.9	1.027 153.0	1041.9	1.027 153.0	971.9	1.027 153.1	901.9	1.027 153.1	27
28	1391.6	1.028 151.0	1321.6	1.028 151.8	1251.6	1.028 151.9	1181.6	1.028 151.9	1111.6	1.028 152.0	1041.6	1.028 152.0	971.6	1.028 152.1	901.6	1.028 152.1	28
29	1391.3	1.029 150.0	1321.3	1.029 150.9	1251.3	1.029 151.0	1181.3	1.029 151.0	1111.3	1.029 151.1	1041.3	1.029 151.1	971.3	1.029 151.2	901.3	1.029 151.2	29
30	1391.0	1.030 149.0	1321.0	1.030 149.9	1251.0	1.030 149.9	1181.0	1.030 149.9	1111.0	1.030 150.0	1041.0	1.030 150.0	971.0	1.030 150.1	901.0	1.030 150.1	30
31	1390.7	1.031 148.0	1320.7	1.031 149.2	1250.7	1.031 149.2	1180.7	1.031 149.2	1110.7	1.031 149.3	1040.7	1.031 149.3	970.7	1.031 149.4	900.7	1.031 149.4	31
32	1390.4	1.032 147.0	1320.4	1.032 148.1	1250.4	1.032 148.2	1180.4	1.032 148.2	1110.4	1.032 148.3	1040.4	1.032 148.3	970.4	1.032 148.4	900.4	1.032 148.4	32
33	1390.1	1.033 146.0	1320.1	1.033 147.2	1250.1	1.033 147.3	1180.1	1.033 147.3	1110.1	1.033 147.4	1040.1	1.033 147.4	970.1	1.033 147.5	900.1	1.033 147.5	33
34	1389.8	1.034 145.0	1319.8	1.034 146.2	1249.8	1.034 146.3	1179.8	1.034 146.3	1109.8	1.034 146.4	1039.8	1.034 146.4	969.8	1.034 146.5	899.8	1.034 146.5	34
35	1389.5	1.035 144.0	1319.5	1.035 145.3	1249.5	1.035 145.4	1179.5	1.035 145.4	1109.5	1.035 145.5	1039.5	1.035 145.5	969.5	1.035 145.6	899.5	1.035 145.6	35
36	1389.2	1.036 143.0	1319.2	1.036 144.4	1249.2	1.036 144.5	1179.2	1.036 144.5	1109.2	1.036 144.6	1039.2	1.036 144.6	969.2	1.036 144.7	899.2	1.036 144.7	36
37	1388.9	1.037 142.0	1318.9	1.037 143.5	1248.9	1.037 143.6	1178.9	1.037 143.6	1108.9	1.037 143.7	1038.9	1.037 143.7	968.9	1.037 143.8	898.9	1.037 143.8	37
38	1388.6	1.038 141.0	1318.6	1.038 142.5	1248.6	1.038 142.7	1178.6	1.038 142.7	1108.6	1.038 142.8	1038.6	1.038 142.8	968.6	1.038 142.9	898.6	1.038 142.9	38
39	1388.3	1.039 140.0	1318.3	1.039 141.6	1248.3	1.039 141.8	1178.3	1.039 141.8	1108.3	1.039 141.9	1038.3	1.039 141.9	968.3	1.039 142.0	898.3	1.039 142.0	39
40	1388.0	1.040 139.0	1318.0	1.040 140.7	1248.0	1.040 140.9	1178.0	1.040 140.9	1108.0	1.040 141.0	1038.0	1.040 141.0	968.0	1.040 141.1	898.0	1.040 141.1	40
41	1387.7	1.041 138.0	1317.7	1.041 139.8	1247.7	1.041 139.9	1177.7	1.041 139.9	1107.7	1.041 140.0	1037.7	1.041 140.0	967.7	1.041 140.1	897.7	1.041 140.1	41
42	1387.4	1.042 137.0	1317.4	1.042 138.7	1247.4	1.042 138.9	1177.4	1.042 138.9	1107.4	1.042 139.0	1037.4	1.042 139.0	967.4	1.042 139.1	897.4	1.042 139.1	42
43	1387.1	1.043 136.0	1317.1	1.043 137.8	1247.1	1.043 138.0	1177.1	1.043 138.0	1107.1	1.043 138.1	1037.1	1.043 138.1	967.1	1.043 138.2	897.1	1.043 138.2	43
44	1386.8	1.044 135.0	1316.8	1.044 136.9	1246.8	1.044 137.1	1176.8	1.044 137.1	1106.8	1.044 137.2	1036.8	1.044 137.2	966.8	1.044 137.3	896.8	1.044 137.3	44
45	1386.5	1.045 134.0	1316.5	1.045 136.0	1246.5	1.045 136.2	1176.5	1.045 136.2	1106.5	1.045 136.3	1036.5	1.045 136.3	966.5	1.045 136.4	896.5	1.045 136.4	45
46	1386.2	1.046 133.0	1316.2	1.046 135.1	1246.2	1.046 135.3	1176.2	1.046 135.3	1106.2	1.046 135.4	1036.2	1.046 135.4	966.2	1.046 135.5	896.2	1.046 135.5	46
47	1385.9	1.047 132.0	1315.9	1.047 134.2	1245.9	1.047 134.4	1175.9	1.047 134.									

Lat. 60°

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.
	Alt.	Az.															
00	50 00.0	1 001 180.0	50 30.0	1 001 180.0	51 00.0	1 001 180.0	51 30.0	1 001 180.0	52 00.0	1 001 180.0	52 30.0	1 001 180.0	53 00.0	1 001 180.0	53 30.0	1 001 180.0	00
1	49 59.6	1 002 178.5	50 29.6	1 002 178.5	50 59.6	1 002 178.5	51 29.6	1 002 178.5	51 59.6	1 002 178.5	52 29.6	1 002 178.5	52 59.6	1 002 178.5	53 29.6	1 002 178.5	1
2	49 58.5	1 003 177.1	50 28.5	1 003 177.1	50 58.4	1 003 177.0	51 28.4	1 003 177.0	51 58.4	1 003 177.0	52 28.4	1 003 177.0	52 58.4	1 003 177.0	53 28.4	1 003 177.0	2
3	49 56.6	1 004 175.6	50 26.5	1 004 175.6	50 56.5	1 004 175.6	51 26.5	1 004 175.6	51 56.5	1 004 175.5	52 26.4	1 004 175.5	52 56.4	1 004 175.5	53 26.4	1 004 175.4	3
4	49 53.9	1 006 174.2	50 23.8	1 006 174.1	50 53.8	1 006 174.1	51 23.8	1 006 174.0	51 53.7	1 006 174.0	52 23.7	1 006 173.9	52 53.6	1 006 173.9	53 23.6	1 006 173.8	4
05	49 50.5	1 007 172.7	50 20.4	1 007 172.7	50 50.3	1 007 172.6	51 20.2	1 007 172.5	51 50.2	1 007 172.5	52 20.1	1 007 172.4	52 50.0	1 007 172.4	53 19.9	1 007 172.3	05
6	49 46.3	1 008 171.3	50 16.2	1 008 171.2	50 46.1	1 008 171.1	51 16.0	1 008 171.1	51 45.9	1 008 171.0	52 15.7	1 008 170.9	52 45.6	1 008 170.9	53 15.5	1 008 170.8	6
7	49 41.3	1 009 169.8	50 11.2	1 009 169.7	50 41.1	1 009 169.7	51 10.9	1 009 169.6	51 40.8	1 009 169.5	52 10.6	1 009 169.4	52 40.5	1 009 169.3	53 10.3	1 009 169.3	7
8	49 35.6	1 011 168.4	50 05.5	1 011 168.3	50 35.3	1 011 168.2	51 05.1	1 011 168.1	51 34.9	1 011 168.0	52 04.7	1 011 167.9	52 34.5	1 011 167.8	53 04.3	1 011 167.7	8
9	49 29.2	1 012 166.9	49 59.0	1 012 166.8	50 28.8	1 012 166.7	50 58.6	1 012 166.6	51 28.3	1 012 166.5	51 58.1	1 012 166.4	52 27.8	1 012 166.3	52 57.6	1 012 166.2	9
10	49 22.1	1 013 165.5	49 51.8	1 013 165.4	50 21.5	1 013 165.3	50 51.2	1 013 165.2	51 21.0	1 013 165.1	51 50.7	1 013 164.9	52 20.4	1 013 164.8	52 50.1	1 013 164.7	10
1	49 14.2	1 014 164.1	49 43.9	1 014 163.9	50 13.5	1 014 163.8	50 43.2	1 014 163.7	51 12.9	1 014 163.6	51 42.5	1 014 163.5	52 12.1	1 014 163.3	52 41.8	1 014 163.2	1
2	49 05.6	1 016 162.6	49 35.2	1 016 162.5	50 04.8	1 016 162.4	50 34.4	1 016 162.3	51 04.0	1 016 162.1	51 33.6	1 016 162.0	52 03.2	1 016 161.9	52 32.7	1 016 161.7	2
3	48 56.3	1 017 161.2	49 25.8	1 017 161.1	49 55.4	1 017 161.0	50 24.9	1 017 160.8	50 54.4	1 017 160.7	51 24.0	1 017 160.5	51 53.5	1 017 160.4	52 23.0	1 017 160.2	3
4	48 46.3	1 018 159.8	49 15.8	1 018 159.7	49 45.3	1 018 159.5	50 14.7	1 018 159.4	50 44.2	1 018 159.2	51 13.6	1 018 159.1	51 43.0	1 018 158.9	52 12.5	1 018 158.8	4
15	48 35.6	1 019 158.4	49 05.0	1 019 158.3	49 34.4	1 019 158.1	50 03.8	1 019 158.0	50 33.2	1 019 157.8	51 02.6	1 019 157.6	51 31.9	1 019 157.5	52 01.2	1 019 157.3	15
6	48 24.2	1 020 157.0	48 53.6	1 020 156.9	49 22.9	1 020 156.7	49 52.2	1 020 156.6	50 21.5	1 020 156.4	50 50.8	1 020 156.2	51 20.1	1 020 156.0	51 49.3	1 020 155.9	6
7	48 12.2	1 021 155.7	48 41.5	1 021 155.5	49 10.7	1 021 155.3	49 39.9	1 021 155.1	50 09.2	1 021 155.0	50 38.4	1 021 154.8	51 07.5	1 021 154.6	51 36.7	1 021 154.4	7
8	47 59.5	1 022 154.3	48 28.7	1 022 154.1	48 57.9	1 022 153.9	49 27.0	1 022 153.8	49 56.1	1 022 153.6	50 25.2	1 022 153.4	50 54.3	1 022 153.2	51 23.4	1 022 153.0	8
9	47 46.2	1 023 152.9	48 15.3	1 023 152.7	48 44.3	1 023 152.6	49 13.7	1 023 152.4	49 42.5	1 023 152.2	50 11.5	1 023 152.0	50 40.5	1 023 151.8	51 09.5	1 023 151.6	9
20	47 32.2	1 024 151.6	48 01.2	1 024 151.4	48 30.2	1 024 151.2	48 59.2	1 024 151.0	49 28.1	1 024 150.8	49 57.1	1 024 150.6	50 26.0	1 024 150.4	50 54.9	1 024 150.2	20
1	47 17.6	1 025 150.2	47 46.5	1 025 150.0	48 15.4	1 025 149.8	48 44.3	1 025 149.6	49 13.2	1 025 149.4	49 42.0	1 025 149.2	50 10.8	1 025 149.0	50 39.6	1 025 148.8	1
2	47 02.4	1 026 148.9	47 31.2	1 026 148.7	48 00.1	1 026 148.5	48 28.8	1 026 148.3	48 57.6	1 026 148.1	49 26.4	1 026 147.8	49 55.1	1 026 147.6	50 23.8	1 026 147.4	2
3	46 46.6	1 027 147.6	47 15.4	1 027 147.4	47 44.1	1 027 147.2	48 12.8	1 027 146.9	48 41.4	1 027 146.7	49 10.1	1 027 146.5	49 38.7	1 027 146.3	50 07.3	1 027 146.0	3
4	46 30.2	1 028 146.3	46 58.9	1 028 146.1	47 27.5	1 028 145.8	47 56.1	1 028 145.6	48 24.7	1 028 145.4	48 53.2	1 028 145.1	49 21.7	1 028 144.9	49 50.2	1 028 144.7	4
25	46 13.3	1 029 145.0	46 41.9	1 029 144.7	47 10.4	1 029 144.5	47 38.9	1 029 144.3	48 07.4	1 029 144.1	48 35.8	1 029 143.8	49 04.2	1 029 143.6	49 32.6	1 029 143.3	25
6	45 55.8	1 030 143.7	46 24.3	1 030 143.5	46 52.7	1 030 143.2	47 21.1	1 030 143.0	47 49.5	1 030 142.7	48 17.8	1 030 142.5	48 46.1	1 030 142.2	49 14.4	1 030 142.0	6
7	45 37.8	1 031 142.4	46 06.1	1 031 142.2	46 34.5	1 031 141.9	47 02.8	1 031 141.7	47 31.0	1 031 141.4	47 59.3	1 031 141.2	48 27.5	1 031 140.9	48 55.7	1 031 140.7	7
8	45 19.2	1 032 141.1	45 47.5	1 032 140.9	46 15.7	1 032 140.7	46 43.9	1 032 140.4	47 12.1	1 032 140.2	47 40.2	1 032 139.9	48 08.3	1 032 139.6	48 36.4	1 032 139.4	8
9	45 00.1	1 033 139.9	45 28.3	1 033 139.6	45 56.4	1 033 139.4	46 24.5	1 033 139.1	46 52.6	1 033 138.8	47 20.6	1 033 138.6	47 48.6	1 033 138.4	48 16.6	1 033 138.1	9
30	44 40.6	1 034 138.6	45 08.6	1 034 138.4	45 36.7	1 034 138.1	46 04.7	1 034 137.9	46 32.6	1 034 137.6	47 00.6	1 034 137.4	47 28.5	1 034 137.1	47 56.3	1 034 136.8	30
1	44 20.5	1 035 137.4	44 48.5	1 035 137.2	45 16.4	1 035 136.9	45 44.3	1 035 136.6	46 12.2	1 035 136.4	46 40.0	1 035 136.1	47 07.8	1 035 135.8	47 35.5	1 035 135.5	1
2	44 00.0	1 036 136.2	44 27.8	1 036 135.9	44 55.7	1 036 135.7	45 23.3	1 036 135.4	45 51.2	1 036 135.1	46 19.0	1 036 134.9	46 46.6	1 036 134.6	47 14.3	1 036 134.3	2
3	43 39.0	1 037 135.0	44 06.7	1 037 134.7	44 34.5	1 037 134.5	45 02.2	1 037 134.2	45 29.8	1 037 133.9	45 57.5	1 037 133.6	46 25.1	1 037 133.3	46 52.6	1 037 133.1	3
4	43 17.5	1 038 133.8	43 45.2	1 038 133.5	44 12.9	1 038 133.2	44 40.5	1 038 133.0	45 08.0	1 038 132.7	45 35.5	1 038 132.4	46 03.0	1 038 132.1	46 30.5	1 038 131.8	4
35	42 55.7	1 039 132.6	43 23.2	1 039 132.3	43 50.8	1 039 132.1	44 18.3	1 039 131.8	44 45.8	1 039 131.5	45 13.2	1 039 131.2	45 40.6	1 039 130.9	46 07.9	1 039 130.6	35
6	42 33.4	1 040 131.4	43 00.9	1 040 131.2	43 28.3	1 040 130.9	43 55.7	1 040 130.6	44 23.1	1 040 130.3	44 50.4	1 040 130.0	45 17.7	1 040 129.7	45 44.9	1 040 129.4	6
7	42 10.7	1 041 130.3	42 38.1	1 041 130.0	43 05.4	1 041 129.7	43 32.7	1 041 129.4	44 00.0	1 041 129.1	44 27.2	1 041 128.8	44 54.4	1 041 128.5	45 21.5	1 041 128.2	7
8	41 47.6	1 042 129.1	42 14.9	1 042 128.8	42 42.1	1 042 128.5	43 09.4	1 042 128.3	43 36.5	1 042 128.0	44 03.7	1 042 127.7	44 30.8	1 042 127.4	44 57.8	1 042 127.1	8
9	41 24.1	1 043 128.0	41 51.3	1 043 127.7	42 18.5	1 043 127.4	42 45.6	1 043 127.1	43 12.7	1 043 126.8	43 39.7	1 043 126.5	44 06.7	1 043 126.2	44 33.7	1 043 125.9	9
40	41 00.3	1 044 126.8	41 27.4	1 044 126.5	41 54.5	1 044 126.3	42 21.5	1 044 126.0	42 48.5	1 044 125.7	43 15.5	1 044 125.4	43 42.4	1 044 125.1	44 09.2	1 044 124.8	40
1	40 36.1	1 045 125.7	41 03.1	1 045 125.4	41 30.1	1 045 125.1	41 57.1	1 045 124.8	42 24.0	1 045 124.5	42 50.8	1 045 124.2	43 17.6	1 045 123.9	43 44.4	1 045 123.6	1
2	40 11.6	1 046 124.6	40 38.5	1 046 124.3	41 05.4	1 046 124.0	41 32.3	1 046 123.7	41 59.1	1 046 123.4	42 25.9	1 046 123.1	42 52.6	1 046 122.8	43 19.2	1 046 122.5	2
3	39 46.7	1 047 123.5	40 13.6	1 047 123.2	40 40.4	1 047 122.9	41 07.2	1 047 122.6	41 33.9	1 047 122.3	42 00.6	1 047 122.0	42 27.2	1 047 121.7	42 53.8	1 047 121.4	3
4	39 21.5	1 048 122.4	39 48.3	1 048 122.1	40 15.1	1 048 121.8	40 41.7	1 048 121.5	41 08.4	1 048 121.2	41 35.0	1 048 120.9	42 01.5	1 048 120.6	42 28.0	1 048 120.3	4
45	38 56.1	1 049 121.3	39 22.8	1 049 121.0	39 49.4	1 049 120.7	40 16.0	1 049 120.4	40 42.6	1 049 120.1	41 09.1	1 049 119.8	41 3				

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.
	Alt.	Az.															
00	10 00.0	1.00 180.0	9 30.0	1.00 180.0	9 00.0	1.00 180.0	8 30.0	1.00 180.0	8 00.0	1.00 180.0	7 30.0	1.00 180.0	7 00.0	1.00 180.0	6 30.0	1.00 180.0	00
1	9 59.8	1.001 179.1	9 29.8	1.001 179.1	8 59.8	1.001 179.1	8 29.8	1.001 179.1	7 59.8	1.001 179.1	7 29.8	1.001 179.1	6 59.8	1.001 179.1	6 29.8	1.001 179.1	1
2	9 59.0	1.002 178.1	9 29.0	1.002 178.1	8 59.0	1.002 178.1	8 29.0	1.002 178.1	7 59.0	1.002 178.1	7 29.0	1.002 178.1	6 59.0	1.002 178.1	6 29.0	1.002 178.1	2
3	9 57.8	1.003 177.1	9 27.8	1.003 177.1	8 57.8	1.003 177.1	8 27.8	1.003 177.1	7 57.8	1.003 177.1	7 27.8	1.003 177.1	6 57.8	1.003 177.1	6 27.8	1.003 177.1	3
4	9 56.0	1.004 176.2	9 26.0	1.004 176.2	8 56.0	1.004 176.2	8 26.0	1.004 176.2	7 56.0	1.004 176.2	7 26.0	1.004 176.2	6 56.0	1.004 176.2	6 26.0	1.004 176.2	4
05	9 53.8	1.005 175.2	9 23.8	1.005 175.2	8 53.8	1.005 175.2	8 23.8	1.005 175.2	7 53.8	1.005 175.2	7 23.8	1.005 175.2	6 53.8	1.005 175.2	6 23.8	1.005 175.2	05
6	9 51.0	1.005 174.3	9 21.0	1.005 174.3	8 51.0	1.005 174.3	8 21.0	1.005 174.3	7 51.0	1.005 174.3	7 21.0	1.005 174.3	6 51.0	1.005 174.3	6 21.0	1.005 174.3	6
7	9 47.8	1.006 173.3	9 17.8	1.006 173.3	8 47.8	1.006 173.3	8 17.8	1.006 173.3	7 48.0	1.006 173.5	7 18.1	1.006 173.5	6 48.1	1.006 173.5	6 18.2	1.006 173.5	7
8	9 44.0	1.007 172.4	9 14.1	1.007 172.4	8 44.2	1.007 172.4	8 14.3	1.007 172.5	7 44.3	1.007 172.5	7 14.4	1.007 172.6	6 44.5	1.007 172.6	6 14.6	1.007 172.6	8
9	9 39.8	1.008 171.4	9 09.9	1.008 171.5	8 40.0	1.008 171.5	8 10.1	1.008 171.5	7 40.2	1.008 171.6	7 10.3	1.008 171.6	6 40.4	1.008 171.6	6 10.5	1.008 171.6	9
10	9 35.1	1.009 170.5	9 05.2	1.009 170.5	8 35.3	1.009 170.6	8 05.4	1.009 170.6	7 35.6	1.009 170.7	7 05.7	1.009 170.7	6 35.8	1.009 170.7	6 05.9	1.009 170.7	10
1	9 29.9	1.009 169.5	9 00.0	1.009 169.6	8 30.2	1.010 169.6	8 00.3	1.009 169.7	7 30.4	1.009 169.7	7 00.6	1.009 169.8	6 30.7	1.009 169.8	6 00.9	1.009 169.9	1
2	9 24.2	99 10 168.6	8 54.4	99 10 168.6	8 24.5	99 10 168.7	7 54.7	99 10 168.7	7 24.9	99 10 168.8	6 55.0	99 10 168.8	6 25.2	99 10 168.9	5 55.4	99 10 168.9	2
3	9 18.0	99 11 167.6	8 48.2	99 11 167.7	8 18.4	99 11 167.7	7 48.6	99 11 167.8	7 18.8	99 11 167.9	6 49.0	99 11 167.9	6 19.2	99 11 168.0	5 49.4	99 11 168.0	3
4	9 11.3	99 12 166.7	8 41.6	99 12 166.7	8 11.8	99 12 166.8	7 42.0	99 12 166.9	7 12.2	99 12 166.9	6 42.5	99 12 167.0	6 12.7	99 12 167.1	5 42.9	99 12 167.1	4
15	9 04.2	99 13 165.7	8 34.4	99 13 165.8	8 04.7	99 13 165.9	7 35.0	99 13 165.9	7 05.2	99 12 166.0	6 35.5	99 12 166.1	6 05.7	99 12 166.1	5 36.0	99 12 166.2	15
6	8 56.6	99 14 164.8	8 26.9	99 13 164.9	7 57.1	99 13 164.9	7 27.4	99 13 165.0	6 57.7	99 13 165.1	6 28.0	99 13 165.2	5 58.3	99 13 165.2	5 28.6	99 13 165.3	6
7	8 48.5	99 14 163.9	8 18.8	99 14 163.9	7 49.1	99 14 164.0	7 19.4	99 14 164.1	6 49.8	99 14 164.2	6 20.1	99 14 164.2	5 50.4	99 14 164.3	5 20.8	99 14 164.4	7
8	8 39.9	99 15 162.9	8 10.3	99 15 163.0	7 40.6	99 15 163.1	7 11.0	99 15 163.2	6 41.4	99 15 163.2	6 11.7	99 15 163.3	5 42.1	99 15 163.4	5 12.4	99 15 163.5	8
9	8 30.8	99 16 162.0	8 01.2	99 16 162.1	7 31.7	99 16 162.1	7 02.1	99 16 162.2	6 32.5	99 16 162.3	6 02.9	99 16 162.4	5 33.3	99 16 162.5	5 03.7	99 16 162.6	9
20	8 21.3	98 17 161.0	7 51.8	98 17 161.1	7 22.2	98 16 161.2	6 52.7	98 16 161.3	6 23.1	98 16 161.4	5 53.6	98 16 161.5	5 24.0	98 16 161.6			20
1	8 11.3	98 17 160.1	7 41.8	98 17 160.2	7 12.3	98 17 160.3	6 42.8	98 17 160.4	6 13.3	98 17 160.5	5 43.8	98 17 160.6	5 14.3	98 17 160.7			1
2	8 00.9	98 18 159.2	7 31.2	98 18 159.3	7 02.0	98 18 159.4	6 32.5	98 18 159.5	6 03.1	98 18 159.6	5 33.6	98 18 159.7	5 04.1	98 18 159.7			2
3	7 50.0	98 19 158.2	7 20.6	98 19 158.3	6 51.2	98 19 158.4	6 21.8	98 19 158.5	5 52.4	98 19 158.6	5 23.0	98 19 158.7					3
4	7 38.7	98 20 157.3	7 09.3	98 20 157.4	6 40.0	98 20 157.5	6 10.6	98 19 157.6	5 41.2	98 19 157.7	5 11.9	98 19 157.8					4
25	7 26.9	98 20 156.4	6 57.6	98 20 156.5	6 28.3	98 20 156.6	5 58.9	98 20 156.7	5 29.6	98 20 156.8	5 00.3	98 20 156.9					25
6	7 14.6	98 21 155.5	6 45.4	98 21 155.6	6 16.1	98 21 155.7	5 46.9	98 21 155.8	5 17.6	98 21 155.9							6
7	7 02.0	97 22 154.5	6 32.8	97 22 154.7	6 03.6	97 22 154.8	5 34.3	97 22 154.9	5 05.1	97 22 155.0							7
8	6 48.9	97 23 153.6	6 19.7	97 23 153.7	5 50.6	97 23 153.9	5 21.4	97 23 154.0									8
9	6 35.3	97 23 152.7	6 06.2	97 23 152.8	5 37.1	97 23 152.9	5 08.0	97 23 153.1									9
30	6 21.3	97 24 151.8	5 52.3	97 24 151.9	5 23.3	97 24 152.0											30
1	6 07.0	97 25 150.9	5 38.0	97 25 151.0	5 09.0	97 24 151.1											1
2	5 52.1	96 26 150.0	5 23.2	96 26 150.1													2
3	5 36.9	96 26 149.1	5 08.1	96 26 149.2													3
4	5 21.3	96 27 148.1															4
35	5 05.3	96 27 147.2															35

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.
	Alt.	Az.															
91	16 44.3	85 40 78.8	17 09.9	85 40 78.6	17 35.4	85 40 78.3	18 01.0	85 40 78.0	18 26.5	85 40 77.7	18 51.9	85 40 77.5	19 17.4	85 40 77.2	19 42.8	85 40 76.9	91
2	16 14.9	85 40 78.0	16 40.5	85 40 77.7	17 06.1	85 40 77.5	17 31.7	85 40 77.2	17 57.2	85 40 76.9	18 22.7	85 40 76.6	18 48.2	85 40 76.4	19 13.7	85 40 76.1	2
3	15 45.6	85 40 77.2	16 11.2	85 40 76.9	16 36.9	85 40 76.6	17 02.4	85 40 76.4	17 28.0	85 40 76.1	17 53.6	85 40 75.8	18 19.1	85 40 75.8	18 44.6	85 40 75.3	3
4	15 16.4	85 40 76.3	15 42.1	85 40 76.1	16 07.7	85 40 75.8	16 33.3	85 40 75.5	16 59.0	85 40 75.3	17 24.5	85 40 75.0	17 50.1	85 40 74.7	18 15.6	85 40 74.4	4
95	14 47.3	85 40 75.5	15 13.0	85 40 75.2	15 38.7	85 40 75.0	16 04.4	85 40 74.7	16 30.0	85 40 74.4	16 55.6	85 40 74.2	17 21.2	85 40 73.9	17 46.8	85 40 73.6	95
6	14 18.3	85 40 74.7	14 44.0	85 40 74.4	15 09.8	85 40 74.1	15 35.5	85 40 73.9	16 01.2	85 40 73.6	16 26.8	85 40 73.3	16 52.5	85 40 73.1	17 18.1	85 40 72.8	6
7	13 49.4	85 40 73.8	14 15.2	85 40 73.6	14 41.0	85 40 73.3	15 06.7	85 40 73.1	15 32.4	85 40 72.8	15 58.1	85 40 72.5	16 23.8	85 40 72.2	16 49.5	85 40 72.0	7
8	13 20.7	85 40 73.0	13 46.5	85 40 72.8	14 12.3	85 40 72.5	14 38.1	85 40 72.2	15 03.8	85 40 72.0	15 29.5	85 40 71.7	15 55.3	85 40 71.4	16 21.0	85 40 71.2	8
9	12 52.1	85 40 72.2	13 17.9	85 40 71.9	13 43.8	85 40 71.7	14 09.6	85 40 71.4	14 35.4	85 40 71.1	15 01.2	85 40 70.9	15 27.0	85 40 70.6	15 52.7	85 40 70.3	9
100	12 23.6	85 40 71.4	12 49.5	85 40 71.1	13 15.3	85 40 70.8	13 41.2	85 40 70.6	14 07.1	85 40 70.3	14 32.9	85 40 70.0	14 58.7	85 40 69.8	15 24.5	85 40 69.5	100
1	11 55.2	87 40 70.5	12 21.2	87 40 70.3	12 47.1	87 40 70.0	13 13.0	87 40 69.7	13 38.9	87 40 69.5	14 04.8	87 40 69.2	14 30.6	87 40 69.0	14 56.5	87 40 68.7	1
2	11 27.0	87 40 69.7	11 53.0	87 40 69.4	12 19.0	87 40 69.2	12 44.9	87 40 68.9	13 10.9	87 40 68.7	13 36.8	87 40 68.4	14 02.7	87 40 68.1	14 28.6	87 40 67.9	2
3	10 58.9	87 40 68.9	11 25.0	87 40 68.6	11 51.0	87 40 68.4	12 17.0	87 40 68.1	12 43.0	87 40 67.8	13 09.0	87 40 67.6	13 35.0	87 40 67.3	14 00.9	87 40 67.1	3
4	10 31.0	87 40 68.0	10 57.1	87 40 67.8	11 23.2	87 40 67.5	11 49.3	87 40 67.3	12 15.3	87 40 67.0	12 41.3	87 40 66.8	13 07.4	87 40 66.5	13 33.4	87 40 66.3	4
105	10 03.3	87 40 67.2	10 29.4	87 40 66.9	1												

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.
	Alt.	Ad. Az.															
00	54 00.0	1.001 180.0	54 30.0	1.001 180.0	55 00.0	1.001 180.0	55 30.0	1.001 180.0	56 00.0	1.001 180.0	56 30.0	1.001 180.0	57 00.0	1.001 180.0	57 30.0	1.001 180.0	00
1	53 59.6	1.002 178.4	54 29.6	1.002 178.4	54 59.6	1.002 178.4	55 29.6	1.002 178.4	55 59.6	1.002 178.4	56 29.6	1.002 178.4	56 59.6	1.002 178.4	57 29.6	1.002 178.4	1
2	53 58.4	1.008 176.9	54 28.4	1.008 176.9	54 58.4	1.008 176.9	55 28.4	1.008 176.9	55 58.4	1.008 176.9	56 28.4	1.008 176.9	56 58.4	1.008 176.9	57 28.4	1.008 176.9	2
3	53 56.3	1.006 175.3	54 26.3	1.006 175.3	54 56.3	1.006 175.3	55 26.3	1.006 175.3	55 56.3	1.006 175.3	56 26.3	1.006 175.3	56 56.3	1.006 175.3	57 26.3	1.006 175.3	3
4	53 53.5	1.006 173.8	54 23.4	1.006 173.8	54 53.4	1.006 173.8	55 23.3	1.006 173.8	55 53.3	1.006 173.8	56 23.2	1.006 173.8	56 53.2	1.006 173.8	57 23.1	1.006 173.8	4
5	53 49.9	1.007 172.2	54 19.8	1.007 172.2	54 49.7	1.008 172.1	55 19.6	1.008 172.1	55 49.5	1.008 172.0	56 19.4	1.008 171.9	56 49.3	1.008 171.8	57 19.2	1.008 171.8	05
6	53 45.4	1.009 170.6	54 15.3	1.009 170.6	54 45.2	1.009 170.6	55 15.0	1.009 170.5	55 44.9	1.009 170.5	56 14.8	1.009 170.3	56 44.6	1.009 170.2	57 14.5	1.009 170.1	6
7	53 40.2	99 10 169.2	54 10.0	99 10 169.1	54 39.8	99 10 169.0	55 09.7	99 10 168.9	55 39.5	99 10 168.8	56 09.3	99 10 168.7	56 39.1	99 10 168.6	57 08.9	99 11 168.5	7
8	53 34.1	99 11 167.6	54 03.9	99 11 167.5	54 33.7	99 12 167.4	55 03.5	99 12 167.3	55 33.3	99 12 167.2	56 03.0	99 12 167.1	56 32.8	99 12 167.0	57 02.6	99 12 166.9	8
9	53 27.3	99 13 166.1	53 57.1	99 13 166.0	54 26.8	99 13 165.9	54 56.5	99 13 165.8	55 26.2	99 13 165.7	55 55.9	99 13 165.6	56 25.6	99 13 165.4	56 55.3	99 13 165.3	9
10	53 19.7	99 14 164.6	53 49.4	99 14 164.5	54 19.1	99 14 164.3	54 48.7	99 14 164.2	55 18.4	99 14 164.1	55 48.0	99 14 163.9	56 17.7	99 15 163.8	56 47.3	99 15 163.7	10
1	53 11.4	99 15 163.1	53 41.0	99 15 163.0	54 10.6	99 15 162.8	54 40.2	99 16 162.7	55 09.8	99 16 162.5	55 39.4	99 16 162.4	56 08.9	99 16 162.2	56 38.5	99 16 162.1	1
2	53 02.3	98 16 161.6	53 31.8	98 17 161.4	54 01.4	98 17 161.3	54 30.9	98 17 161.1	55 00.4	98 17 161.0	55 29.9	98 17 160.8	55 59.4	98 17 160.7	56 28.8	98 17 160.5	2
3	52 52.4	98 18 160.1	53 21.9	98 18 159.9	53 51.4	98 18 159.8	54 20.8	98 18 159.6	54 50.2	98 18 159.4	55 19.6	98 18 159.3	55 49.1	98 18 159.1	56 18.4	98 19 158.9	3
4	52 41.9	98 19 158.6	53 11.3	98 19 158.4	53 40.6	98 19 158.3	54 10.0	98 19 158.1	54 39.3	98 19 157.9	55 08.7	98 20 157.7	55 38.0	98 20 157.6	56 07.3	98 20 157.4	4
5	52 30.0	98 20 157.1	52 59.9	98 20 157.0	53 29.2	98 20 156.8	53 58.4	98 20 156.6	54 27.7	97 21 156.4	54 56.9	97 21 156.2	55 26.1	97 21 156.0	55 55.3	97 21 155.8	15
6	52 18.6	97 21 155.7	52 47.8	97 21 155.5	53 17.9	97 22 155.3	53 46.2	97 22 155.1	54 15.3	97 22 154.9	54 44.5	97 22 154.7	55 13.6	97 22 154.5	55 42.7	97 22 154.3	6
7	52 05.9	97 22 154.2	52 35.0	97 22 154.0	53 04.1	97 23 153.8	53 32.2	97 23 153.6	54 02.2	97 23 153.4	54 31.3	97 23 153.2	55 00.3	97 23 153.0	55 29.3	97 23 152.8	7
8	51 52.5	97 23 152.8	52 21.5	97 24 152.6	52 50.5	97 24 152.4	53 19.5	97 24 152.2	53 48.5	97 24 151.9	54 17.4	97 24 151.7	54 46.3	97 24 151.5	55 15.2	97 24 151.3	8
9	51 38.4	97 24 151.4	52 07.4	97 25 151.1	52 36.3	97 25 150.9	53 05.2	97 25 150.7	53 34.0	97 25 150.5	54 02.9	97 25 150.2	54 31.7	97 25 150.0	55 00.5	97 25 149.8	9
20	51 23.7	96 26 149.9	51 52.6	96 26 149.7	52 21.4	96 26 149.5	52 50.2	96 26 149.3	53 18.9	96 26 149.0	53 47.7	96 26 148.8	54 16.4	96 27 148.5	54 45.0	96 27 148.3	20
1	51 08.4	96 27 148.5	51 37.1	96 27 148.3	52 05.8	96 27 148.1	52 34.5	96 27 147.8	53 03.2	96 27 147.6	53 31.8	96 28 147.3	54 00.4	96 28 147.1	54 28.9	96 28 146.8	1
2	50 52.4	96 28 147.2	51 21.1	96 28 146.9	51 49.1	96 28 146.7	52 18.2	96 28 146.4	52 46.8	96 28 146.2	53 15.3	96 29 145.9	53 43.8	96 29 145.7	54 12.2	96 29 145.4	2
3	50 35.8	96 29 145.8	51 04.4	96 29 145.5	51 32.9	96 29 145.3	52 01.3	96 29 145.0	52 29.8	96 29 144.8	52 56.2	96 30 144.5	53 26.5	96 30 144.2	53 54.8	96 30 144.0	3
4	50 18.7	96 30 144.4	50 47.1	96 30 144.2	51 15.5	96 30 143.9	51 43.9	96 30 143.6	52 12.2	96 30 143.4	52 40.5	96 30 143.1	53 08.7	96 31 142.8	53 36.9	96 31 142.5	4
5	50 00.9	96 31 142.8	50 29.3	96 31 142.5	50 57.5	96 31 142.2	51 25.8	96 31 141.9	51 54.0	96 31 141.6	52 22.2	96 31 141.3	52 50.3	96 32 141.0	53 18.4	96 32 140.7	25
6	49 42.6	96 31 141.7	50 10.8	96 32 141.5	50 39.0	96 32 141.2	51 07.1	96 32 140.9	51 35.2	96 32 140.6	52 03.3	96 32 140.4	52 31.3	96 32 140.1	52 59.3	96 33 139.8	6
7	49 23.8	96 32 140.4	49 51.9	96 32 140.1	50 19.9	96 33 139.9	50 48.0	96 33 139.6	51 15.9	96 33 139.3	51 43.9	96 33 139.0	52 11.8	96 34 138.7	52 39.6	96 34 138.4	7
8	49 04.4	96 33 139.1	49 32.4	96 33 138.8	50 00.3	96 34 138.5	50 28.3	96 34 138.3	50 56.1	96 34 138.0	51 23.9	96 34 137.7	51 51.7	96 34 137.4	52 19.4	96 34 137.1	8
9	48 44.5	96 34 137.8	49 12.4	96 34 137.5	49 00.2	96 34 137.2	50 08.0	96 35 136.9	50 35.8	96 35 136.7	51 03.5	96 35 136.3	51 31.1	96 35 136.0	51 58.7	96 35 135.7	9
30	48 24.1	96 35 136.5	48 51.9	96 35 136.2	49 19.6	96 35 135.9	49 47.3	96 35 135.7	50 14.9	96 35 135.3	50 42.5	96 35 135.0	51 10.1	96 35 134.7	51 37.5	96 35 134.4	30
1	48 03.2	96 36 135.3	48 30.9	96 36 135.0	48 58.5	96 36 134.7	49 26.1	96 36 134.4	49 53.6	96 36 134.1	50 21.1	96 36 133.8	50 48.5	96 37 133.4	51 15.9	96 37 133.1	1
2	47 41.9	96 36 134.0	48 09.4	96 37 133.7	48 37.0	96 37 133.4	49 04.4	96 37 133.1	49 31.8	96 37 132.8	49 59.2	96 37 132.5	50 26.5	96 38 132.2	50 53.7	96 38 131.8	2
3	47 20.1	96 37 132.8	47 47.5	96 37 132.5	48 14.9	96 37 132.2	48 42.3	96 38 131.9	49 09.6	96 38 131.5	49 36.8	96 38 131.2	50 04.0	96 38 130.9	50 31.2	96 38 130.6	3
4	46 57.8	96 38 131.5	47 25.2	96 38 131.2	47 52.5	96 38 130.9	48 19.7	96 38 130.6	48 46.9	96 38 130.3	49 14.1	96 39 130.0	49 41.1	96 39 129.6	50 08.2	96 39 129.3	4
35	46 35.1	96 39 130.3	47 02.4	96 39 130.0	47 29.6	96 39 129.7	47 56.7	96 39 129.4	48 23.8	96 39 129.1	48 50.9	96 39 128.7	49 17.8	96 40 128.4	49 44.7	96 40 128.1	35
6	46 12.2	96 39 129.1	46 39.2	96 39 128.8	47 06.3	96 40 128.5	47 33.4	96 40 128.2	48 00.3	96 40 127.9	48 27.3	96 40 127.5	48 54.1	96 40 127.2	49 20.9	96 40 126.8	6
7	45 48.6	96 40 127.9	46 15.7	96 40 127.6	46 42.7	96 40 127.3	47 09.6	96 40 127.0	47 36.5	96 40 126.7	48 03.3	96 41 126.3	48 30.0	96 41 126.0	48 56.7	96 41 125.6	7
8	45 24.8	96 40 126.8	45 51.7	96 41 126.4	45 18.6	96 41 126.1	45 45.4	96 41 125.8	46 12.2	96 41 125.5	46 38.9	96 41 125.1	47 05.6	96 41 124.8	47 32.2	96 42 124.4	8
9	45 00.6	96 41 125.6	45 27.4	96 41 125.3	45 04.2	96 41 125.0	45 30.9	96 41 124.6	46 07.6	96 41 124.3	46 34.2	96 42 123.9	47 01.0	96 42 123.6	47 27.3	96 42 123.3	9
40	44 36.0	96 42 124.4	45 02.7	96 42 124.1	45 29.4	96 42 123.8	45 56.1	96 42 123.5	46 22.6	96 42 123.1	46 49.2	96 42 122.8	47 15.6	96 42 122.4	47 42.0	96 42 122.1	40
1	44 11.1	96 42 123.3	44 37.7	96 42 123.0	45 04.3	96 42 122.7	45 30.9	96 42 122.3	45 57.4	96 42 122.0	46 23.8	96 43 121.6	46 50.1	96 43 121.3	47 16.4	96 43 120.9	1
2	43 45.9	96 42 122.2	44 12.4	96 43 121.9	44 38.9	96 43 121.5	45 05.4	96 43 121.2	45 31.8	96 43 120.9	46 03.1	96 43 120.5	46 29.3	96 43 120.2	46 55.0	96 43 119.8	2
3	43 20.3	96 43 121.1	43 46.8	96 43 120.7	44 13.2	96 43 120.4	44 39.6	96 44 120.1	45 05.8	96 44 119.7	45 32.1	96 44 119.4	46 03.1	96 44 119.0	46 28.4	96 44 118.7	3
4	42 54.5	96 44 120.0	43 20.8	96 44 119.6	43 47.2	96 44 119.3	44 13.4	96 44 118.9	44 39.7	96 44 118.6	45 05.8	96 44 118.3	45 31.9	96 44 117.9	45 57.9	96 45 117.6	4
45	42 28.3	96 44 118.9	42 54.6	96 44 118.5	43 20.9	96 44 118.2	43 47.1	96 44 117.9	44 13.2	96 45 117.5	44 39.2	96 45 117.2	45 05.7	96 45 116.8			



DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.
	Alt.	Az.															
00	58 00.0	1.001 180.0	58 30.0	1.001 180.0	59 00.0	1.001 180.0	60 00.0	1.001 180.0	62 00.0	1.001 180.0	64 00.0	1.001 180.0	64 30.0	1.001 180.0	65 30.0	1.001 180.0	00
1	57 59.6	1.002 178.3	58 29.6	1.002 178.3	58 59.6	1.002 178.3	59 59.5	1.002 178.3	61 59.5	1.002 178.2	63 59.5	1.002 178.1	64 29.5	1.002 178.1	65 29.5	1.002 178.0	1
2	57 58.3	1.004 176.6	58 28.2	1.004 176.6	58 58.2	1.004 176.6	59 58.2	1.004 176.5	61 58.2	1.004 176.4	63 58.0	1.004 176.2	64 28.0	1.004 176.2	65 28.0	1.004 176.1	2
3	57 56.1	1.006 175.0	58 26.0	1.006 175.0	58 56.0	1.006 174.9	59 55.9	1.006 174.8	61 55.8	1.006 174.6	63 55.6	1.006 174.3	64 25.5	1.006 174.3	65 25.4	1.006 174.1	3
4	57 53.0	1.008 173.3	58 23.0	1.007 173.3	58 52.9	1.007 173.2	59 52.8	1.007 173.1	61 52.5	1.007 172.8	63 52.1	1.007 172.5	64 22.0	1.007 172.4	65 21.8	1.008 172.2	4
05	57 49.1	1.008 171.7	58 19.0	1.008 171.6	58 48.9	1.008 171.5	59 48.7	1.008 171.4	61 48.2	1.009 171.0	63 47.7	1.009 170.6	64 17.5	09 09 170.5	65 17.2	09 09 170.2	05
6	57 44.4	1.009 170.0	58 14.2	1.009 169.9	58 44.1	09 10 169.9	59 43.8	09 10 169.7	61 43.1	09 10 169.2	63 42.3	09 11 168.7	64 12.1	09 11 168.6	65 11.6	09 11 168.3	6
7	57 38.8	09 11 168.4	58 08.6	09 11 168.3	58 38.4	09 11 168.2	59 37.9	09 11 167.9	61 37.0	09 12 167.4	63 35.9	09 12 166.9	64 05.7	09 12 166.7	65 05.0	09 13 166.4	7
8	57 32.3	09 12 166.8	58 02.0	09 12 166.6	58 31.8	09 12 166.5	59 31.2	09 13 166.3	61 30.0	09 13 165.7	63 28.7	09 14 165.0	63 58.3	09 14 164.8	64 57.5	09 14 164.5	8
9	57 25.0	09 14 165.1	57 54.7	09 14 165.0	58 24.4	09 14 164.9	59 23.7	09 14 164.6	61 22.2	09 15 163.9	63 20.4	09 15 163.2	63 50.0	09 15 163.0	64 49.0	09 16 162.6	9
10	57 16.9	09 16 163.5	57 46.5	09 16 163.4	58 16.1	09 16 163.2	59 15.3	09 16 162.9	61 13.4	09 16 162.2	63 11.3	09 17 161.4	63 40.8	09 17 161.2	64 39.5	09 17 160.7	10
1	57 08.0	09 18 161.9	57 37.5	09 18 161.7	58 07.0	09 18 161.6	59 06.0	09 18 161.2	61 03.8	09 18 160.5	63 01.3	09 18 159.6	63 30.6	09 18 159.4	64 29.2	09 19 158.9	1
2	57 05.3	09 18 160.3	57 27.7	09 18 160.1	57 57.2	09 18 160.0	58 56.0	09 18 159.6	61 03.4	09 19 159.8	62 50.4	09 20 157.8	63 19.6	09 20 157.6	64 17.9	09 20 157.0	2
3	56 47.8	09 19 158.7	57 17.2	09 19 158.5	57 46.5	09 19 158.3	58 45.1	09 19 157.9	60 42.1	09 20 157.1	62 38.7	09 21 156.1	63 07.7	09 21 155.8	64 05.8	09 22 155.2	3
4	56 36.5	09 20 157.2	57 05.8	09 20 157.0	57 35.0	09 20 156.8	58 33.4	09 21 156.3	60 30.0	09 22 155.4	62 26.1	09 22 154.3	62 55.0	09 23 154.0	63 52.8	09 23 153.4	4
15	56 24.5	09 21 155.6	56 53.7	09 21 155.4	57 22.8	09 22 155.2	58 21.0	09 22 154.7	60 17.1	09 23 153.7	62 12.7	09 24 152.6	62 41.5	09 24 152.3	63 38.9	09 24 151.7	15
6	56 11.8	09 22 154.1	56 40.8	09 22 153.8	57 09.8	09 23 153.6	58 07.8	09 23 153.1	60 03.4	09 24 152.1	61 58.5	09 25 150.9	62 27.1	09 25 150.6	63 24.3	09 25 149.9	6
7	55 58.3	09 24 152.5	56 27.2	09 24 152.3	56 56.1	09 24 152.0	57 53.9	09 24 151.5	59 49.0	09 25 150.5	61 43.5	09 26 149.2	62 12.0	09 26 148.9	63 08.9	09 27 148.2	7
8	55 44.1	09 26 151.0	56 12.9	09 26 150.8	56 41.7	09 26 150.5	57 39.2	09 26 150.0	59 33.8	09 26 148.8	61 27.8	09 27 147.6	61 56.1	09 28 147.2	62 52.7	09 28 146.5	8
9	55 29.2	09 28 149.5	55 57.9	09 28 149.3	56 26.6	09 28 149.0	57 23.9	09 28 148.4	59 18.0	09 28 147.3	61 11.3	09 29 145.9	61 39.5	09 29 145.6	62 35.8	09 29 144.8	9
20	55 13.7	09 27 148.0	55 42.3	09 27 147.8	56 10.8	09 28 147.5	57 07.8	09 28 146.9	59 01.4	09 29 145.7	60 54.2	09 30 144.3	61 22.2	09 30 144.0	62 16.1	09 31 143.2	20
1	54 57.4	09 28 146.6	55 25.9	09 28 146.3	55 54.4	09 28 146.0	56 51.1	09 29 145.4	58 44.2	09 30 144.2	60 36.3	09 31 142.7	61 04.2	09 31 142.4	61 59.8	09 32 141.6	1
2	54 40.6	09 29 145.1	55 09.0	09 29 144.8	55 37.3	09 30 144.5	56 33.8	09 30 143.9	58 26.3	09 31 142.6	60 17.9	09 32 141.2	60 45.6	09 32 140.8	61 40.9	09 33 140.0	2
3	54 23.1	09 30 143.7	54 51.4	09 30 143.4	55 19.6	09 30 143.1	56 15.8	09 31 142.5	58 07.7	09 32 141.1	59 58.7	09 33 139.7	60 26.3	09 33 139.3	61 21.3	09 34 138.4	3
4	54 05.1	09 31 142.3	54 33.2	09 31 142.0	55 01.2	09 32 141.6	55 57.2	09 32 141.0	57 48.6	09 33 139.6	59 39.0	09 34 138.1	60 06.4	09 34 137.7	61 01.1	09 35 136.9	4
25	53 46.4	09 32 140.8	54 14.4	09 32 140.5	54 42.3	09 32 140.2	55 38.1	09 33 139.6	57 28.9	09 34 138.2	59 18.7	09 35 136.6	59 46.0	09 35 136.2	60 40.3	09 36 135.4	25
6	53 27.2	09 33 139.5	53 55.0	09 33 139.1	54 22.9	09 33 138.8	55 18.4	09 34 138.2	57 08.6	09 35 136.7	58 57.8	09 36 135.2	59 24.9	09 36 134.8	60 18.9	09 36 133.9	6
7	53 07.4	09 34 138.1	53 35.2	09 34 137.8	54 02.8	09 34 137.4	54 58.1	09 35 136.8	56 47.8	09 36 135.3	58 36.4	09 37 133.7	59 03.4	09 37 133.3	59 57.0	09 37 132.4	7
8	52 47.1	09 35 136.7	53 14.7	09 35 136.4	53 42.3	09 35 136.1	54 37.3	09 36 135.4	56 26.4	09 36 133.9	58 14.5	09 37 132.3	58 41.3	09 38 131.9	59 34.6	09 38 131.0	8
9	52 26.3	09 36 135.4	52 53.8	09 36 135.1	53 21.2	09 36 134.7	54 15.9	09 36 134.0	56 04.6	09 37 132.5	57 52.1	09 38 130.9	58 18.7	09 38 130.5	59 11.8	09 39 129.6	9
30	52 05.0	09 36 134.1	52 32.4	09 36 133.7	52 59.7	09 37 133.4	53 54.1	09 37 132.7	55 42.2	09 38 131.2	57 29.2	09 39 129.5	57 55.7	09 39 129.1	58 48.4	09 40 128.2	30
1	51 43.2	09 37 132.8	52 10.4	09 37 132.4	52 37.6	09 38 132.1	53 31.8	09 38 131.4	55 19.4	09 39 129.9	57 05.8	09 40 128.2	57 32.2	09 40 127.7	58 24.6	09 40 126.8	1
2	51 20.9	09 38 131.5	51 48.1	09 38 131.1	52 15.2	09 38 130.8	53 09.1	09 39 130.1	54 56.2	09 40 128.5	56 42.0	09 40 126.9	57 08.2	09 41 126.4	58 00.4	09 41 125.5	2
3	50 58.2	09 39 130.2	51 25.3	09 39 129.9	51 52.2	09 39 129.5	52 45.9	09 39 128.8	54 32.5	09 40 127.2	56 17.8	09 41 125.5	56 43.9	09 41 125.1	57 35.8	09 42 124.2	3
4	50 35.1	09 40 129.0	51 02.0	09 40 128.6	51 28.9	09 40 128.2	52 22.3	09 40 127.5	54 08.4	09 41 126.0	55 53.2	09 42 124.2	56 19.1	09 42 123.8	57 10.8	09 42 122.9	4
35	50 11.6	09 40 127.7	50 38.4	09 40 127.4	51 05.1	09 40 127.0	51 58.4	09 41 126.3	53 43.9	09 41 124.7	55 28.2	09 42 123.0	55 54.0	09 42 122.5	56 45.4	09 43 121.6	35
6	49 47.7	09 40 126.5	50 14.3	09 41 126.1	50 41.0	09 41 125.8	51 34.0	09 41 125.0	53 19.1	09 42 123.4	55 02.9	09 43 121.7	55 28.6	09 43 121.3	56 19.6	09 43 120.3	6
7	49 23.4	09 41 125.3	49 49.9	09 41 124.9	50 16.4	09 42 124.6	51 09.2	09 42 123.8	52 53.9	09 43 122.2	54 37.2	09 44 120.5	55 02.7	09 44 120.0	55 53.6	09 44 119.1	7
8	48 58.7	09 42 124.1	49 25.2	09 42 123.7	49 51.6	09 42 123.4	50 44.1	09 42 122.6	52 28.3	09 43 121.0	54 11.2	09 44 119.3	54 36.6	09 44 118.8	55 27.2	09 44 117.9	8
9	48 33.7	09 43 122.9	49 00.0	09 43 122.5	49 26.3	09 43 122.2	50 18.7	09 43 121.4	52 02.5	09 44 119.8	53 44.8	09 45 118.1	54 10.2	09 45 117.6	55 00.6	09 45 116.7	9
40	48 08.3	09 43 121.7	48 34.6	09 43 121.4	49 00.8	09 43 121.0	49 52.9	09 43 120.2	51 36.3	09 44 118.6	53 18.2	09 45 116.9	53 43.5	09 45 116.4	54 33.6	09 45 115.5	40
1	47 42.7	09 44 120.6	48 08.8	09 44 120.2	48 34.9	09 44 119.8	49 26.9	09 44 119.1	51 09.8	09 45 117.5	52 51.3	09 45 115.7	53 16.5	09 45 115.3	54 06.4	09 46 114.4	1
2	47 16.7	09 44 119.4	47 42.7	09 44 119.1	48 08.7	09 44 118.7	49 00.5	09 44 117.9	50 43.1	09 45 116.3	52 24.2	09 46 114.6	52 49.2	09 46 114.1	53 39.0	09 46 113.2	2
3	46 50.4	09 44 118.3	47 16.4	09 44 118.0	47 42.3	09 44 117.6	48 33.9	09 44 116.8	50 16.0	09 45 115.2	51 56.8	09 46 113.5	52 21.7	09 46 113.0	53 11.3	09 46 112.1	3
4	46 23.9	09 45 117.2	46 49.7	09 45 116.8	47 15.6	09 45 116.5	48 07.0	09 45 115.7	49 48.8	09 46 114.1	51 29.2	09 46 112.4	51 54.0	09 47 111.9	52 43.4	09 47 111.0	4
45	45 57.0	09 45 116.1	46 22.8	09 45 115.7	46 48.6	09 45 115.4	47 39.8	09 45 114.6	49 21.3	09 46 113.0	51 01.3	09 47 111.3	51 26.1	09 47 110.8	52 15.3		

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00'			28° 30'			29° 00'			30° 00'			32° 00'			34° 00'			34° 30'			35° 30'			H.A.
	Ait.	Ad At	Az.																						
91	23 39.5	84 48	74.3	23 55.6	84 48	74.0	24 20.7	84 48	73.7	25 10.8	83 48	73.1	26 50.5	83 47	71.9	28 29.5	82 47	70.6	28 54.2	82 47	70.3	29 43.3	82 47	69.6	91
2	23 01.6	84 48	73.5	23 26.8	84 48	73.2	23 51.9	84 48	72.9	24 42.1	84 48	72.3	26 22.0	83 47	71.1	28 01.3	82 47	69.8	28 26.0	82 47	69.5	29 15.3	82 46	68.8	2
3	22 32.9	84 48	72.7	22 58.1	84 48	72.4	23 23.3	84 48	72.1	24 13.6	84 47	71.5	25 53.7	83 47	70.3	27 33.2	83 47	69.0	27 58.0	82 46	68.7	28 47.4	82 46	68.1	3
4	22 04.3	84 47	71.9	22 29.6	84 47	71.6	22 54.9	84 47	71.3	23 45.2	84 47	70.7	25 25.6	83 47	69.5	27 05.3	83 46	68.3	27 30.1	83 46	68.0	28 19.6	82 46	67.3	4
95	21 35.9	84 47	71.1	22 01.2	84 47	70.8	22 26.5	84 47	70.5	23 17.0	84 47	69.9	24 57.5	84 46	68.7	26 37.5	83 46	67.5	27 02.4	83 46	67.2	27 52.0	83 46	66.5	95
6	21 07.6	85 47	70.3	21 33.0	85 47	70.0	21 58.3	84 47	69.7	22 48.9	84 47	69.1	24 29.7	84 46	67.9	26 09.9	83 46	66.7	26 34.8	83 46	66.4	27 24.6	83 45	65.8	6
7	20 39.4	85 47	69.5	21 04.8	85 47	69.2	21 30.2	85 46	68.9	22 29.9	84 46	68.3	24 01.9	84 46	67.2	25 42.4	83 46	66.0	26 07.4	83 46	65.7	26 57.3	83 45	65.0	7
8	20 11.4	85 46	68.7	20 36.9	85 46	68.4	21 02.3	85 46	68.1	21 53.1	85 46	67.5	23 34.4	84 46	66.4	25 15.1	84 45	65.2	25 40.1	84 45	64.9	26 30.2	83 45	64.3	8
9	19 43.5	85 46	67.9	20 09.1	85 46	67.6	20 34.6	85 46	67.3	21 25.5	85 46	66.8	23 07.0	84 45	65.6	24 47.9	84 45	64.4	25 13.1	84 45	64.1	26 03.3	84 45	63.5	9
100	19 15.8	85 46	67.1	19 41.4	85 46	66.8	20 07.0	85 46	66.5	20 58.0	85 46	66.0	22 39.7	85 45	64.8	24 20.9	84 45	63.7	24 46.2	84 45	63.4	25 36.5	84 44	62.8	100
1	18 48.3	86 46	66.3	19 13.9	86 46	66.0	19 39.5	85 46	65.7	20 30.7	85 46	65.2	22 12.7	85 45	64.1	23 54.1	84 44	62.9	24 19.4	84 44	62.6	25 09.9	84 44	62.0	1
2	18 20.9	86 45	65.5	18 46.6	86 45	65.2	19 12.3	86 45	64.9	20 03.5	85 45	64.4	21 45.8	85 44	63.3	23 27.5	85 44	62.1	23 52.9	84 44	61.8	24 43.5	84 44	61.2	2
3	17 53.7	86 45	64.7	18 19.4	86 45	64.4	18 45.2	86 45	64.2	19 36.6	86 45	63.6	21 19.1	85 44	62.5	23 01.1	85 44	61.4	23 26.5	85 44	61.1	24 17.3	85 43	60.5	3
4	17 26.6	86 45	63.9	17 52.5	86 45	63.6	18 18.3	86 44	63.4	19 09.8	86 44	62.8	20 52.5	85 44	61.7	22 34.9	85 43	60.6	23 00.4	85 43	60.3	23 51.3	85 43	59.7	4
105	16 59.8	86 44	63.1	17 25.7	86 44	62.8	17 51.5	86 44	62.6	18 43.2	86 44	62.0	20 26.2	86 44	60.9	22 08.8	85 43	59.8	22 34.4	85 43	59.6	23 25.5	85 43	59.0	105
6	16 33.1	87 44	62.3	16 59.1	87 44	62.0	17 25.0	86 44	61.8	18 16.8	86 44	61.2	20 00.1	86 43	60.2	21 43.0	86 43	59.1	22 08.7	85 43	58.8	22 59.9	85 42	58.2	6
7	16 06.7	87 44	61.5	16 32.7	87 44	61.2	16 58.7	87 44	61.0	17 50.6	86 43	60.5	19 34.2	86 43	59.4	21 17.4	86 42	58.3	21 43.1	86 42	58.0	22 34.5	86 42	57.5	7
8	15 40.4	87 44	60.7	16 06.5	87 43	60.5	16 32.5	87 43	60.2	17 24.6	87 43	59.7	19 08.5	86 42	58.6	20 52.0	86 42	57.5	21 17.8	86 42	57.3	22 09.3	86 42	56.7	8
9	15 14.3	87 43	59.9	15 40.5	87 43	59.7	16 06.6	87 43	59.4	16 58.8	87 43	58.9	18 43.0	87 42	57.8	20 26.7	86 42	56.8	20 52.6	86 42	56.5	21 44.3	86 41	56.0	9
110	14 48.5	87 43	59.1	15 14.7	87 43	58.9	15 40.9	87 43	58.6	16 33.2	87 42	58.1	18 17.7	87 42	57.1	20 01.8	87 41	56.0	20 27.7	87 41	55.7	21 19.6	86 41	55.2	110
1	14 22.8	88 42	58.3	14 49.1	88 42	58.1	15 15.4	88 42	57.8	16 07.9	87 42	57.3	17 52.6	87 41	56.3	19 37.0	87 41	55.3	20 03.0	87 41	55.0	20 55.1	87 40	54.5	1
2	13 57.4	88 42	57.5	14 23.8	88 42	57.3	14 50.1	88 42	57.0	15 42.7	88 42	56.5	17 27.7	87 41	55.5	19 12.5	87 40	54.5	19 38.6	87 40	54.2	20 30.8	87 40	53.7	2
3	13 32.2	88 42	56.7	13 58.7	88 42	56.5	14 25.1	88 41	56.2	15 17.8	88 41	55.7	17 03.1	88 41	54.7	18 48.2	87 40	53.7	19 14.4	87 40	53.5	20 06.7	87 40	52.9	3
4	13 07.3	88 41	55.9	13 33.8	88 41	55.7	14 00.2	88 41	55.4	14 53.1	88 41	54.9	16 38.8	88 40	54.0	18 24.1	88 40	53.0	18 50.4	88 40	52.7	19 42.9	87 39	52.2	4
115	12 42.5	89 41	55.1	13 09.1	89 41	54.9	13 35.6	89 40	54.6	14 28.7	89 40	54.2	16 14.6	89 40	53.2	18 00.3	88 39	52.2	18 26.6	88 39	51.9	19 19.3	88 39	51.4	115
6	12 18.1	89 40	54.3	12 44.7	89 40	54.1	13 11.3	89 40	53.8	14 04.5	89 40	53.4	15 50.7	89 39	52.4	17 36.7	88 39	51.4	18 03.1	88 39	51.2	18 56.0	88 38	50.7	6
7	11 53.8	89 40	53.5	12 20.9	89 40	53.3	12 47.2	89 40	53.0	13 40.6	89 40	52.6	15 27.1	89 39	51.6	17 13.4	88 38	50.7	17 39.9	88 38	50.4	18 32.9	88 38	49.9	7
8	11 29.8	89 40	52.7	11 56.6	89 39	52.5	12 23.4	89 39	52.2	13 16.9	89 39	51.8	15 03.7	89 39	50.8	16 50.3	88 38	49.9	17 16.9	88 38	49.6	18 10.1	88 38	49.2	8
9	11 06.1	90 39	51.9	11 32.9	89 39	51.7	11 59.8	89 39	51.4	12 53.4	89 39	51.0	14 40.6	89 38	50.1	16 27.5	88 38	49.1	16 54.2	88 37	48.9	17 47.5	88 37	48.4	9
120	10 42.6	90 39	51.1	11 09.5	90 39	50.9	11 36.4	90 38	50.6	12 30.2	90 38	50.2	14 17.7	89 38	49.3	16 04.9	89 37	48.3	16 31.7	89 37	48.1	17 25.2	89 37	47.6	120
1	10 19.4	90 38	50.3	10 46.4	90 38	50.1	11 13.4	90 38	49.8	12 07.3	90 38	49.4	13 55.1	90 37	48.5	15 42.6	90 37	47.6	16 09.5	89 37	47.3	17 03.2	89 36	46.9	1
2	9 56.4	90 38	49.5	10 23.5	90 38	49.3	10 50.6	90 38	49.0	11 44.7	90 37	48.6	13 32.8	90 37	47.7	15 20.6	90 36	46.8	15 47.6	90 36	46.6	16 41.4	90 36	46.1	2
3	9 33.8	91 37	48.7	10 00.9	90 37	48.5	10 28.1	90 37	48.2	11 22.3	90 37	47.8	13 10.7	90 36	46.9	14 58.9	90 36	46.0	15 25.9	90 36	45.8	16 19.9	90 35	45.4	3
4	9 11.4	91 37	47.9	9 38.6	91 37	47.6	10 05.8	91 37	47.4	11 00.2	91 36	47.0	12 48.9	91 36	46.1	14 37.5	90 35	45.3	15 04.6	90 35	45.0	15 58.7	90 35	44.6	4
125	8 49.3	91 36	47.0	9 16.6	91 36	46.8	9 43.9	91 36	46.6	10 38.4	91 36	46.2	12 27.4	91 35	45.4	14 16.3	91 35	44.5	14 43.5	91 35	44.3	15 37.8	91 34	43.8	125
6	8 27.5	91 36	46.2	8 54.8	91 36	46.0	9 22.2	91 36	45.8	10 16.9	91 35	45.4	12 06.2	91 35	44.6	13 55.4	91 34	43.7	14 22.7	91 34	43.5	15 17.2	91 34	43.1	6
7	8 06.0	92 35	45.4	8 33.4	91 35	45.2	9 00.8	91 35	45.0	9 55.7	91 35	44.6	11 45.3	91 34	43.8	13 34.8	91 34	42.9	14 02.2	91 34	42.7	14 56.8	91 33	42.3	7
8	7 44.7	92 35	44.6	8 12.3	92 35	44.4	8 39.8	92 35	44.2	9 34.8	92 34	43.8	11 24.7	92 34	43.0	13 14.5	91 33	42.2	13 42.0	91 33	41.9	14 36.8	91 33	41.5	8
9	7 23.8	92 34	43.8	7 51.4	92 34	43.6	8 19.0	92 34	43.4	9 14.2	92 34	43.0	11 04.4	92 33	42.2	12 54.6	92 33	41.4	13 22.1	92 33	41.2	14 17.1	92 32	40.8	9
130	7 03.2	92 34	43.0	7 30.9	92 34	42.8	7 58.6	92 34	42.6	8 53.9	92 33	42.2	10 44.4	92 33	41.4	12 34.9	92 32	40.6	13 02.5	92 32	40.4	13 57.6	92 32	40.0	130
1	6 42.9	92 33	42.1	7 10.7	92 33	42.0	7 38.4	92 33	41.8	8 33.9	92 33	41.4	10 24.8	92 32	40.6	12 15.5	92 32								

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and declination values for various latitude ranges from 00 to 90 degrees. Each latitude range has a corresponding declination value, and the table is organized into 5-degree intervals.

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00'			37° 00'			38° 30'			40° 00'			42° 00'			42° 30'			48° 00'			45° 00'			H.A.
	Alt.	Ad	Az.																						
91	30 07.9	82 47	69.3	30 56.7	81 46	68.6	32 09.6	81 46	67.6	33 22.0	80 46	66.5	34 57.6	79 46	65.0	35 21.3	79 46	64.7	35 45.0	79 46	64.3	37 18.9	78 44	62.7	91
2	29 39.9	82 46	68.5	30 28.9	81 46	67.8	31 41.9	81 46	66.8	32 54.5	80 46	65.8	34 30.5	80 46	64.3	34 54.3	79 46	64.0	35 18.0	79 46	63.6	36 52.3	78 44	62.1	2
3	29 12.0	82 46	67.7	30 01.1	82 46	67.1	31 14.4	81 46	66.1	32 27.2	81 46	65.0	34 03.5	80 46	63.6	34 27.4	80 46	63.2	34 51.3	79 44	62.9	36 25.9	78 44	61.4	3
4	28 44.3	82 46	67.0	29 33.6	82 46	66.3	30 47.1	81 46	65.3	32 00.1	81 46	64.3	33 06.7	80 46	62.9	34 00.7	80 46	62.5	34 24.6	80 44	62.2	35 59.7	79 43	60.7	4
95	28 16.8	82 46	66.2	29 06.2	82 46	65.6	30 19.9	82 46	64.6	31 33.2	81 46	63.6	33 10.1	80 44	62.2	33 34.2	80 44	61.8	33 58.2	80 44	61.5	35 33.6	79 43	60.0	95
6	27 49.4	82 46	65.5	28 39.0	82 46	64.8	29 52.9	82 46	63.9	31 06.4	81 44	62.8	32 43.6	81 44	61.5	33 07.8	80 44	61.1	33 31.1	81 00	60.4	35 07.0	79 43	59.3	6
7	27 22.2	82 46	64.7	28 11.9	82 46	64.1	29 26.1	82 44	63.1	30 39.8	82 44	62.1	32 17.4	81 43	60.8	32 41.6	81 43	60.4	33 05.8	81 43	60.4	34 47.0	80 43	58.6	7
8	26 55.2	82 46	64.0	27 45.0	82 46	63.3	28 59.4	82 44	62.4	30 13.4	82 44	61.4	31 51.3	81 43	60.0	32 15.6	81 43	59.7	32 39.9	81 43	59.4	34 16.5	80 42	57.9	8
9	26 28.3	82 46	63.2	27 18.3	82 44	62.6	28 32.9	82 44	61.6	29 47.1	82 43	60.7	31 25.4	82 43	59.3	31 49.8	81 43	59.0	32 14.2	81 43	58.6	33 51.2	80 42	57.2	9
100	26 01.6	84 44	62.5	26 51.7	83 44	61.8	28 06.6	83 44	60.9	29 21.1	83 43	59.9	30 59.7	82 43	58.6	31 24.2	82 42	57.9	30 58.8	82 42	57.6	31 48.7	82 42	56.6	100
1	25 35.1	84 44	61.7	26 25.4	84 44	61.1	27 40.5	83 43	60.2	28 55.2	83 43	59.2	30 34.2	82 42	57.9	30 58.2	82 42	57.6	31 23.4	82 42	57.2	33 01.1	81 41	55.9	1
2	25 08.8	84 44	60.9	25 59.2	84 43	60.3	27 14.5	84 43	59.4	28 29.5	83 42	58.5	30 06.9	82 42	57.2	30 33.6	82 42	56.9	30 58.2	82 42	56.5	32 36.4	81 41	55.2	2
3	24 42.7	84 43	60.2	25 33.2	84 43	59.6	26 48.8	84 43	58.7	28 04.0	83 42	57.8	29 43.7	83 42	56.5	30 08.6	83 41	56.2	30 33.3	82 41	55.8	32 11.9	82 41	54.5	3
4	24 16.7	85 43	59.4	25 07.5	84 43	58.9	26 23.3	84 42	58.0	27 38.8	84 42	57.0	29 18.8	83 41	55.8	29 43.7	83 41	55.5	30 08.6	82 41	55.1	31 47.5	82 40	53.8	4
105	23 51.0	85 43	58.7	24 41.9	85 42	58.1	25 58.0	84 42	57.2	27 13.7	84 41	56.3	28 54.1	83 41	55.1	29 19.1	83 41	54.8	29 44.1	83 40	54.4	31 23.4	82 40	53.1	105
6	23 25.5	85 42	57.9	24 16.5	85 42	57.4	25 32.8	85 42	56.5	26 48.8	84 41	55.6	28 29.6	84 40	54.4	28 54.7	84 40	54.1	29 19.8	83 40	53.7	30 59.5	83 39	52.5	6
7	23 00.1	85 42	57.2	23 51.4	85 42	56.6	25 07.9	85 41	55.8	26 24.2	85 41	54.9	28 05.4	84 40	53.7	28 30.5	84 40	53.4	28 55.7	84 40	53.0	30 35.8	83 39	51.8	7
8	22 35.0	86 41	56.4	23 26.4	86 41	55.9	24 43.2	85 41	55.0	25 59.8	85 40	54.2	27 41.3	84 40	53.0	28 06.6	84 40	52.7	28 31.8	84 39	52.3	30 12.4	84 39	51.1	8
9	22 10.1	86 41	55.7	23 01.7	86 41	55.1	24 18.8	85 40	54.3	25 35.6	85 40	53.4	27 17.5	85 39	52.2	27 42.9	85 39	51.9	28 08.2	84 39	51.6	29 49.2	84 38	50.4	9
110	21 45.5	86 41	54.9	22 37.2	86 40	54.4	23 54.5	86 40	53.6	25 11.6	85 40	52.7	26 53.9	85 39	51.5	27 19.3	85 39	51.2	27 44.8	85 39	50.9	29 26.2	84 38	49.7	110
1	21 21.0	87 40	54.2	22 12.9	86 40	53.6	23 30.5	86 40	52.8	24 47.8	86 39	52.0	26 30.5	85 39	50.8	26 56.1	85 38	50.5	27 21.6	86 38	50.2	29 03.4	86 38	49.0	1
2	20 56.8	87 40	53.4	21 48.9	87 40	52.9	23 06.7	86 39	52.1	24 24.3	86 39	51.3	26 07.3	86 38	50.1	26 33.0	86 38	49.8	26 58.7	86 38	49.5	28 40.8	86 37	48.4	2
3	20 32.8	87 40	52.7	21 25.1	87 39	52.2	22 43.2	87 39	51.4	24 01.0	86 38	50.5	25 44.4	86 38	49.4	26 10.2	86 38	49.1	26 36.0	86 37	48.8	28 18.5	86 37	47.7	3
4	20 09.1	87 39	51.9	21 01.5	87 39	51.4	22 19.9	87 38	50.6	23 38.0	87 38	49.8	25 21.8	86 37	48.7	25 47.6	86 37	48.4	26 13.5	86 37	48.1	27 56.5	86 36	47.0	4
115	19 45.6	88 39	51.2	20 38.2	87 38	50.7	21 56.8	87 38	49.9	23 15.2	87 38	49.1	24 59.4	87 37	48.0	25 25.3	87 37	47.7	25 51.3	86 37	47.4	27 34.7	86 36	46.3	115
6	19 22.4	88 38	50.4	20 15.1	88 38	49.9	21 34.0	88 38	49.1	22 52.7	87 37	48.4	24 37.2	87 37	47.3	25 03.3	87 36	47.0	25 29.3	87 36	46.7	27 13.1	86 36	45.6	6
7	18 59.4	88 38	49.7	19 52.2	88 38	49.2	21 11.4	88 37	48.4	22 30.4	88 37	47.6	24 17.5	87 36	46.6	24 41.7	87 36	46.3	25 07.6	87 36	46.0	26 51.8	87 35	44.9	7
8	18 36.6	88 37	48.9	19 29.7	88 37	48.4	20 49.1	88 37	47.7	22 08.3	88 36	46.9	23 53.6	88 36	45.9	24 19.9	87 36	45.6	24 46.1	87 35	45.3	26 30.7	87 35	44.2	8
9	18 14.1	89 37	48.2	19 07.4	89 37	47.7	20 27.1	88 36	46.9	21 46.6	88 36	46.2	23 32.2	88 35	45.2	23 58.6	88 35	44.9	24 24.9	88 35	44.6	26 09.7	87 34	43.6	9
120	17 51.9	89 37	47.4	18 45.3	89 36	46.9	20 05.3	89 36	46.2	21 25.0	89 36	45.4	23 11.1	88 35	44.4	23 37.5	88 35	44.2	24 04.0	88 34	43.9	25 49.4	88 34	42.9	120
1	17 30.0	89 36	46.6	18 23.5	89 36	46.2	19 43.8	89 35	45.5	21 03.8	89 35	44.7	22 50.7	88 34	43.7	23 16.8	88 34	43.5	23 43.3	88 34	43.2	25 29.1	88 33	42.2	1
2	17 08.3	90 36	45.9	18 02.0	90 35	45.4	19 22.5	89 35	44.7	20 22.8	89 34	44.0	22 29.6	89 34	43.0	22 56.3	89 34	42.8	23 22.9	89 34	42.5	25 09.1	88 33	41.5	2
3	16 46.9	90 35	45.1	17 40.8	90 35	44.7	19 01.5	90 34	44.0	20 42.1	89 34	43.3	22 09.3	89 33	42.3	22 36.0	89 33	42.0	23 02.7	89 33	41.8	24 49.4	88 32	40.8	3
4	16 25.8	90 35	44.4	17 19.9	90 34	43.9	18 40.9	90 34	43.2	20 01.7	90 34	42.5	21 49.2	89 33	41.6	22 16.1	89 33	41.3	22 42.9	89 33	41.1	24 29.9	88 32	40.1	4
125	16 04.9	90 34	43.6	16 59.2	90 34	43.2	18 20.5	90 34	42.5	19 41.6	90 33	41.8	21 29.5	90 32	40.9	21 56.4	90 32	40.6	22 23.3	90 32	40.4	24 10.7	89 32	39.4	125
6	15 44.4	91 34	42.8	16 38.8	91 33	42.4	18 00.3	91 33	41.7	19 21.7	91 33	41.1	21 10.0	90 32	40.1	21 37.0	90 32	39.9	22 04.0	90 32	39.7	23 51.8	90 31	38.7	6
7	15 24.1	91 33	42.1	16 18.7	91 33	41.6	17 40.5	91 33	41.0	19 02.2	91 32	40.3	20 50.8	90 32	39.4	21 17.9	90 31	39.2	21 45.0	90 31	39.0	23 33.0	90 31	38.0	7
8	15 04.2	91 33	41.3	15 58.9	91 32	40.9	17 21.0	91 32	40.2	18 42.9	91 32	39.6	20 31.9	91 31	38.7	20 59.1	91 31	38.5	21 26.3	91 31	38.3	23 14.8	90 30	37.3	8
9	14 44.5	92 32	40.6	15 39.5	91 32	40.1	17 01.7	91 32	39.5	18 23.9	91 31	38.9	20 13.3	91 31	38.0	20 40.6	91 30	37.8	21 07.9	91 30	37.5	22 56.8	91 30	36.6	9
130	14 25.2	92 32	39.8	15 20.3	92 31	39.4	16 42.8	92 31	38.8	18 05.2	92 31	38.1	19 55.0	91 30	37.3	20 22.3	91 30	37.0	20 49.7	91 30	36.8	22 39.0	91 29	35.9	130
1	14 06.1	92 31	39.0	15 01.4	92 31	38.6	16 24.2	92 31	38.0	17 46.9	92 30	37.4	19 36.9	92 30	36.5										

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and declination values (00, 01, 02, 03, 04) for various latitude ranges (46° 00' to 54° 00').

DECLINATION SAME NAME AS LATITUDE

Main table with columns for Right Ascension (RA) and Declination (Dec) values. The table is organized into rows corresponding to declination values from 60° to 180°. Each row contains multiple columns of RA values, with some rows including sub-columns for 'Alt.' and 'Az.'.

Lat. 60°
Lat. 61°
Lat. 62°
Lat. 63°
Lat. 64°
La 65

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30'			55° 00'			56° 00'			56° 30'			57° 00'			57° 30'			59° 00'			59° 30'			H.A.
	Alt.	Δd	Δz																						
00	84 30.0	1.0 03	180.0	85 00.0	1.0 03	180.0	86 00.0	1.0 03	180.0	86 30.0	1.0 04	180.0	87 00.0	1.0 04	180.0	87 30.0	1.0 06	180.0	89 00.0	1.0 12	180.0	89 30.0	1.0 21	180.0	00
1	84 28.4	1.0 08	174.0	84 58.3	1.0 08	173.4	85 57.9	99 10	172.0	86 27.6	99 12	171.0	86 57.3	99 13	169.7	87 26.8	98 15	167.8	88 52.8	90 30	152.7	89 17.4	71 41	134.4	01
2	84 23.7	98 13	168.0	84 53.2	98 14	167.0	85 51.8	97 17	164.3	86 20.8	98 18	162.4	86 49.4	98 21	159.9	87 17.6	98 24	158.6	88 34.5	71 40	133.7	88 52.6	46 47	115.5	02
3	84 16.9	97 18	162.3	84 44.9	98 19	160.9	85 41.8	94 22	157.0	86 09.7	92 24	154.4	86 39.0	90 27	151.1	87 03.7	86 30	146.8	88 10.7	87 44	122.0	88 24.5	34 48	107.0	03
4	84 05.5	94 22	156.8	84 33.6	93 23	155.0	85 28.5	90 27	150.4	85 55.0	87 29	147.3	86 20.7	84 32	143.4	86 45.1	79 35	138.6	87 44.2	47 46	114.5	87 55.4	27 49	102.2	04
05	83 52.5	91 26	151.7	84 19.7	90 27	149.6	85 12.3	85 31	144.3	85 37.4	82 33	140.9	86 01.4	78 36	136.8	86 24.0	72 39	131.8	87 16.4	40 48	109.3	87 26.0	23 50	99.1	05
6	83 37.2	88 29	146.9	84 03.4	88 31	144.6	84 53.7	81 34	138.9	85 17.4	77 37	135.4	85 39.8	72 39	131.2	86 00.6	66 42	126.2	86 47.8	35 48	105.6	86 56.2	21 50	96.8	06
7	83 19.8	85 32	142.5	83 45.0	83 33	140.0	84 33.0	77 37	134.1	84 55.4	73 39	130.5	85 16.4	67 41	126.3	85 35.7	61 43	121.5	86 18.7	32 49	102.7	86 26.4	19 50	95.0	07
8	83 00.7	82 34	138.4	83 24.9	79 36	135.9	84 10.7	73 39	129.9	84 31.9	68 41	126.3	84 51.6	63 43	122.2	85 09.6	57 45	117.6	85 49.3	30 49	100.4	85 56.5	18 50	93.6	08
9	82 40.0	79 37	134.6	83 03.3	76 38	132.1	83 47.1	69 41	126.1	84 07.2	65 43	122.6	84 25.8	59 45	118.6	84 42.6	53 46	114.3	85 19.7	28 50	98.4	85 26.5	18 50	92.4	09
10	82 18.1	76 39	131.2	82 40.5	73 40	128.6	83 22.3	66 43	122.7	83 41.4	61 44	119.3	83 59.0	56 46	115.5	84 15.0	50 47	111.4	84 49.9	27 50	96.8	84 56.6	17 50	91.3	10
1	81 54.9	73 40	128.0	82 16.5	70 41	125.5	82 56.7	63 44	119.7	83 14.9	58 45	116.4	83 31.7	53 47	112.8	83 46.8	47 48	108.9	84 20.1	26 50	95.4	84 26.6	17 50	90.4	11
2	81 30.8	71 42	125.1	81 51.7	68 43	122.6	82 30.6	60 45	117.0	82 47.7	56 46	113.8	83 03.8	51 47	110.4	83 18.2	45 48	106.7	83 50.2	25 50	94.1	83 56.6	17 50	89.5	12
3	81 05.9	69 43	122.4	81 26.0	66 44	120.0	82 03.2	58 46	114.5	82 20.0	54 47	111.5	82 35.4	49 48	108.2	82 49.3	44 49	104.7	83 20.3	25 50	93.0	83 26.6	17 50	88.7	13
4	80 40.2	67 44	119.9	80 59.7	63 45	117.6	81 35.7	56 47	112.3	81 51.9	52 47	109.3	82 06.8	47 48	106.2	82 20.2	42 49	102.9	82 50.3	24 50	91.9	82 56.6	18 50	88.0	14
15	80 13.9	65 46	117.6	80 32.9	62 46	115.3	81 07.7	54 47	110.2	81 23.4	50 48	107.4	81 37.8	46 49	104.4	81 50.8	41 49	101.3	82 20.3	24 50	91.0	82 26.6	18 50	87.3	15
6	79 47.1	63 48	115.5	80 05.5	60 46	113.2	80 39.4	53 48	108.3	80 54.7	49 48	105.6	81 08.7	45 49	102.8	81 21.4	40 49	99.8	81 50.3	24 50	90.1	81 56.6	18 50	86.6	16
7	79 19.8	61 46	113.5	79 37.8	58 47	111.3	80 10.8	52 48	106.6	80 25.7	48 49	104.0	80 39.3	44 49	101.3	80 51.7	39 50	98.4	81 20.3	24 50	89.2	81 26.7	19 50	86.0	17
8	78 52.0	60 47	111.7	79 09.6	57 47	109.5	79 41.9	50 48	104.9	79 56.4	47 49	102.4	80 09.8	43 49	99.9	80 22.0	38 50	97.2	80 50.3	24 50	88.4	80 56.8	19 50	85.3	18
9	78 24.0	59 47	109.9	78 41.2	56 48	107.8	79 12.8	49 49	103.4	79 27.1	46 49	101.0	79 40.2	42 50	98.5	79 52.2	38 50	96.0	80 20.3	24 50	87.7	80 26.9	19 50	84.7	19
20	77 55.7	58 48	108.3	78 12.5	55 48	106.3	78 43.5	48 49	102.0	78 57.6	45 49	99.7	79 10.5	41 50	97.3	79 22.3	37 50	94.8	79 50.4	25 50	86.9	79 57.0	20 50	84.2	20
1	77 27.1	57 48	106.7	77 43.6	54 48	104.8	78 14.1	48 49	100.6	78 27.9	44 50	98.4	78 40.7	41 50	96.1	78 52.4	37 50	93.8	79 20.4	25 50	86.2	79 27.2	20 50	83.6	21
2	76 58.2	56 48	105.2	77 14.5	53 48	103.3	77 44.6	47 49	99.4	77 58.2	44 50	97.2	78 10.9	40 50	95.0	78 22.5	37 50	92.8	78 50.5	25 50	85.5	78 57.4	21 50	83.0	22
3	76 29.2	55 49	103.8	76 45.3	52 49	102.0	77 14.9	47 50	98.1	77 28.4	43 50	96.1	77 41.0	40 50	94.0	77 52.5	37 50	91.8	78 20.6	26 50	84.9	78 27.7	21 50	82.5	23
4	76 00.0	54 49	102.5	76 15.8	52 49	100.7	76 45.2	46 50	97.0	76 58.6	43 50	95.0	77 11.0	40 50	93.0	77 22.5	37 50	90.9	77 50.7	26 50	84.2	77 57.9	22 49	81.9	24
25	75 30.6	54 49	101.2	75 46.3	51 49	99.5	76 15.4	46 50	95.9	76 28.7	43 50	94.0	76 41.0	40 50	92.0	76 52.5	37 50	90.0	77 20.9	26 50	83.6	77 28.2	23 49	81.4	25
6	75 01.1	53 49	100.0	75 16.7	51 50	98.3	75 45.5	45 50	94.8	75 58.7	43 50	93.0	76 11.1	40 50	91.1	76 22.5	37 50	89.2	76 51.1	27 50	83.0	76 58.6	23 49	80.9	26
7	74 31.5	53 49	98.8	74 47.0	50 50	97.2	75 15.6	45 50	93.8	75 28.7	42 50	92.0	75 41.1	40 50	90.2	75 52.5	37 50	88.3	76 21.4	27 50	82.6	76 29.0	24 49	80.3	27
8	74 01.8	52 50	97.7	74 17.2	50 50	96.1	74 45.6	45 50	92.9	74 58.4	42 50	91.1	75 11.1	40 50	89.4	75 22.5	37 50	87.5	75 51.6	28 49	81.8	75 59.5	24 49	79.8	28
9	73 32.1	52 50	96.6	73 47.3	50 50	95.1	74 15.7	45 50	91.9	74 28.8	42 50	90.2	74 41.1	40 50	88.5	74 52.6	37 50	86.8	75 22.0	28 49	81.2	75 30.0	25 49	79.3	29
30	73 02.3	52 50	95.6	73 17.4	49 50	94.1	73 45.7	45 50	91.0	73 58.8	42 50	89.4	74 11.1	40 50	87.7	74 22.6	37 50	86.0	74 52.3	29 49	80.7	75 00.5	26 49	78.8	30
1	72 32.4	51 50	94.6	72 47.5	49 50	93.1	73 15.7	45 50	90.1	73 28.8	42 50	88.5	73 41.1	40 50	86.9	73 52.7	37 50	85.3	74 22.8	29 49	80.1	74 31.1	26 49	78.3	1
2	72 02.5	51 50	93.6	72 17.5	49 50	92.2	72 45.7	45 50	89.3	72 58.8	42 50	87.7	73 11.2	40 50	86.2	73 22.8	38 50	84.6	73 53.0	30 49	79.6	74 01.7	27 49	77.8	2
3	71 32.5	51 50	92.7	71 47.5	49 50	91.3	72 15.7	45 50	88.4	72 28.8	42 50	86.9	72 41.3	40 50	85.4	72 53.0	38 50	83.9	73 23.8	30 49	79.0	73 32.4	28 49	77.3	3
4	71 02.5	51 50	91.7	71 17.5	49 50	90.3	71 45.7	45 50	87.6	71 58.9	43 50	86.2	72 11.4	40 50	84.7	72 23.2	38 50	83.2	72 54.3	31 49	78.5	73 03.2	28 49	76.8	4
35	70 32.5	51 50	90.8	70 47.5	49 50	89.5	71 15.7	45 50	86.8	71 28.9	43 50	85.4	71 41.5	41 50	84.0	71 53.4	39 50	82.5	72 25.0	31 49	77.9	72 34.0	29 49	76.3	35
6	70 02.5	51 50	90.0	70 17.5	49 50	88.7	70 45.8	45 50	86.0	70 59.1	43 50	84.7	71 11.7	41 50	83.3	71 23.7	39 49	81.8	71 55.7	32 49	77.4	72 04.9	30 48	75.8	6
7	69 32.5	51 50	89.1	69 47.5	49 50	87.9	70 15.9	45 50	85.3	70 29.2	43 50	84.0	70 41.9	41 50	82.6	70 54.0	39 49	81.2	71 26.4	33 49	76.9	71 35.8	30 48	75.4	7
8	69 02.5	51 50	88.3	69 17.6	49 50	87.1	69 46.0	46 50	84.5	69 59.4	44 50	83.2	70 12.2	42 49	81.9	70 24.4	40 49	80.6	70 57.2	33 49	76.3	71 06.8	31 48	74.9	8
9	68 32.6	51 50	87.5	68 47.6	49 50	86.3	69 16.2	46 50	83.8	69 29.6	44 50	82.5	69 42.5	42 49	81.2	69 54.8	40 49	79.9	70 28.1	34 48	75.8	70 37.9	32 48	74.4	9
40																									

DECLINATION SAME NAME AS LATITUDE

Main table with columns for HA (91-180), Alt., Az., and Az. for various declinations (54° 30' to 59° 30').

Lat. 60° L 6 L 6

Vertical text on the left margin, possibly a scale or index.

DECLINATION SAME NAME AS LATITUDE

H.A.	60° 00'		60° 30'		62° 00'		62° 30'		63° 00'		69° 00'		69° 30'		74° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
00	90 00.0	00 00	89 30.0	00 00	88 00.0	00 00	87 30.0	00 00	87 00.0	00 00	81 00.0	00 00	80 30.0	00 00	75 30.0	00 00	00
1	89 30.0	01 50	89 17.8	01 44.3	87 56.6	01 13.2	87 27.3	01 05.5	86 57.8	01 08.6	80 59.4	01 08.2	80 29.4	01 08.2	75 29.7	01 01.1	1
2	89 00.0	02 50	88 53.3	02 46.2	87 46.6	02 25.0	87 19.3	02 21.2	86 51.1	02 16.8	80 57.6	02 04.6	80 27.8	02 04.2	75 28.9	01 02.2	2
3	88 30.0	03 50	88 27.8	03 48.7	87 31.7	03 34.7	87 06.8	03 28.7	86 40.6	03 24.2	80 54.6	03 06.8	80 25.0	03 06.3	75 27.9	00 08.2	3
4	88 00.0	04 50	88 22.2	04 48.1	87 26.2	04 34.2	87 01.9	04 28.2	86 34.4	04 23.7	80 50.5	02 09.0	80 21.2	02 08.4	75 25.5	00 04.2	4
05	87 30.0	05 50	87 22.2	05 46.4	86 51.5	05 30.8	86 32.0	05 24.7	86 10.1	05 21.1	80 45.2	05 11.2	80 16.3	05 10.4	75 23.0	00 05.3	05
6	87 00.0	06 50	87 17.8	06 42.9	86 58.9	06 27.1	86 41.1	06 21.1	86 18.4	06 17.4	80 38.8	06 13.3	80 10.4	06 12.4	75 20.0	00 06.3	6
7	86 30.0	07 50	87 13.3	07 38.8	86 53.8	07 22.9	86 36.8	07 16.9	86 14.1	07 13.1	80 31.4	07 08.4	80 03.4	07 07.4	75 16.4	00 07.4	7
8	86 00.0	08 50	87 08.9	08 30.8	86 49.9	08 14.9	86 32.9	08 08.9	86 10.1	08 04.1	80 22.9	08 01.1	79 55.5	08 01.1	75 12.3	00 08.4	8
9	85 30.2	09 50	87 04.4	09 16.7	86 45.4	09 00.7	86 28.4	08 54.7	86 05.6	08 50.6	80 13.5	08 46.7	79 46.7	08 46.7	75 07.7	00 09.4	9
10	85 00.0	10 50	87 00.0	10 00.0	86 41.1	09 44.4	86 24.4	09 38.8	86 01.1	09 34.2	80 03.1	09 30.5	79 37.0	09 28.0	75 02.6	00 10.4	10
1	84 30.4	11 50	86 55.5	11 40.0	86 32.2	11 24.4	86 15.5	11 18.8	85 52.2	11 14.2	79 51.9	11 10.6	79 26.5	11 09.0	74 56.9	00 11.3	1
2	84 00.5	12 50	86 51.1	12 30.0	86 27.8	12 14.4	86 11.1	12 08.8	85 47.9	12 04.2	79 39.8	12 00.6	79 15.2	12 00.0	74 50.8	00 12.3	2
3	83 30.6	13 50	86 46.7	13 10.0	86 23.4	12 54.4	86 06.7	12 48.8	85 33.6	12 44.2	79 27.0	12 38.4	79 03.1	12 32.8	74 44.2	00 13.2	3
4	83 00.8	14 50	86 42.3	13 00.0	86 19.1	12 44.4	86 02.4	12 38.8	85 29.8	12 34.2	79 13.4	12 28.6	78 50.3	12 23.0	74 37.1	00 14.1	4
15	82 31.0	15 50	86 37.9	14 50.0	86 14.6	14 34.4	85 57.9	14 28.8	85 34.2	14 24.2	78 59.2	14 18.6	78 36.8	14 13.0	74 29.5	00 15.0	15
6	82 01.2	16 50	86 33.5	15 40.0	86 10.2	15 24.4	85 53.2	15 18.8	85 29.8	15 14.2	78 44.3	15 08.6	78 22.8	15 03.0	74 21.6	00 15.9	6
7	81 31.4	17 50	86 29.1	16 30.0	86 05.8	16 14.4	85 48.5	16 08.8	85 25.1	16 04.2	78 28.9	15 58.0	78 06.1	15 52.4	74 13.2	00 16.7	7
8	81 01.7	18 50	86 24.7	17 20.0	86 01.4	17 04.4	85 44.1	16 58.8	85 20.7	16 54.2	78 12.9	15 52.4	77 52.9	15 46.8	74 04.3	00 17.5	8
9	80 32.0	19 50	86 20.3	18 10.0	85 57.0	17 48.4	85 39.8	17 42.8	85 16.6	17 38.0	77 56.4	15 46.8	77 32.1	15 41.2	73 55.1	00 18.3	9
20	80 02.3	20 50	86 15.9	19 00.0	85 52.6	18 42.4	85 34.4	18 36.8	85 11.2	18 32.0	77 39.4	15 41.2	77 21.0	15 35.4	73 45.5	00 19.1	20
1	79 32.6	21 50	86 11.5	19 50.0	85 48.2	19 36.4	85 30.0	19 30.8	85 06.4	19 26.0	77 22.0	15 35.4	77 04.4	15 29.8	73 35.5	00 19.8	1
2	79 03.0	22 50	86 07.1	20 40.0	85 43.8	20 22.4	85 25.6	20 16.8	85 01.8	20 12.0	77 04.4	15 29.8	76 47.3	15 24.2	73 25.2	00 20.2	2
3	78 33.5	23 50	86 02.7	21 30.0	85 39.4	21 08.8	85 21.2	21 03.2	84 77.6	20 57.6	76 46.0	15 24.2	76 29.9	15 18.6	73 15.2	00 21.2	3
4	78 04.0	24 50	85 98.3	22 20.0	85 35.0	21 44.4	85 17.0	21 38.8	84 63.4	21 33.2	76 27.5	15 18.6	76 12.2	15 13.0	73 03.4	00 21.9	4
25	77 34.5	25 50	85 93.9	23 10.0	85 30.6	22 30.8	85 12.4	22 25.2	84 49.4	22 19.6	76 06.6	15 13.0	75 54.1	15 07.4	72 52.1	00 22.5	25
6	77 05.0	26 50	85 89.5	24 00.0	85 26.2	23 16.8	85 08.0	23 11.2	84 45.0	23 05.6	75 49.5	15 07.4	75 35.7	15 01.8	72 40.4	00 23.2	6
7	76 35.6	27 50	85 85.1	24 50.0	85 21.8	24 08.8	85 03.6	24 03.0	84 40.6	23 57.4	75 30.1	15 01.8	75 17.1	14 56.2	72 28.5	00 23.8	7
8	76 06.3	28 50	85 80.7	25 40.0	85 17.4	25 00.0	84 99.2	24 54.4	84 36.0	24 48.4	75 10.5	14 56.2	74 58.2	14 50.6	72 16.3	00 24.3	8
9	75 37.0	29 50	85 76.3	26 30.0	85 13.0	25 48.8	84 94.8	25 43.2	84 31.6	25 37.6	74 50.7	14 50.6	74 39.1	14 45.0	72 03.8	00 24.9	9
30	75 07.7	30 50	85 71.9	27 20.0	85 08.6	26 47.2	84 90.4	26 41.6	84 27.2	26 35.6	74 30.7	14 45.0	74 19.7	14 39.0	71 51.0	00 25.4	30
1	74 38.5	31 50	85 67.5	28 10.0	85 04.2	27 45.6	84 86.0	27 40.0	84 23.0	27 34.4	74 10.4	14 39.0	74 00.2	14 33.4	71 38.0	00 25.9	1
2	74 09.4	32 50	85 63.1	29 00.0	85 00.0	28 44.0	84 81.6	28 38.4	84 18.4	28 32.8	73 50.0	14 33.4	73 40.4	14 27.8	71 24.8	00 26.4	2
3	73 40.3	33 50	85 58.7	29 50.0	84 55.8	29 42.4	84 77.2	29 36.8	84 14.0	29 31.2	73 29.5	14 27.8	73 20.6	14 22.2	71 11.4	00 26.8	3
4	73 11.3	34 50	85 54.3	30 40.0	84 51.4	30 40.8	84 72.8	30 35.2	84 09.6	30 29.6	73 08.9	14 22.2	73 00.5	14 16.6	70 57.7	00 27.3	4
35	72 42.3	35 50	85 49.9	31 30.0	84 47.0	31 39.2	84 68.4	31 33.6	84 05.2	31 28.0	72 48.1	14 16.6	72 40.4	14 11.0	70 43.9	00 27.7	35
6	72 13.4	36 50	85 45.5	32 20.0	84 42.6	32 38.4	84 64.0	32 32.8	84 00.8	32 27.2	72 27.2	14 11.0	72 20.1	14 05.4	70 29.9	00 28.1	6
7	71 44.6	37 50	85 41.1	33 10.0	84 38.2	33 48.0	83 59.6	33 42.4	83 56.4	33 36.8	72 06.1	14 05.4	71 59.7	14 00.0	70 15.7	00 28.4	7
8	71 15.8	38 50	85 36.7	34 00.0	84 33.8	34 57.6	83 55.0	34 52.0	83 51.8	34 46.4	71 45.9	14 00.0	71 39.2	13 54.4	70 01.3	00 28.8	8
9	70 47.1	39 50	85 32.3	34 50.0	84 29.4	35 67.2	83 51.4	35 61.6	83 47.0	35 56.0	71 33.1	13 54.4	71 31.6	13 48.8	69 46.8	00 29.1	9
40	70 18.4	40 50	85 27.9	35 40.0	84 25.0	36 76.8	83 47.0	36 71.2	83 42.6	36 66.0	71 02.6	13 48.8	71 02.6	13 43.2	69 32.1	00 29.4	40
1	69 49.8	41 50	85 23.5	36 30.0	84 20.6	37 86.4	83 42.6	37 80.8	83 38.4	37 84.8	70 41.3	13 43.2	70 37.7	13 37.6	69 17.3	00 29.7	1
2	69 21.3	42 50	85 19.1	37 20.0	84 16.2	38 96.0	83 38.0	38 90.4	83 33.6	38 85.2	70 20.0	13 37.6	70 16.4	13 32.0	69 02.4	00 30.0	2
3	68 52.9	43 50	85 14.7	38 10.0	84 11.8	39 105.6	83 33.6	39 100.0	83 29.2	39 04.6	69 58.6	13 32.0	69 55.5	13 26.4	68 47.3	00 30.2	3
4	68 24.5	44 50	85 10.3	39 00.0	84 07.4	40 205.2	83 29.2	40 199.6	83 24.8	40 194.0	69 37.2	13 26.4	69 34.6	13 20.8	68 32.1	00 30.5	4
45	67 56.3	45 50	85 05.9	39 50.0	84 03.0	41 304.8	83 24.8	41 300.0	83 20.4	41 24.8	69 15.7	13 20.8	69 13.7	13 15.2	68 16.9	00 30.7	45
6	67 28.1	46 50	85 01.5	40 40.0	83 58.6	42 404.4	83 20.4	42 400.0	83 16.0	42 34.4	68 54.2	13 15.2	68 52.7	13 09.6	68 01.5	00 30.9	6
7	67 00.0	47 50	84 57.1	41 30.0	83 54.2	43 504.0	83 16.0	43 500.0	83 11.6	43 06.0	68 32.7	13 09.6	68 31.7	13 04.0	67 46.1	00 31.1	7
8	66 31.9	48 50	84 52.7	42 20.0	83 49.8	44 603.6	83 11.6	44 600.0	83 07.2	44 01.6	68 11.2	13 04.0	68 10.7	12 58.4	67 30.5	00 31.3	8
9	66 04.0	49 50	84 48.3	43 10.0	83 45.4	45 703.2	83 07.2	45 700.0	83 02.8	45 01.2	67 49.7	12 58.4	67 49.7	12 52.8	67 14.9	00 31.4	9
50	65 36.1	50 50	84 43.9	44 00.0	83 41.0	46 802.8	83 02.8	46 800.0	82 58.4	46 72.8	67 28.2	12 52.8	67 28.7	12 47.2	66 59.2	00 31.6	50
1	65 08.3	51 50	84 39.5	44 50.0	83 36.6	47 902.4	82 58.4	47 900.0	82 54.0	47 84.4	67 06.7	12 47.2	67 07.7	12 41.6	66 43.5	00 31.7	1
2	64 40.7	52 50	84 35.1	45 40.0	83 32.2	48 1020.0	82 54.0	48 1016.0	82 49.6	48 44.0	66 45.1	12 41.6</					

## DECLINATION SAME NAME AS LATITUDE

25

H.A.	60° 00'		60° 30'		62° 00'		62° 30'		63° 00'		69° 00'		69° 30'		74° 30'		H.A.								
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.									
91	48 12.8	66 37	48.6	48 32.6	66 37	48.0	49 30.8	64 36	46.3	49 49.9	63 36	45.7	50 08.7	63 36	45.1	53 38.8	64 30	37.2	53 54.8	63 30	36.5	56 19.5	63 24	28.8	91
2	47 50.4	67 37	48.1	47 48.4	68 37	47.6	49 09.2	65 36	45.8	49 28.5	64 36	45.3	49 47.6	64 36	44.7	53 20.7	66 30	36.9	53 37.0	64 29	36.2	56 05.1	64 24	28.6	2
3	47 28.2	67 37	47.6	47 48.3	67 36	47.1	48 47.8	65 35	45.4	49 27.6	64 35	44.8	49 46.6	64 35	44.2	53 02.8	66 30	36.5	53 19.4	65 29	35.8	55 50.8	64 24	28.4	3
4	47 06.1	68 36	47.1	47 26.4	68 36	46.6	48 26.5	65 35	44.9	48 46.2	65 35	44.3	49 05.7	65 34	43.8	52 45.0	67 29	36.2	53 01.9	66 29	35.5	55 36.6	64 24	28.2	4
95	46 44.2	69 36	46.6	47 04.7	69 36	46.1	48 05.4	67 35	44.4	48 25.3	66 35	43.9	48 45.1	66 34	43.3	52 27.4	68 29	35.9	52 44.5	67 29	35.2	55 22.5	68 23	27.9	95
6	46 22.5	69 36	46.1	46 43.2	69 36	45.6	47 44.5	67 35	44.0	48 24.6	67 34	43.4	48 44.8	67 34	42.9	52 09.9	68 29	35.5	52 27.3	68 28	34.9	55 08.5	68 23	27.7	6
7	46 01.0	70 36	45.6	46 21.9	69 35	45.1	47 23.7	68 34	43.5	47 44.1	67 34	43.0	48 04.2	67 34	42.4	51 52.5	69 29	35.2	52 10.2	68 28	34.5	54 54.6	68 23	27.5	7
8	45 39.6	71 35	45.1	46 00.7	70 35	44.6	47 03.2	69 34	43.0	47 23.7	68 34	42.5	47 44.1	68 33	41.9	51 35.3	69 28	34.8	51 53.3	68 28	34.2	54 40.8	68 23	27.2	8
9	45 18.4	71 35	44.6	45 39.7	71 35	44.1	46 42.8	69 34	42.6	47 03.5	69 33	42.0	47 24.1	68 33	41.5	51 18.2	61 28	34.5	51 36.5	61 28	33.8	54 27.1	63 23	27.0	9
100	44 57.5	72 35	44.1	45 19.0	71 34	43.6	46 22.6	70 33	42.1	46 43.6	70 33	41.6	47 04.4	69 33	41.0	51 01.3	62 28	34.1	51 19.9	62 27	33.5	54 13.5	64 22	26.8	100
1	44 36.7	72 34	43.6	44 58.4	72 34	43.1	46 02.6	71 33	41.6	46 23.7	70 33	41.1	46 44.8	70 32	40.6	50 44.6	63 28	33.8	51 03.4	62 27	33.2	54 00.1	65 22	26.5	1
2	44 16.1	73 34	43.1	44 38.0	73 34	42.6	45 42.8	71 33	41.1	46 04.1	71 32	40.6	46 25.3	70 32	40.1	50 28.0	64 27	33.4	50 47.1	63 27	32.8	53 46.8	66 22	26.3	2
3	43 55.7	74 34	42.6	44 17.8	73 33	42.1	45 23.1	72 32	40.6	46 06.1	71 32	39.6	46 26.1	71 32	39.6	50 11.5	65 27	33.1	50 30.9	64 27	32.5	53 33.6	67 22	26.0	3
4	43 35.5	74 33	42.1	43 57.7	74 33	41.6	45 03.7	73 32	40.2	45 25.4	72 32	39.7	45 47.1	72 31	39.2	49 55.3	66 27	32.7	50 14.9	65 26	32.1	53 20.5	68 22	25.7	4
105	43 15.5	75 33	41.5	43 37.9	74 33	41.1	44 44.4	74 32	39.7	45 06.4	73 31	39.2	45 28.2	73 31	38.7	49 39.1	67 27	32.3	49 59.0	66 26	31.7	53 07.5	69 21	25.5	105
6	42 55.7	75 33	41.0	43 18.3	75 32	40.6	44 25.4	74 31	39.2	44 47.5	74 31	38.7	45 09.5	73 31	38.2	49 23.2	67 26	32.0	49 43.3	67 26	31.4	52 54.6	69 21	25.2	6
7	42 36.1	76 32	40.5	42 58.9	76 32	40.1	44 06.5	75 31	38.7	44 28.9	74 31	38.2	44 51.1	74 30	37.8	49 07.4	68 26	31.6	49 27.8	68 26	31.0	52 41.9	61 21	24.9	7
8	42 16.8	77 32	40.0	42 39.7	76 32	39.6	43 47.9	75 31	38.2	44 10.4	75 30	37.8	44 32.8	74 30	37.3	48 51.8	69 26	31.2	49 12.4	68 26	30.7	52 29.3	63 21	24.7	8
9	41 57.6	77 32	39.5	42 20.0	77 31	39.0	43 29.4	76 30	37.7	44 12.1	75 30	37.3	44 14.7	75 30	36.8	48 36.3	70 26	30.8	48 57.2	68 26	30.3	52 16.9	63 21	24.4	9
110	41 38.6	78 31	39.0	42 01.9	77 31	38.5	43 11.2	76 30	37.2	43 34.1	76 30	36.8	43 56.8	76 29	36.3	48 21.0	71 25	30.4	48 42.2	70 25	29.9	52 04.6	64 20	24.1	110
1	41 19.9	78 31	38.4	41 43.3	78 31	38.0	42 53.1	77 30	36.7	43 16.2	77 30	36.3	43 39.2	76 29	35.9	48 05.9	72 25	29.7	48 27.3	71 25	29.5	51 52.4	65 20	23.8	1
2	41 01.3	79 31	37.9	41 24.9	79 30	37.5	42 35.3	78 29	36.2	42 58.5	77 29	35.8	43 21.7	77 29	35.4	47 51.0	72 25	29.1	48 12.6	72 24	29.2	51 40.3	66 20	23.5	2
3	40 43.0	79 30	37.4	41 06.8	79 30	37.0	42 17.6	78 29	35.7	42 41.1	78 29	35.3	43 04.4	78 28	34.9	47 36.2	73 24	29.3	47 58.0	73 24	28.8	51 28.4	67 20	23.3	3
4	40 24.9	80 30	36.9	40 48.8	80 30	36.5	42 00.2	79 29	35.3	42 23.8	79 28	34.8	42 47.4	78 28	34.4	47 21.6	74 24	28.9	47 43.7	73 24	28.4	51 16.6	68 19	23.0	4
115	40 07.0	81 29	36.3	40 31.1	80 29	36.0	41 43.0	80 28	34.8	42 06.8	80 28	34.3	42 30.5	79 28	33.9	47 07.2	75 24	28.5	47 29.5	74 23	28.0	51 05.0	69 19	22.7	115
6	39 49.3	81 29	35.8	40 13.6	81 29	35.4	41 26.0	80 28	34.3	41 50.0	80 28	33.8	42 13.9	79 27	33.4	46 53.0	75 23	28.1	47 15.5	75 23	27.6	50 53.5	70 19	22.4	6
7	39 31.9	82 29	35.3	39 56.3	81 28	34.9	41 09.2	81 28	33.7	41 33.4	80 27	33.4	41 57.5	80 27	33.0	46 38.9	76 23	27.7	47 01.7	76 23	27.2	50 42.1	71 19	22.1	7
8	39 14.7	82 28	34.8	39 39.3	82 28	34.4	40 52.7	81 27	33.2	41 17.0	81 27	32.9	41 42.1	81 27	32.5	46 25.1	77 23	27.3	46 48.0	76 23	26.9	50 30.9	72 18	21.8	8
9	38 57.7	83 28	34.2	39 22.5	82 28	33.9	40 36.4	82 27	32.7	41 00.8	81 27	32.4	41 25.3	81 26	32.0	46 11.4	78 23	26.9	46 34.6	77 23	26.5	50 19.9	73 18	21.5	9
120	38 40.9	83 28	33.7	39 05.9	83 27	33.3	40 20.2	82 26	32.2	40 44.9	82 26	31.9	41 09.5	82 26	31.5	45 57.9	78 23	26.5	46 21.3	78 23	26.1	50 09.0	74 18	21.2	120
1	38 24.4	84 27	33.2	38 49.5	84 27	32.8	40 04.4	83 26	31.7	40 29.2	83 26	31.4	40 53.9	83 26	31.0	45 44.6	79 23	26.1	46 08.2	79 23	25.7	49 58.2	75 18	20.9	1
2	38 08.1	84 27	32.6	38 33.4	84 26	32.3	39 48.7	83 26	31.2	40 13.7	83 26	30.9	40 38.6	83 26	30.5	45 31.5	80 23	25.7	45 55.3	79 23	25.3	49 47.6	76 17	20.6	2
3	37 52.1	85 26	32.1	38 17.5	85 26	31.7	39 33.3	84 26	30.7	39 58.4	84 26	30.4	40 23.5	83 25	30.0	45 18.6	80 21	25.3	45 42.6	80 21	24.9	49 37.1	77 17	20.2	3
4	37 36.2	85 26	31.5	38 01.8	85 26	31.2	39 18.1	84 26	30.2	39 43.4	84 26	29.8	40 08.6	84 24	29.5	45 05.8	81 21	24.9	45 30.1	81 21	24.5	49 26.8	77 17	19.9	4
125	37 20.7	86 26	31.0	37 46.4	86 26	30.7	39 03.1	85 26	29.7	39 28.5	85 24	29.3	39 53.9	85 24	29.0	44 53.3	82 21	24.5	45 17.7	81 20	24.1	49 16.7	78 17	19.6	125
6	37 05.3	86 26	30.5	37 31.2	86 26	30.2	38 48.3	85 24	29.2	39 14.0	85 24	28.8	39 39.5	85 24	28.5	44 41.0	82 20	24.1	45 05.6	82 20	23.7	49 06.7	79 16	19.3	6
7	36 59.2	87 26	29.9	37 16.2	86 24	29.6	38 33.8	86 24	28.7	38 59.6	86 24	28.3	39 25.3	86 23	28.0	44 28.8	83 20	23.6	44 53.7	83 20	23.3	48 56.9	79 16	19.0	7
8	36 35.4	87 24	29.4	37 01.5	87 24	29.1	38 19.6	86 23	28.1	38 45.5	86 23	27.8	39 11.3	86 23	27.5	44 16.9	83 20	23.2	44 41.9	83 19	22.8	48 47.2	80 16	18.6	8
9	36 20.8	88 24	28.8	36 47.1	87 24	28.5	38 05.5	87 23	27.6	38 31.6	87 23	27.3	38 57.6	87 22	27.0	44 05.2	84 19	22.8	44 30.4	84 19	22.4	48 37.7	81 16	18.3	9
130	36 06.5	88 24	28.3	36 32.8	88 23	28.0	37 51.8	87 23	27.1	38 18.0	87 23	26.8	38 44.1	87 22	26.5	43 53.6	85 19	22.4	44 19.0	84 19	22.0	48 28.4	82 15	18.0	130
1	35 52.4	88 23	27.8	36 18.9	88 23	27.5	37 38.2	88 22	26.6	38 04.6	88 22	26.3	38 30.9	88 22	26.0	43 42.3	85 19	22.0	44 07.9	85 18	21.6				

DECLINATION SAME NAME AS LATITUDE

H.A.	60° 00'		60° 30'		62° 00'		62° 30'		63° 00'		69° 00'		69° 30'		74° 30'		H.A.							
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.								
00	90 00.0	...	89 30.0	1.0 20	00.0	88 00.0	1.0 06	00.0	87 30.0	1.0 05	00.0	87 00.0	1.0 04	00.0	81 00.0	1.0 01	00.0	80 30.0	1.0 01	00.0	75 30.0	1.0 00	00.0	00
1	89 30.0	01 50	89.6	89 17.8	70 41	87 56.6	97 16	13.2	87 27.3	98 18	10.5	86 57.8	99 11	08.6	86 59.4	1.0 08	02.3	86 29.4	1.0 08	02.1	75 29.7	1.0 01	01.1	1
2	89 00.0	02 50	89.7	88 53.3	44 46	87 46.6	89 25	25.0	87 19.3	93 21	20.2	86 51.1	95 18	16.8	86 57.6	96 05	04.6	86 27.8	96 05	04.2	75 28.9	1.0 02	02.1	2
3	88 30.0	03 50	88.1	88 25.8	30 48	87 31.7	90 31	34.7	87 06.8	95 27	28.2	86 40.6	98 23	24.2	86 54.6	99 07	06.8	86 25.8	99 06	06.3	75 27.5	1.0 03	03.2	3
4	88 00.0	04 50	88.3	87 57.2	21 48	87 12.9	93 36	42.4	86 50.8	97 31	35.8	86 26.8	98 28	30.7	86 50.5	99 09	09.0	86 21.2	99 08	08.4	75 25.5	1.0 04	04.2	4
05	87 30.0	04 50	87.8	87 28.2	16 49	86 51.5	61 30	48.3	86 32.0	69 35	41.7	86 10.1	76 31	36.3	86 45.2	96 11	11.2	86 16.3	97 10	10.4	75 23.0	1.0 05	05.3	05
6	87 00.0	05 50	87.4	86 58.9	12 49	86 28.3	63 41	52.9	86 11.1	67 37	46.5	85 51.4	69 34	41.1	86 38.8	96 12	13.3	86 10.4	96 12	12.4	75 20.9	1.0 06	06.3	6
7	86 30.0	06 50	87.0	86 29.5	09 49	86 03.8	65 42	56.5	85 48.6	69 39	50.4	85 30.9	69 36	45.0	86 31.4	96 14	15.4	86 03.4	96 14	14.3	75 16.4	1.0 07	07.4	7
8	86 00.0	07 50	86.5	86 00.1	06 49	85 38.4	67 43	59.3	85 25.0	71 41	53.5	85 09.0	71 38	48.4	86 22.9	96 16	17.4	86 02.9	96 16	16.2	75 12.3	1.0 08	08.4	8
9	85 30.0	08 50	86.1	85 30.6	04 49	85 12.3	69 44	61.5	85 00.4	74 42	56.1	84 46.1	74 40	51.2	86 13.5	96 17	19.3	86 02.9	96 17	18.0	75 07.7	1.0 09	09.4	9
10	85 00.0	09 50	85.7	85 01.1	02 49	84 45.7	71 45	63.3	84 35.2	76 43	58.2	84 22.4	76 41	53.5	86 03.1	96 19	21.1	86 03.1	96 19	21.1	75 02.6	1.0 10	10.4	10
1	84 30.0	10 50	85.2	84 31.5	01 49	84 18.8	73 45	64.7	84 09.5	78 44	61.0	83 57.9	78 42	57.5	86 03.1	96 20	22.9	86 03.1	96 20	22.9	74 56.9	1.0 11	11.3	1
2	84 00.0	11 50	84.8	84 02.0	00 49	83 51.5	75 46	65.8	83 43.3	81 44	60.4	83 30.9	81 42	57.2	86 03.1	96 21	24.5	86 03.1	96 21	24.5	74 50.8	1.0 12	12.3	2
3	83 30.0	12 50	84.4	83 32.4	02 49	83 24.0	77 46	66.8	83 16.8	83 46	62.6	83 07.6	83 44	58.6	86 03.1	96 22	26.1	86 03.1	96 22	26.1	74 44.2	1.0 13	13.2	3
4	83 00.0	13 50	83.9	83 02.9	03 49	82 56.4	79 46	67.5	82 50.1	85 46	63.6	82 41.8	85 44	59.8	86 03.1	96 23	27.6	86 03.1	96 23	27.6	74 37.1	1.0 14	14.1	4
15	82 31.0	14 50	83.5	82 33.4	05 49	82 28.5	81 46	68.1	82 23.1	86 45	64.4	82 15.7	86 44	60.8	86 03.1	96 24	29.0	86 03.1	96 24	29.0	74 29.5	1.0 15	15.0	15
6	82 01.2	15 50	83.1	82 03.9	06 49	82 00.7	83 47	68.6	81 56.0	89 45	65.1	81 49.4	89 44	61.6	86 03.1	96 25	30.4	86 03.1	96 25	30.4	74 21.6	1.0 16	15.9	6
7	81 31.4	16 50	82.6	81 34.4	07 49	81 32.8	85 47	69.0	81 28.7	91 46	65.7	81 23.0	91 44	62.4	86 03.1	96 26	31.6	86 03.1	96 26	31.6	74 13.2	1.0 17	16.7	7
8	81 01.7	17 50	82.2	81 04.9	08 49	81 04.7	87 47	69.3	81 01.3	93 46	66.1	80 56.3	93 44	63.0	86 03.1	96 27	32.8	86 03.1	96 27	32.8	74 04.3	1.0 18	17.5	8
9	80 32.0	18 49	81.8	80 35.5	09 49	80 36.6	89 47	69.5	80 33.8	95 46	66.5	80 29.5	95 44	63.5	86 03.1	96 28	33.9	86 03.1	96 28	33.9	73 55.1	1.0 19	18.3	9
20	80 02.3	19 49	81.3	80 06.1	10 49	80 08.5	91 47	69.7	80 06.3	10 46	66.8	80 02.6	10 45	63.9	86 03.1	96 29	35.0	86 03.1	96 29	35.0	73 45.5	1.0 20	19.1	20
1	79 32.6	20 49	80.9	79 36.7	11 49	79 40.4	93 47	69.8	79 38.7	10 46	67.0	79 35.6	10 45	64.3	86 03.1	96 30	36.0	86 03.1	96 30	36.0	73 35.5	1.0 21	19.8	1
2	79 03.0	21 49	80.4	79 07.4	12 49	79 12.2	95 47	69.9	79 11.1	10 46	67.2	79 08.6	11 45	64.5	86 03.1	96 31	37.0	86 03.1	96 31	37.0	73 25.2	1.0 22	20.5	2
3	78 33.5	22 49	80.0	78 38.1	13 49	78 44.0	97 47	69.9	78 43.4	10 46	67.3	78 41.5	11 45	64.8	86 03.1	96 32	37.7	86 03.1	96 32	37.7	73 15.5	1.0 23	21.2	3
4	78 04.0	23 49	79.6	78 08.8	14 49	78 15.7	99 47	69.9	78 15.7	10 46	67.4	78 14.3	11 45	64.9	86 03.1	96 33	38.5	86 03.1	96 33	38.5	73 03.4	1.0 24	21.9	4
25	77 34.5	24 49	79.1	77 39.6	15 49	77 47.7	101 47	69.8	77 48.0	10 46	67.4	77 47.1	11 45	65.1	86 03.1	96 34	39.2	86 03.1	96 34	39.2	72 54.1	1.0 25	22.5	25
6	77 05.0	25 49	78.7	77 10.4	16 49	77 19.6	103 47	69.7	77 20.3	10 46	67.4	77 19.9	11 45	65.2	86 03.1	96 35	39.9	86 03.1	96 35	39.9	72 42.4	1.0 26	23.2	6
7	76 35.6	26 49	78.3	76 41.2	17 49	76 51.4	105 47	69.6	76 52.6	10 46	67.4	76 52.7	11 45	65.2	86 03.1	96 36	40.5	86 03.1	96 36	40.5	72 28.5	1.0 27	23.8	7
8	76 06.3	27 49	77.8	76 12.1	18 49	76 23.3	107 47	69.5	76 24.4	10 46	67.4	76 25.0	11 45	65.2	86 03.1	96 37	41.1	86 03.1	96 37	41.1	72 16.3	1.0 28	24.3	8
9	75 37.0	28 49	77.4	75 43.1	19 49	75 55.2	109 47	69.3	75 57.2	10 46	67.3	75 58.2	11 45	65.2	86 03.1	96 38	41.6	86 03.1	96 38	41.6	72 03.8	1.0 29	24.9	9
30	75 07.7	29 49	76.9	75 14.0	20 49	75 27.2	111 47	69.2	75 29.6	10 46	67.2	75 31.0	11 45	65.2	86 03.1	96 39	42.1	86 03.1	96 39	42.1	71 51.0	1.0 30	25.4	30
1	74 38.5	30 49	76.5	74 45.1	21 49	74 59.2	113 47	69.0	75 01.9	10 46	67.0	75 03.7	11 45	65.1	86 03.1	96 40	42.6	86 03.1	96 40	42.6	71 38.0	1.0 31	25.9	1
2	74 09.4	31 49	76.1	74 16.2	22 49	74 31.2	115 47	68.8	74 34.3	10 46	66.9	74 36.5	11 45	65.0	86 03.1	96 41	43.0	86 03.1	96 41	43.0	71 24.8	1.0 32	26.4	2
3	73 40.3	32 49	75.6	73 47.4	23 49	74 03.2	117 47	68.5	74 06.6	10 46	66.7	74 09.4	11 45	64.9	86 03.1	96 42	43.4	86 03.1	96 42	43.4	71 11.4	1.0 33	26.8	3
4	73 11.3	33 49	75.2	73 18.6	24 49	73 35.3	119 47	68.3	73 39.2	11 46	66.6	73 42.2	11 45	64.8	86 03.1	96 43	43.7	86 03.1	96 43	43.7	70 57.7	1.0 34	27.3	4
35	72 42.3	34 49	74.7	72 49.8	25 49	73 07.5	121 47	68.1	73 11.7	11 46	66.4	73 15.1	11 45	64.6	86 03.1	96 44	44.0	86 03.1	96 44	44.0	70 43.9	1.0 35	27.7	35
6	72 13.4	35 49	74.3	72 21.2	26 49	72 39.7	123 47	67.8	72 44.1	11 46	66.1	72 48.0	11 45	64.5	86 03.1	96 45	44.3	86 03.1	96 45	44.3	70 29.9	1.0 36	28.1	6
7	71 44.6	36 49	73.8	71 52.5	27 49	72 11.9	125 47	67.5	72 16.8	11 46	65.9	72 20.9	11 45	64.3	86 03.1	96 46	44.6	86 03.1	96 46	44.6	70 15.7	1.0 37	28.4	7
8	71 15.8	37 49	73.4	71 24.0	28 49	71 44.2	127 47	67.3	71 49.5	11 46	65.7	71 53.9	11 45	64.1	86 03.1	96 47	44.8	86 03.1	96 47	44.8	70 01.3	1.0 38	28.8	8
9	70 47.1	38 49	73.0	70 55.5	29 49	71 16.6	129 47	67.0	71 22.2	11 46	65.4	71 27.0	11 45	63.9	86 03.1	96 48	45.0	86 03.1	96 48	45.0	69 46.8	1.0 39	29.1	9
40	70 18.4	39 49	72.5	70 27.1	30 49	70 49.0	131 47	66.7	70 54.9	11 46	65.2	71 00.0	11 45	63.7	86 03.1	96 49	45.2	86 03.1	96 49	45.2	69 32.1	1.0 40	29.4	40
1	69 49.3	40 49	72.1	69 58.8	31 49	70 21.5	133 47	66.4	70 27.7	11 46	64.9	70 33.2	11 45	63.5	86 03.1	96 50	45.3	86 03.1	96 50	45.3	69 17.3	1.0 41	29.7	1
2	69 20.3	41 49																						

DECLINATION SAME NAME AS LATITUDE

H.A.	60° 00'		60° 30'		62° 00'		62° 30'		63° 00'		69° 00'		69° 30'		74° 30'		H.A.								
	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At									
91	48 12.8	66 37	48.6	48 32.6	66 37	48.0	49 30.8	64 36	46.3	49 49.9	63 36	45.7	50 08.7	63 35	47.2	53 38.8	64 30	37.2	53 54.8	63 30	36.5	56 19.5	63 24	28.8	91
2	47 50.4	67 37	48.1	48 10.4	66 37	47.6	49 09.2	65 36	45.8	49 28.5	64 35	44.3	49 47.8	63 34	42.7	50 27.0	63 33	36.9	53 37.0	62 29	35.8	56 05.1	62 24	28.6	2
3	47 28.2	67 37	47.6	47 48.3	67 36	47.1	48 47.8	65 35	45.4	49 07.2	64 34	44.2	49 26.6	63 33	41.7	50 05.8	63 32	36.5	53 02.8	62 28	35.5	55 50.8	62 24	28.4	3
4	47 06.1	68 36	47.1	47 26.4	68 36	46.6	48 26.5	65 34	44.9	48 46.2	64 33	43.8	49 05.7	63 32	41.2	49 84.5	63 31	36.2	53 01.9	62 27	35.5	55 36.6	62 24	28.2	4
95	46 44.2	69 36	46.6	47 04.7	69 36	46.1	48 05.4	67 35	44.4	48 25.3	66 34	43.9	48 45.1	65 33	43.3	49 24.7	64 32	35.9	52 27.4	63 29	35.2	55 22.5	63 23	27.9	95
6	46 22.5	69 36	46.1	46 43.2	69 36	45.6	47 44.5	67 34	44.0	48 04.6	66 33	43.4	48 24.6	65 32	42.9	49 04.0	64 31	35.5	52 07.9	63 28	34.9	55 08.5	63 17	27.7	6
7	46 01.0	70 36	45.6	46 21.9	69 35	45.1	47 23.7	68 34	43.5	47 44.1	67 33	43.0	48 04.2	66 32	42.4	48 84.0	65 31	35.2	51 52.5	63 27	34.5	54 54.6	63 07	27.5	7
8	45 39.6	71 35	45.1	46 00.7	70 35	44.6	47 03.2	69 34	43.0	47 23.7	68 33	42.5	47 44.1	67 32	41.9	48 64.0	66 30	34.8	51 35.3	63 26	34.2	54 40.8	62 57	27.2	8
9	45 18.4	71 35	44.6	45 39.7	71 35	44.1	46 42.8	69 34	42.6	47 03.5	68 33	42.0	47 24.1	67 32	41.5	48 44.0	66 29	34.5	51 36.5	63 25	33.8	54 27.1	62 47	27.0	9
100	44 57.5	72 35	44.1	45 19.0	71 34	43.6	46 22.6	70 33	42.1	46 43.6	70 32	41.6	47 04.4	69 31	41.0	47 84.0	68 30	34.1	51 01.3	63 24	33.5	54 13.5	62 37	26.8	100
1	44 36.7	72 34	43.6	44 58.4	72 34	43.1	46 02.6	71 32	41.6	46 23.7	70 31	41.1	46 44.8	70 30	40.6	47 64.0	68 29	33.8	51 03.4	63 23	33.2	54 00.1	62 27	26.5	1
2	44 16.1	73 34	43.1	44 38.0	73 34	42.6	45 42.8	71 31	41.1	46 04.1	71 30	40.6	46 25.3	70 29	40.1	48 44.0	68 28	33.4	50 47.1	63 22	32.8	53 46.8	62 17	26.3	2
3	43 55.7	74 34	42.6	44 17.8	73 33	42.1	45 23.1	72 32	40.6	45 44.7	72 31	40.1	46 06.1	71 30	39.6	48 24.0	68 27	33.1	50 30.9	63 21	32.5	53 33.6	62 07	26.0	3
4	43 35.5	74 33	42.1	43 57.7	74 33	41.6	45 03.7	73 32	40.2	45 25.4	73 31	39.7	45 47.1	72 30	39.2	49 44.0	68 26	32.7	50 14.9	63 20	32.1	53 20.5	61 57	25.7	4
105	43 15.5	75 33	41.5	43 37.9	74 33	41.1	44 44.4	73 32	39.7	45 06.4	73 31	39.2	45 28.2	73 30	38.7	49 39.1	67 27	32.3	49 59.0	63 19	31.7	53 07.5	61 47	25.5	105
6	42 55.7	75 33	41.0	43 18.3	75 32	40.6	44 25.4	74 31	39.2	44 47.5	74 30	38.7	45 09.5	73 29	38.2	49 23.2	67 26	32.0	49 43.3	63 18	31.4	52 54.6	61 37	25.2	6
7	42 36.1	76 32	40.5	42 58.9	76 32	40.1	44 06.5	75 31	38.7	44 28.9	74 30	38.2	44 51.1	74 29	37.8	49 07.4	67 25	31.6	49 27.8	63 17	31.0	52 41.9	61 27	24.9	7
8	42 16.8	77 32	40.0	42 39.7	77 32	39.6	43 47.9	76 31	38.2	44 10.4	75 30	37.8	44 32.8	74 29	37.3	48 51.8	67 24	31.2	49 12.4	63 16	30.7	52 29.3	61 17	24.7	8
9	41 57.6	77 32	39.5	42 20.7	77 31	39.0	43 29.4	76 30	37.7	43 52.1	75 29	37.3	44 14.7	75 28	36.8	48 36.3	67 23	30.8	48 57.2	63 15	30.3	52 16.9	61 07	24.4	9
110	41 38.6	78 31	39.0	42 01.9	77 31	38.5	43 11.2	76 30	37.2	43 34.1	76 29	36.8	43 56.8	76 28	36.3	48 21.0	67 22	30.4	48 42.2	63 14	29.9	52 04.6	60 57	24.1	110
1	41 19.9	78 31	38.4	41 43.3	78 31	38.0	42 53.1	77 29	36.7	43 16.2	77 28	36.3	43 39.2	76 27	35.9	48 05.9	67 21	30.1	48 27.3	63 13	29.5	51 52.4	60 47	23.8	1
2	41 01.3	79 31	37.9	41 24.9	79 30	37.5	42 35.3	78 29	36.2	42 58.5	77 28	35.8	43 21.7	77 27	35.4	47 51.0	67 20	29.7	48 12.6	63 12	29.2	51 40.3	60 37	23.5	2
3	40 43.0	79 30	37.4	41 06.8	79 30	37.0	42 17.6	78 28	35.7	42 41.1	78 27	35.3	43 04.4	77 26	34.9	47 36.2	67 19	29.3	47 58.9	63 11	28.8	51 28.4	60 27	23.3	3
4	40 24.9	80 30	36.9	40 48.8	80 30	36.5	42 00.2	79 29	35.3	42 23.8	79 28	34.8	42 47.4	78 27	34.4	47 21.6	67 18	28.9	47 43.7	63 10	28.4	51 16.6	60 17	23.0	4
115	40 07.0	81 29	36.3	40 31.1	81 29	36.0	41 43.0	79 28	34.8	42 06.8	79 27	34.3	42 30.5	79 26	33.9	47 07.2	67 17	28.5	47 29.5	63 09	28.0	51 05.0	60 07	22.7	115
6	39 49.3	81 29	35.8	40 13.6	81 29	35.4	41 26.0	80 28	34.3	41 50.0	80 27	33.8	42 13.9	79 27	33.4	46 53.0	67 16	28.1	47 15.5	63 08	27.6	50 53.5	60 00	22.4	6
7	39 31.9	82 29	35.3	39 56.3	81 28	34.9	41 09.2	81 28	33.7	41 33.4	80 27	33.4	41 57.5	80 26	33.0	46 38.9	67 15	27.7	47 01.7	63 07	27.2	50 42.1	60 00	22.1	7
8	39 14.7	82 28	34.8	39 39.3	82 28	34.4	40 52.7	81 27	33.2	41 17.0	81 26	32.9	41 41.2	81 25	32.5	46 25.1	67 14	27.3	46 48.0	63 06	26.9	50 30.9	60 00	21.8	8
9	38 57.7	83 28	34.2	39 22.5	83 28	33.9	40 36.4	82 27	32.7	41 00.8	81 26	32.4	41 25.3	81 25	32.0	46 11.4	67 13	26.9	46 34.6	63 05	26.6	50 19.9	60 00	21.5	9
120	38 40.9	83 28	33.7	39 05.9	83 27	33.3	40 20.2	82 26	32.2	40 44.9	82 26	31.9	41 09.5	82 25	31.5	45 57.9	67 12	26.5	46 21.3	63 04	26.1	50 09.0	60 00	21.2	120
1	38 24.4	84 27	33.2	38 49.5	84 27	32.8	40 04.4	83 26	31.7	40 29.2	83 26	31.4	40 53.9	82 25	31.0	45 44.6	67 11	26.1	46 08.2	63 03	25.7	49 58.2	60 00	20.9	1
2	38 08.1	84 27	32.6	38 33.4	84 26	32.3	39 48.7	83 25	31.2	40 13.7	83 25	30.9	40 38.6	82 24	30.5	45 31.5	67 10	25.7	45 55.3	63 02	25.3	49 47.6	60 00	20.6	2
3	37 52.1	85 26	32.1	38 17.5	85 26	31.7	39 33.3	84 25	30.7	39 58.4	84 25	30.4	40 23.5	83 24	30.0	45 18.6	67 09	25.3	45 42.6	63 01	24.9	49 37.1	60 00	20.2	3
4	37 36.2	85 26	31.5	38 01.8	85 26	31.2	39 18.1	84 25	30.2	39 43.4	84 25	29.8	40 08.6	84 24	29.5	45 05.8	67 08	24.9	45 30.1	63 00	24.5	49 26.8	60 00	19.9	4
125	37 20.7	86 26	31.0	37 05.3	86 26	30.5	39 03.1	85 25	29.7	39 28.5	85 24	29.3	39 53.9	85 24	28.9	44 53.3	67 07	24.5	45 17.7	63 00	24.1	49 16.7	60 00	19.6	125
6	37 05.3	86 26	30.5	37 11.2	86 26	30.2	38 48.3	85 24	29.2	39 14.0	85 24	28.8	39 39.5	85 24	28.5	44 41.0	67 06	24.1	45 05.6	63 00	23.7	49 06.7	60 00	19.3	6
7	36 50.2	87 26	29.9	37 16.2	86 24	29.6	38 33.8	86 24	28.7	38 59.6	86 24	28.3	39 25.3	86 23	28.0	44 28.8	67 05	23.6	44 53.7	63 00	23.3	48 56.9	60 00	19.0	7
8	36 35.4	87 24	29.4	37 01.5	87 24	29.1	38 19.6	86 23	28.1	38 45.6	86 23	27.8	39 11.3	86 23	27.5	44 16.9	67 04	23.2	44 41.9	63 00	22.8	48 47.2	60 00	18.6	8
9	36 20.8	88 24	28.8	36 47.1	87 24	28.5	38 05.5	87 23	27.6	38 31.6	87 23	27.3	38 57.6	87 22	27.0	44 05.2	67 03	22.8	44 30.4	63 00	22.4	48 37.7	60 00	18.3	9
130	36 06.5	88 24	28.3	36 32.8	88 23	28.0	37 51.8	87 22	27.1	38 18.0	87 22	26.8	38 44.1	87 22	26.5	43 53.6	67 02	22.4	44 19.0	63 00	22.0	48 28.4	60 00	18.0	130
1	35 52.4	88 23	27.8	36 18.9	88 23	27.5	37 38.2	88 22	26.6	38 04.6	88 22	26.3	38 30.9	88 22	26.0	43 42.3	67 01	22.0	44 07.9						

# STAR IDENTIFICATION TABLE

26

## ALTITUDE

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.																					
00	34	180	38	180	42	180	46	180	50	180	54	180	58	180	62	180	66	180	70	180	74	180	00
4	34	175	38	175	42	175	46	174	50	174	54	174	58	173	62	173	66	172	70	171	74	170	4
8	34	170	38	170	42	170	46	169	50	168	54	168	58	167	62	166	65	164	69	162	73	160	8
12	33	166	37	165	41	164	45	164	49	163	53	162	57	160	61	159	65	157	69	154	72	150	12
16	33	161	37	160	41	159	44	158	48	157	52	156	56	154	60	152	64	150	68	146	71	142	16
20	32	156	36	155	40	154	44	153	48	152	51	150	55	148	59	146	63	143	66	139	70	134	20
24	31	152	35	151	39	149	43	148	47	146	50	144	54	142	58	140	61	136	65	132	68	127	24
28	30	147	34	146	38	145	42	143	45	141	49	139	53	137	56	134	60	131	63	126	67	121	28
32	29	143	33	141	36	140	40	138	44	136	48	134	51	131	55	129	58	125	62	121	65	115	32
36	28	139	31	137	35	135	39	133	43	131	46	129	50	126	53	123	57	120	60	116	63	110	36
40	26	134	30	133	34	131	37	129	41	127	45	124	48	122	52	119	55	115	58	111	61	106	40
44	25	130	28	129	32	127	36	125	39	122	43	120	46	117	50	114	53	110	56	106	59	101	44
48	23	126	27	124	30	122	34	120	38	118	41	116	45	113	48	110	51	106	54	102	57	97	48
52	22	122	25	120	29	118	32	116	36	114	39	112	43	109	46	106	49	102	52	98	55	94	52
56	20	118	23	117	27	115	30	112	34	110	37	108	41	105	44	102	47	98	50	94	53	90	56
60	18	115	22	113	25	111	29	108	32	106	35	104	39	101	42	98	45	95	48	91	51	87	60
64	16	111	20	109	23	107	27	105	30	102	34	100	37	97	40	94	43	91	46	87	49	83	64
68	14	107	18	105	21	103	25	101	28	99	32	96	35	94	38	91	41	88	44	84	47	80	68
72	12	104	16	102	19	100	23	97	26	95	30	93	33	90	36	87	39	84	42	81	45	77	72
76	10	100	14	98	17	96	21	94	24	92	28	89	31	87	34	84	37	81	40	78	44	74	76
80	08	97	12	95	15	93	19	90	22	88	26	86	29	83	32	81	35	78	39	75	42	71	80
84	06	93	10	91	13	89	17	87	20	85	24	82	27	80	30	77	33	75	37	72	40	68	84
88	04	90	08	88	11	86	15	84	18	81	22	79	25	77	28	74	32	72	35	69	38	66	88
92	02	86	06	84	09	82	13	80	16	78	20	76	23	73	26	71	30	69	33	66	36	63	92
96	00	83	04	81	07	79	11	77	14	75	18	73	21	70	24	68	28	65	31	63	34	60	96
100	02	79	02	77	05	75	09	73	12	71	16	69	19	67	23	65	26	62	29	60	33	57	100
104	03	76	00	74	04	72	07	70	11	68	14	66	17	64	21	62	24	59	28	57	31	54	104
108	05	72	02	70	02	69	05	67	09	65	12	63	16	61	19	59	23	56	26	54	29	52	108
112	07	69	04	67	00	65	03	63	07	61	10	59	14	58	17	56	21	53	24	51	28	49	112
116	09	65	06	63	02	62	02	60	05	58	09	56	12	54	16	52	19	50	23	48	26	46	116
120	11	62	07	60	04	58	00	56	04	55	07	53	11	51	14	49	18	47	21	45	25	43	120
124	13	58	09	56	05	55	02	53	02	51	06	50	09	48	13	46	16	44	20	43	24	41	124
128	14	54	11	53	07	51	03	49	00	48	04	46	08	45	11	43	15	41	19	40	22	38	128
132	16	50	12	49	08	47	05	46	01	44	03	43	06	41	10	40	14	38	17	37	21	35	132
136	17	47	14	45	10	44	06	42	02	41	01	39	05	38	09	37	13	35	16	34	20	32	136
140	19	43	15	41	11	40	07	39	04	37	00	36	04	35	08	33	11	32	15	31	19	29	140
144	20	39	16	37	12	36	09	35	05	34	01	32	03	31	07	30	10	29	14	28	18	26	144
148	21	35	17	33	14	32	10	31	06	30	02	29	02	28	06	27	10	26	13	25	17	24	148
152	22	30	18	29	15	28	11	27	07	26	03	25	01	24	05	24	09	23	13	22	17	21	152
156	23	26	19	25	15	24	12	24	08	23	04	22	00	21	04	20	08	19	12	19	16	18	156
160	24	22	20	21	16	20	12	20	08	19	04	18	00	18	03	17	07	16	11	15	15	15	160
164	25	18	21	17	17	16	13	16	09	15	05	15	01	14	03	14	07	13	11	12	15	12	164
168	25	13	21	13	17	12	13	12	09	11	05	11	01	11	03	10	07	10	10	09	14	09	168
172	26	09	22	09	18	08	14	08	10	08	06	07	02	07	02	07	06	07	10	06	14	06	172
176	26	04	22	04	18	04	14	04	10	04	06	04	02	04	02	03	06	03	10	03	14	03	176
180	26	00	22	00	18	00	14	00	10	00	06	00	02	00	02	00	06	00	10	00	14	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

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

16-16330

# STAR IDENTIFICATION TABLE

## ALTITUDE

27

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.																					
00	78	180	82	180	86	180	90	...	86	00	82	00	78	00	74	00	70	00	66	00	62	00	00
4	78	167	82	163	85	150	88	88	86	23	82	11	78	06	74	03	70	02	66	01	62	00	4
8	77	155	81	147	84	130	86	87	85	40	81	20	78	12	74	07	70	04	66	02	62	01	8
12	76	145	80	135	83	117	84	85	83	49	80	28	77	17	73	10	70	06	66	03	62	01	12
16	75	135	78	125	81	108	82	83	82	55	79	34	76	21	73	13	69	08	66	04	62	01	16
20	73	127	76	117	79	102	80	81	80	58	78	39	76	25	73	16	69	10	66	05	62	01	20
24	72	120	75	110	77	97	78	80	78	60	77	42	75	29	72	19	69	11	65	06	62	02	24
28	70	114	73	105	75	93	76	78	76	61	76	45	74	31	71	21	68	13	65	07	62	02	28
32	68	109	71	100	73	89	74	76	75	61	74	46	73	33	71	23	68	14	65	08	62	02	32
36	66	104	69	96	71	86	72	74	73	61	73	48	72	35	70	24	67	15	65	08	62	02	36
40	64	100	67	92	69	83	70	73	71	61	71	48	70	36	69	26	67	16	64	09	62	03	40
44	62	96	65	89	67	80	68	71	69	60	70	48	69	37	68	27	66	17	64	10	61	03	44
48	60	92	63	85	65	78	67	69	68	59	68	48	68	38	67	28	66	18	64	10	61	03	48
52	58	88	61	82	63	75	65	67	66	58	67	48	67	38	66	28	65	19	63	11	61	03	52
56	56	85	59	79	61	73	63	65	64	57	65	48	66	38	65	29	64	19	63	11	61	03	56
60	54	82	57	77	59	70	61	63	63	56	64	47	64	38	64	29	64	20	63	11	61	04	60
64	52	79	55	74	57	68	59	62	61	54	62	46	63	38	63	29	63	20	62	12	61	04	64
68	50	76	53	71	55	66	58	60	59	53	61	45	62	37	62	29	62	20	62	12	61	04	68
72	48	73	51	69	54	64	56	58	58	51	59	44	61	37	61	29	62	20	61	12	61	04	72
76	46	70	49	66	52	61	54	56	56	50	58	43	59	36	60	28	61	20	61	12	60	04	76
80	45	68	47	64	50	59	53	54	55	48	57	42	58	35	59	28	60	20	60	12	60	04	80
84	43	65	46	61	48	57	51	52	53	47	55	41	57	34	59	27	60	20	60	12	60	04	84
88	41	62	44	59	47	55	49	50	52	45	54	40	56	34	58	27	59	20	60	12	60	04	88
92	39	60	42	56	45	52	48	48	50	43	53	38	55	32	57	26	58	19	59	12	60	04	92
96	37	57	41	54	44	50	46	46	49	42	52	37	54	31	56	25	58	19	59	12	60	04	96
100	36	54	39	51	42	48	45	44	48	40	50	35	53	30	55	25	57	18	58	11	60	04	100
104	34	52	37	49	41	46	44	42	46	38	49	34	52	29	54	24	56	18	58	11	59	04	104
108	33	49	36	46	39	43	42	40	45	36	48	32	51	28	53	23	56	17	58	11	59	04	108
112	31	47	35	44	38	41	41	38	44	34	47	31	50	26	53	22	55	16	57	10	59	04	112
116	30	44	33	41	37	39	40	36	43	33	46	29	49	25	52	21	55	16	57	10	59	03	116
120	28	41	32	39	35	36	39	34	42	31	45	27	48	24	51	20	54	15	57	09	59	03	120
124	27	39	31	36	34	34	38	32	41	29	44	26	47	22	51	18	54	14	56	09	59	03	124
128	26	36	30	34	33	32	37	29	40	27	43	24	47	21	50	17	53	13	56	08	59	03	128
132	25	33	28	31	32	29	36	27	39	25	43	22	46	19	49	16	53	12	56	08	59	03	132
136	24	31	27	29	31	27	35	25	38	23	42	20	45	18	49	15	52	11	55	07	59	03	136
140	23	28	27	26	30	25	34	23	38	21	41	19	45	16	48	14	52	10	55	07	58	02	140
144	22	25	26	24	29	22	33	21	37	19	41	17	44	15	48	12	52	09	55	06	58	02	144
148	21	22	25	21	29	20	33	18	36	17	40	15	44	13	48	11	51	08	55	06	58	02	148
152	20	20	24	18	28	17	32	16	36	15	40	13	43	12	47	10	51	07	55	05	58	02	152
156	20	17	24	16	28	15	31	14	35	13	39	11	43	10	47	08	51	06	54	04	58	02	156
160	19	14	23	13	27	12	31	12	35	11	39	09	43	08	47	07	50	05	54	04	58	01	160
164	19	11	23	11	27	10	31	09	35	08	39	08	42	07	46	06	50	04	54	03	58	01	164
168	18	08	22	08	26	07	30	07	34	06	38	06	42	05	46	04	50	03	54	02	58	01	168
172	18	06	22	05	26	05	30	05	34	04	38	04	42	03	46	03	50	02	54	01	58	01	172
176	18	03	22	03	26	02	30	02	34	02	38	02	42	02	46	01	50	01	54	01	58	00	176
180	18	00	22	00	26	00	30	00	34	00	38	00	42	00	46	00	50	00	54	00	58	00	180

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

16-19820

DECLINATION SAME NAME AS LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Az.															
00	29 00.0	1.00 180.0	29 30.0	1.00 180.0	30 00.0	1.00 180.0	30 30.0	1.00 180.0	31 00.0	1.00 180.0	31 30.0	1.00 180.0	32 00.0	1.00 180.0	32 30.0	1.00 180.0	00
1	28 59.7	1.00 178.9	29 29.7	1.00 178.9	29 59.7	1.00 178.8	30 29.7	1.00 178.8	30 59.7	1.00 178.8	31 29.7	1.00 178.8	31 59.7	1.00 178.8	32 29.7	1.00 178.8	1
2	28 58.8	1.00 177.7	29 28.8	1.00 177.7	29 58.8	1.00 177.7	30 28.8	1.00 177.7	30 58.8	1.00 177.7	31 28.8	1.00 177.7	31 58.8	1.00 177.7	32 28.8	1.00 177.7	2
3	28 57.4	1.00 176.6	29 27.4	1.00 176.6	29 57.4	1.00 176.5	30 27.4	1.00 176.5	30 57.4	1.00 176.5	31 27.4	1.00 176.5	31 57.4	1.00 176.5	32 27.4	1.00 176.5	3
4	28 55.4	1.00 175.4	29 25.3	1.00 175.4	29 55.3	1.00 175.4	30 25.3	1.00 175.4	30 55.3	1.00 175.3	31 25.2	1.00 175.3	31 55.2	1.00 175.3	32 25.2	1.00 175.3	4
05	28 52.8	1.00 174.3	29 22.7	1.00 174.3	29 52.7	1.00 174.2	30 22.6	1.00 174.2	30 52.6	1.00 174.2	31 22.6	1.00 174.1	31 52.5	1.00 174.1	32 22.5	1.00 174.1	05
6	28 49.6	1.00 173.1	29 19.5	1.00 173.1	29 49.5	1.00 173.1	30 19.4	1.00 173.0	30 49.4	1.00 173.0	31 19.3	1.00 173.0	31 49.3	1.00 172.9	32 19.2	1.00 172.9	6
7	28 45.8	1.00 172.0	29 15.7	1.00 172.0	29 45.7	1.00 171.9	30 15.6	1.00 171.9	30 45.5	1.00 171.9	31 15.5	1.00 171.8	31 45.4	1.00 171.8	32 15.3	1.00 171.7	7
8	28 41.5	1.00 170.9	29 11.4	1.00 170.8	29 41.3	1.00 170.8	30 11.2	1.00 170.7	30 41.1	1.00 170.7	31 11.0	1.00 170.6	31 40.9	1.00 170.6	32 10.8	1.00 170.6	8
9	28 36.6	1.00 169.7	29 06.5	1.00 169.7	29 36.4	1.00 169.6	30 06.2	1.00 169.6	30 36.1	1.00 169.5	31 06.0	1.00 169.5	31 35.9	1.00 169.4	32 05.8	1.00 169.4	9
10	28 31.1	1.00 168.6	29 01.0	1.00 168.5	29 30.8	1.00 168.5	30 00.7	1.00 168.4	30 30.6	1.00 168.4	31 00.4	1.00 168.3	31 30.3	1.00 168.3	32 00.1	1.00 168.2	10
1	28 25.1	00 11 167.5	28 54.9	00 11 167.4	29 24.8	00 11 167.3	29 54.6	00 11 167.3	30 24.4	00 11 167.2	30 54.2	00 11 167.2	31 24.1	00 11 167.1	31 53.9	00 11 167.0	1
2	28 18.5	00 12 166.3	28 48.3	00 12 166.3	29 18.1	00 12 166.2	29 47.9	00 12 166.1	30 17.7	00 12 166.1	30 47.5	00 12 166.0	31 17.3	00 12 165.9	31 47.1	00 12 165.9	2
3	28 11.3	00 13 165.2	28 41.1	00 13 165.1	29 10.9	00 13 165.1	29 40.6	00 13 165.0	30 10.4	00 13 164.9	30 40.2	00 13 164.9	31 09.9	00 13 164.8	31 39.7	00 13 164.7	3
4	28 03.6	00 14 164.1	28 33.4	00 14 164.0	29 03.1	00 14 163.9	29 32.8	00 14 163.9	30 02.6	00 14 163.8	30 32.3	00 14 163.7	31 02.0	00 14 163.6	31 31.7	00 14 163.5	4
15	27 55.4	00 15 163.0	28 25.1	00 15 162.9	28 54.8	00 15 162.8	29 24.5	00 15 162.7	29 54.2	00 15 162.6	30 23.8	00 15 162.6	30 53.5	00 15 162.5	31 23.2	00 15 162.4	15
6	27 46.6	00 16 161.8	28 16.3	00 16 161.8	28 45.9	00 16 161.7	29 15.6	00 16 161.6	29 45.2	00 16 161.5	30 14.8	00 16 161.4	30 44.5	00 16 161.3	31 14.1	00 16 161.2	6
7	27 37.3	00 16 160.7	28 06.9	00 17 160.6	28 36.5	00 17 160.6	29 06.1	00 17 160.5	29 35.7	00 17 160.4	30 05.3	00 17 160.3	30 34.9	00 17 160.2	31 04.5	00 17 160.1	7
8	27 27.0	00 17 159.6	27 57.0	00 17 159.5	28 26.5	00 17 159.4	28 56.1	00 18 159.3	29 25.7	00 18 159.2	29 55.2	00 18 159.1	30 24.8	00 18 159.0	30 54.3	00 18 158.9	8
9	27 17.0	00 18 158.5	27 46.5	00 18 158.4	28 16.1	00 18 158.3	28 45.6	00 18 158.2	29 15.1	00 18 158.1	29 44.6	00 18 158.0	30 14.1	00 18 157.9	30 43.6	00 18 157.8	9
20	27 06.1	00 19 157.4	27 35.6	00 19 157.3	28 05.0	00 19 157.2	28 34.5	00 19 157.1	29 04.0	00 19 157.0	29 33.4	00 19 156.9	30 02.9	00 20 156.8	30 32.3	00 20 156.6	20
1	26 54.7	00 20 156.3	27 24.1	00 20 156.2	27 53.5	00 20 156.1	28 22.9	00 20 156.0	28 52.3	00 20 155.9	29 21.7	00 20 155.7	29 51.1	00 20 155.6	30 20.5	00 21 155.5	1
2	26 42.7	00 21 155.2	27 12.1	00 21 155.1	27 41.5	00 21 155.0	28 10.8	00 21 154.9	28 40.2	00 21 154.7	29 09.5	00 21 154.6	29 38.9	00 21 154.5	30 08.2	00 21 154.4	2
3	26 30.3	00 22 154.1	26 59.6	00 22 154.0	27 28.9	00 22 153.9	27 58.2	00 22 153.8	28 27.5	00 22 153.6	28 56.8	00 22 153.5	29 26.1	00 22 153.4	29 55.4	00 22 153.3	3
4	26 17.3	00 22 153.0	26 46.6	00 22 152.9	27 15.8	00 22 152.8	27 45.1	00 22 152.6	28 14.3	00 22 152.5	28 43.6	00 22 152.4	29 12.8	00 22 152.3	29 42.0	00 22 152.1	4
25	26 03.9	00 23 151.9	26 33.1	00 23 151.8	27 02.3	00 23 151.7	27 31.5	00 23 151.5	28 00.7	00 23 151.4	28 29.9	00 23 151.3	28 59.0	00 23 151.2	29 28.2	00 23 151.0	25
6	25 50.9	00 24 150.9	26 19.1	00 24 150.7	26 48.2	00 24 150.6	27 17.4	00 24 150.5	27 46.5	00 24 150.3	28 15.6	00 24 150.2	28 44.7	00 24 150.0	29 13.8	00 24 149.9	6
7	25 35.6	00 25 149.8	26 04.7	00 25 149.6	26 33.7	00 25 149.5	27 02.8	00 25 149.4	27 31.9	00 25 149.2	28 00.9	00 25 149.1	28 30.0	00 25 148.9	28 59.0	00 25 148.8	7
8	25 29.7	00 26 148.7	25 49.7	00 26 148.6	26 18.7	00 26 148.4	26 47.7	00 26 148.3	27 16.7	00 26 148.1	27 45.7	00 26 148.0	28 14.7	00 26 147.8	28 43.7	00 26 147.7	8
9	25 05.3	00 27 147.6	25 34.3	00 27 147.5	26 03.3	00 27 147.3	26 32.2	00 27 147.2	27 01.2	00 27 147.1	27 30.1	00 27 146.9	27 59.0	00 27 146.8	28 27.9	00 27 146.6	9
30	24 49.5	00 27 146.6	25 18.4	00 27 146.4	25 47.3	00 27 146.3	26 16.2	00 27 146.1	26 45.1	00 28 146.0	27 14.0	00 28 145.8	27 42.8	00 28 145.7	28 11.7	00 28 145.5	30
1	24 33.3	00 28 145.5	25 02.1	00 28 145.4	25 31.0	00 28 145.2	25 59.8	00 28 145.1	26 28.6	00 28 144.9	26 57.4	00 28 144.7	27 26.2	00 28 144.6	27 55.0	00 29 144.4	1
2	24 16.6	00 29 144.5	24 45.4	00 29 144.3	25 14.1	00 29 144.1	25 42.9	00 29 144.0	26 11.7	00 29 143.8	26 40.4	00 29 143.7	27 09.1	00 29 143.5	27 37.8	00 29 143.3	2
3	23 59.5	00 29 143.4	24 28.2	00 29 143.2	24 56.9	00 29 143.1	25 25.6	00 29 142.9	25 54.3	00 29 142.8	26 22.9	00 29 142.6	26 51.6	00 29 142.4	27 20.3	00 29 142.3	3
4	23 41.9	00 30 142.4	24 10.6	00 30 142.2	24 39.2	00 30 142.0	25 07.8	00 30 141.9	25 36.5	00 30 141.7	26 05.1	00 30 141.5	26 33.7	00 31 141.4	27 02.2	00 31 141.2	4
35	23 23.9	00 31 141.3	23 52.5	00 31 141.2	24 21.1	00 31 141.0	24 49.7	00 31 140.8	25 18.2	00 31 140.6	25 46.8	00 31 140.5	26 15.3	00 31 140.3	26 43.8	00 31 140.1	35
6	23 05.6	00 32 140.3	23 34.1	00 32 140.1	24 02.6	00 32 139.9	24 31.1	00 32 139.8	24 59.6	00 32 139.6	25 28.0	00 32 139.4	25 56.5	00 32 139.3	26 24.9	00 32 139.1	6
7	22 46.8	00 33 139.3	23 15.2	00 33 139.1	23 43.7	00 33 138.9	24 12.1	00 33 138.7	24 40.5	00 33 138.6	25 08.9	00 33 138.4	25 37.3	00 33 138.2	26 05.7	00 33 138.0	7
8	22 27.6	00 33 138.2	22 56.0	00 33 138.1	23 24.4	00 33 137.9	23 52.7	00 33 137.7	24 21.1	00 33 137.5	24 49.4	00 33 137.3	25 17.7	00 33 137.2	25 46.0	00 33 137.0	8
9	22 08.0	00 33 137.2	22 36.3	00 33 137.0	23 04.6	00 33 136.8	23 32.9	00 33 136.6	24 01.2	00 33 136.5	24 29.5	00 33 136.3	24 57.8	00 33 136.1	25 26.0	00 33 135.9	9
40	21 48.1	00 34 136.2	22 16.3	00 34 136.0	22 44.6	00 34 135.8	23 12.8	00 34 135.6	23 41.0	00 34 135.5	24 09.2	00 34 135.3	24 37.4	00 34 135.1	25 05.6	00 34 134.9	40
1	21 27.7	00 34 135.2	21 55.9	00 34 135.0	22 24.1	00 34 134.8	22 52.3	00 34 134.6	23 20.4	00 34 134.4	23 48.6	00 34 134.2	24 16.7	00 34 134.0	24 44.8	00 34 133.8	1
2	21 07.1	00 35 134.2	21 35.2	00 35 134.0	22 03.3	00 35 133.8	22 31.4	00 35 133.6	22 59.5	00 35 133.4	23 27.5	00 35 133.2	23 55.6	00 35 133.0	24 23.6	00 35 132.8	2
3	20 46.0	00 35 133.2	21 14.1	00 35 133.0	21 42.1	00 35 132.8	22 10.1	00 35 132.6	22 38.2	00 35 132.4	23 06.2	00 35 132.2	23 34.1	00 35 132.0	24 02.1	00 35 131.8	3
4	20 24.6	00 36 132.2	20 52.6	00 36 132.0	21 20.6	00 36 131.8	21 48.6	00 36 131.6	22 16.5	00 36 131.4	22 44.4	00 36 131.2	23 12.4	00 36 131.0	23 40.3	00 36 130.8	4
45	20 02.9	00 37 131.2	20 30.8	00 37 131.0	20 58.7	00 37 130.8	21 26.6	00 37 130.6	21 54.5	00 37 130.4	22 22.4	00 37 130.2	22 50.2	00 37 130.0	23 18.1	00 37 129.8	45
6	19 40.8	00 37 130.2	20 08.7	00 37 130.0													

Main table with columns for H.A., Alt., Az., and declination values (0° 00' to 3° 30').

Lat. 61°

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	33 00.0	1.00	180.0	33 30.0	1.00	180.0	34 00.0	1.00	180.0	34 30.0	1.00	180.0	35 00.0	1.00	180.0	35 30.0	1.00	180.0	00
1	32 59.7	1.00	178.8	33 29.7	1.00	178.8	33 59.7	1.00	178.8	34 29.7	1.00	178.8	34 59.7	1.00	178.8	35 29.7	1.00	178.8	1
2	32 58.8	1.00	177.6	33 28.8	1.00	177.6	33 58.8	1.00	177.6	34 28.8	1.00	177.6	34 58.8	1.00	177.6	35 28.8	1.00	177.6	2
3	32 57.3	1.00	176.4	33 27.3	1.00	176.4	33 57.3	1.00	176.4	34 27.3	1.00	176.4	34 57.3	1.00	176.4	35 27.3	1.00	176.4	3
4	32 55.2	1.00	175.2	33 25.2	1.00	175.2	33 55.2	1.00	175.2	34 25.2	1.00	175.2	34 55.2	1.00	175.2	35 25.2	1.00	175.2	4
05	32 52.5	1.00	174.1	33 22.4	1.00	174.0	33 52.4	1.00	174.0	34 22.3	1.00	173.9	34 52.3	1.00	173.9	35 22.3	1.00	173.9	05
6	32 49.2	1.00	172.9	33 19.1	1.00	172.8	33 49.0	1.00	172.8	34 19.0	1.00	172.7	34 48.9	1.00	172.7	35 18.9	1.00	172.6	6
7	32 45.2	1.00	171.7	33 15.2	1.00	171.6	33 45.1	1.00	171.6	34 15.0	1.00	171.5	34 44.9	1.00	171.5	35 14.8	1.00	171.4	7
8	32 40.7	1.00	170.5	33 10.6	1.00	170.5	33 40.5	1.00	170.4	34 10.4	1.00	170.3	34 40.3	1.00	170.3	35 10.2	1.00	170.2	8
9	32 35.6	1.00	169.3	33 05.5	1.00	169.2	33 35.4	1.00	169.2	34 05.3	1.00	169.1	34 35.2	1.00	169.1	35 05.0	1.00	169.0	9
10	32 30.0	1.00	168.1	32 59.8	09 10	168.1	33 29.7	09 11	168.0	33 59.5	09 11	167.9	34 29.4	09 11	167.8	34 59.2	09 11	167.7	10
1	32 27.9	09 11	167.0	32 57.5	09 11	166.9	33 27.3	09 12	166.8	33 57.2	09 12	166.7	34 27.1	09 12	166.6	34 56.9	09 12	166.5	1
2	32 16.9	09 12	165.8	32 46.6	09 12	165.7	33 16.4	09 12	165.7	33 46.2	09 12	165.6	34 16.0	09 12	165.5	34 45.8	09 12	165.4	2
3	32 09.4	09 13	164.6	32 39.2	09 13	164.6	33 08.9	09 13	164.5	33 38.7	09 13	164.4	34 08.4	09 13	164.3	34 38.1	09 13	164.2	3
4	32 01.4	09 14	163.5	32 31.1	09 14	163.4	33 00.9	09 14	163.3	33 30.6	09 14	163.2	34 00.3	09 14	163.1	34 30.0	09 14	163.0	4
15	31 52.9	09 15	162.3	32 22.5	09 15	162.2	32 52.2	09 15	162.1	33 21.9	09 15	162.0	33 51.5	09 15	161.9	34 21.2	09 15	161.8	15
6	31 43.7	09 16	161.1	32 13.4	09 16	161.0	32 43.0	09 16	161.0	33 12.6	09 16	160.9	33 42.2	09 16	160.8	34 11.8	09 16	160.7	6
7	31 34.1	09 17	160.0	32 03.6	09 17	159.9	32 33.2	09 17	159.8	33 02.8	09 17	159.7	33 32.4	09 17	159.6	34 01.9	09 17	159.5	7
8	31 23.8	09 18	158.8	31 53.4	09 18	158.7	32 22.9	09 18	158.6	32 52.4	09 18	158.5	33 21.9	09 18	158.4	33 51.4	09 18	158.3	8
9	31 13.1	09 19	157.6	31 42.5	09 19	157.5	32 12.0	09 19	157.4	32 41.5	09 19	157.3	33 11.0	09 19	157.2	33 40.4	09 19	157.1	9
20	31 01.7	09 20	156.5	31 31.2	09 20	156.4	32 00.6	09 20	156.3	32 30.0	09 20	156.2	33 00.0	09 20	156.1	33 28.8	09 20	156.0	20
1	30 49.9	09 21	155.4	31 19.3	09 21	155.3	31 48.6	09 21	155.2	32 18.0	09 21	155.0	32 47.4	09 21	154.9	33 16.7	09 21	154.8	1
2	30 37.5	09 22	154.3	31 06.8	09 22	154.1	31 36.2	09 22	154.0	32 05.8	09 22	153.9	32 34.8	09 22	153.8	33 04.1	09 22	153.7	2
3	30 24.6	09 23	153.1	30 53.9	09 23	153.0	31 23.2	09 23	152.9	31 52.4	09 23	152.7	32 21.6	09 23	152.6	32 50.9	09 23	152.5	3
4	30 11.2	09 24	152.0	30 40.4	09 24	151.9	31 09.6	09 24	151.7	31 38.8	09 24	151.6	32 08.0	09 24	151.5	32 37.2	09 24	151.3	4
25	29 57.3	09 24	150.9	30 26.5	09 24	150.7	30 55.6	09 24	150.6	31 24.7	09 24	150.5	31 53.9	09 24	150.3	32 23.0	09 24	150.2	25
6	29 42.9	09 25	149.8	30 12.9	09 25	149.6	30 41.1	09 25	149.5	31 10.1	09 25	149.3	31 39.2	09 25	149.2	32 08.2	09 25	149.0	6
7	29 28.0	09 26	148.7	29 57.1	09 26	148.5	30 26.1	09 26	148.4	30 55.1	09 26	148.2	31 24.1	09 26	148.1	31 53.0	09 26	147.9	7
8	29 12.7	09 27	147.5	29 41.6	09 27	147.4	30 10.6	09 27	147.2	30 39.5	09 27	147.1	31 08.4	09 27	146.9	31 37.3	09 27	146.8	8
9	28 56.8	09 27	146.4	29 25.7	09 27	146.3	29 54.6	09 27	146.1	30 23.5	09 27	146.0	30 52.3	09 27	145.8	31 21.2	09 27	145.7	9
30	28 40.5	09 28	145.4	29 09.3	09 28	145.2	29 38.2	09 28	145.0	30 07.0	09 28	144.9	30 35.8	09 28	144.7	31 04.5	09 28	144.5	30
1	28 23.8	09 29	144.3	28 52.5	09 29	144.1	29 21.3	09 29	143.9	29 50.0	09 29	143.8	30 18.7	09 29	143.6	30 47.4	09 29	143.4	1
2	28 06.5	09 30	143.2	28 35.2	09 30	143.0	29 03.9	09 30	142.8	29 32.6	09 30	142.7	30 01.2	09 30	142.5	30 29.9	09 30	142.3	2
3	27 48.9	09 30	142.1	28 17.5	09 30	141.9	28 46.1	09 30	141.8	29 14.7	09 30	141.6	29 43.3	09 30	141.4	30 11.9	09 30	141.2	3
4	27 30.8	09 31	141.0	27 59.4	09 31	140.9	28 27.9	09 31	140.7	28 56.4	09 31	140.5	29 25.0	09 31	140.3	29 53.5	09 31	140.1	4
35	27 12.3	09 32	140.0	27 40.8	09 32	139.8	28 09.3	09 32	139.6	28 37.7	09 32	139.4	29 06.2	09 32	139.2	29 34.6	09 32	139.0	35
6	26 53.4	09 33	138.9	27 21.8	09 33	138.7	27 50.2	09 33	138.5	28 18.6	09 33	138.4	28 47.0	09 33	138.2	29 15.3	09 33	138.0	6
7	26 34.1	09 33	137.8	27 02.4	09 33	137.7	27 30.7	09 33	137.5	27 59.1	09 33	137.3	28 27.4	09 33	137.1	28 55.7	09 33	136.9	7
8	26 14.3	09 34	136.8	26 42.4	09 34	136.6	27 10.9	09 34	136.4	27 39.1	09 34	136.2	28 07.4	09 34	136.0	28 35.6	09 34	135.8	8
9	25 54.2	09 34	135.7	26 22.4	09 34	135.5	26 50.6	09 34	135.4	27 18.8	09 34	135.2	27 47.0	09 34	135.0	28 15.1	09 34	134.8	9
40	25 33.7	09 35	134.7	26 01.9	09 35	134.5	26 30.0	09 35	134.3	26 58.1	09 35	134.1	27 26.2	09 35	133.9	27 54.3	09 35	133.7	40
1	25 12.9	09 35	133.7	25 41.0	09 35	133.5	26 09.0	09 35	133.3	26 37.1	09 35	133.1	27 05.1	09 35	132.9	27 33.1	09 35	132.7	1
2	24 51.7	09 36	132.6	25 19.7	09 36	132.4	25 47.7	09 36	132.2	26 15.6	09 36	132.0	26 43.6	09 36	131.8	27 11.5	09 36	131.6	2
3	24 30.1	09 37	131.6	24 58.0	09 37	131.4	25 25.9	09 37	131.2	25 53.9	09 37	131.0	26 21.7	09 37	130.8	26 49.6	09 37	130.6	3
4	24 08.2	09 37	130.6	24 36.0	09 37	130.4	25 03.9	09 37	130.2	25 31.7	09 37	130.0	25 59.6	09 37	129.8	26 27.4	09 37	129.6	4
45	23 45.9	09 38	129.6	24 13.7	09 38	129.4	24 41.5	09 38	129.2	25 09.3	09 38	129.0	25 37.0	09 38	128.8	26 04.8	09 38	128.6	45
6	23 23.3	09 38	128.6	23 51.1	09 38	128.4	24 18.8	09 38	128.2	24 46.5	09 38	128.0	25 14.2	09 38	127.7	25 41.9	09 38	127.5	6
7	23 00.4	09 39	127.6	23 28.1	09 39	127.4	23 55.8	09 39	127.1	24 23.4	09 39	126.9	24 51.0	09 39	126.7	25 18.6	09 39	126.5	7
8	22 37.2	09 39	126.6	23 04.8	09 39	126.4	23 32.4	09 39	126.1	24 00.0	09 39	125.9	24 27.6	09 39	125.7	24 55.1	09 39	125.5	8
9	22 13.7	09 40	125.6	22 41.3	09 40	125.4	23 08.8	09 40	125.1	23 36.3	09 40	124.9	24 03.8	09 40	124.7	24 31.3	09 40	124.5	9
50	21 49.9	09 40	124.6	22 17.4	09 40	124.4	22 44.9	09 40	124.2	23 12.3	09 40	123.9	23 39.7	09 40	123.7	24 07.2	09 40	123.5	50
1	21 25.6	09 41	123.6	21 53.2	09 41	123.4	22 20.6	09 41	123.2	22 48.0	09 41	123.0	23 15.4	09 41	122.7	23 42.8	09 41	122.5	1
2	21 01.4	09 41</																	

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 61°

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Ad At															
00	2500.0	1.00	2430.0	1.00	2300.0	1.00	2300.0	1.00	2230.0	1.00	2200.0	1.00	2100.0	1.00	2100.0	1.00	00
1	2459.7	1.01	2429.7	1.01	2359.7	1.01	2329.7	1.01	2259.7	1.01	2229.7	1.01	2159.7	1.01	2129.7	1.01	1
2	2458.9	1.02	2428.9	1.02	2358.9	1.02	2328.9	1.02	2258.9	1.02	2228.9	1.02	2158.9	1.02	2128.9	1.02	2
3	2457.5	1.03	2427.5	1.03	2357.5	1.03	2327.5	1.03	2257.5	1.03	2227.5	1.03	2157.5	1.03	2127.5	1.03	3
4	2455.5	1.04	2425.5	1.04	2355.5	1.04	2325.5	1.04	2255.5	1.04	2225.5	1.04	2155.5	1.04	2125.5	1.04	4
5	2453.0	1.05	2423.0	1.05	2353.0	1.05	2323.0	1.05	2253.0	1.05	2223.0	1.05	2153.0	1.05	2123.0	1.05	5
6	2450.0	1.06	2420.0	1.06	2350.0	1.06	2320.0	1.06	2250.0	1.06	2220.0	1.06	2150.0	1.06	2120.0	1.06	6
7	2446.3	1.07	2416.3	1.07	2346.3	1.07	2316.3	1.07	2246.3	1.07	2216.3	1.07	2146.3	1.07	2116.3	1.07	7
8	2442.2	1.08	2412.2	1.08	2342.2	1.08	2312.2	1.08	2242.2	1.08	2212.2	1.08	2142.2	1.08	2112.2	1.08	8
9	2437.4	1.09	2407.4	1.09	2337.4	1.09	2307.4	1.09	2237.4	1.09	2207.4	1.09	2137.4	1.09	2107.4	1.09	9
10	2432.2	1.10	2402.2	1.10	2332.2	1.10	2302.2	1.10	2232.2	1.10	2202.2	1.10	2132.2	1.10	2102.2	1.10	10
11	2426.4	1.11	2396.4	1.11	2326.4	1.11	2296.4	1.11	2226.4	1.11	2196.4	1.11	2126.4	1.11	2096.4	1.11	11
12	2420.0	1.12	2390.0	1.12	2320.0	1.12	2290.0	1.12	2220.0	1.12	2190.0	1.12	2120.0	1.12	2090.0	1.12	12
13	2413.1	1.13	2383.1	1.13	2313.1	1.13	2283.1	1.13	2213.1	1.13	2183.1	1.13	2113.1	1.13	2083.1	1.13	13
14	2405.7	1.14	2375.7	1.14	2305.7	1.14	2275.7	1.14	2205.7	1.14	2175.7	1.14	2105.7	1.14	2075.7	1.14	14
15	2397.8	1.15	2367.8	1.15	2297.8	1.15	2267.8	1.15	2197.8	1.15	2167.8	1.15	2097.8	1.15	2067.8	1.15	15
16	2389.3	1.16	2359.3	1.16	2289.3	1.16	2259.3	1.16	2189.3	1.16	2159.3	1.16	2089.3	1.16	2059.3	1.16	16
17	2380.3	1.17	2350.3	1.17	2280.3	1.17	2250.3	1.17	2180.3	1.17	2150.3	1.17	2080.3	1.17	2050.3	1.17	17
18	2370.8	1.18	2340.8	1.18	2270.8	1.18	2240.8	1.18	2170.8	1.18	2140.8	1.18	2070.8	1.18	2040.8	1.18	18
19	2360.8	1.19	2330.8	1.19	2260.8	1.19	2230.8	1.19	2160.8	1.19	2130.8	1.19	2060.8	1.19	2030.8	1.19	19
20	2350.3	1.20	2320.3	1.20	2250.3	1.20	2220.3	1.20	2150.3	1.20	2120.3	1.20	2050.3	1.20	2020.3	1.20	20
21	2339.3	1.21	2309.3	1.21	2239.3	1.21	2209.3	1.21	2139.3	1.21	2109.3	1.21	2039.3	1.21	2009.3	1.21	21
22	2327.8	1.22	2297.8	1.22	2227.8	1.22	2197.8	1.22	2127.8	1.22	2097.8	1.22	2027.8	1.22	1997.8	1.22	22
23	2315.8	1.23	2285.8	1.23	2215.8	1.23	2185.8	1.23	2115.8	1.23	2085.8	1.23	2015.8	1.23	1985.8	1.23	23
24	2303.3	1.24	2273.3	1.24	2203.3	1.24	2173.3	1.24	2103.3	1.24	2073.3	1.24	2003.3	1.24	1973.3	1.24	24
25	2290.3	1.25	2260.3	1.25	2190.3	1.25	2160.3	1.25	2090.3	1.25	2060.3	1.25	1990.3	1.25	1960.3	1.25	25
26	2276.8	1.26	2246.8	1.26	2176.8	1.26	2146.8	1.26	2076.8	1.26	2046.8	1.26	1976.8	1.26	1946.8	1.26	26
27	2262.8	1.27	2232.8	1.27	2162.8	1.27	2132.8	1.27	2062.8	1.27	2032.8	1.27	1962.8	1.27	1932.8	1.27	27
28	2248.3	1.28	2218.3	1.28	2148.3	1.28	2118.3	1.28	2048.3	1.28	2018.3	1.28	1948.3	1.28	1918.3	1.28	28
29	2233.3	1.29	2203.3	1.29	2133.3	1.29	2103.3	1.29	2033.3	1.29	2003.3	1.29	1933.3	1.29	1903.3	1.29	29
30	2217.8	1.30	2187.8	1.30	2117.8	1.30	2087.8	1.30	2017.8	1.30	1987.8	1.30	1917.8	1.30	1887.8	1.30	30
31	2201.8	1.31	2171.8	1.31	2101.8	1.31	2071.8	1.31	2001.8	1.31	1971.8	1.31	1901.8	1.31	1871.8	1.31	31
32	2185.3	1.32	2155.3	1.32	2085.3	1.32	2055.3	1.32	1985.3	1.32	1955.3	1.32	1885.3	1.32	1855.3	1.32	32
33	2168.3	1.33	2138.3	1.33	2068.3	1.33	2038.3	1.33	1968.3	1.33	1938.3	1.33	1868.3	1.33	1838.3	1.33	33
34	2150.8	1.34	2120.8	1.34	2050.8	1.34	2020.8	1.34	1950.8	1.34	1920.8	1.34	1850.8	1.34	1820.8	1.34	34
35	2132.8	1.35	2102.8	1.35	2032.8	1.35	2002.8	1.35	1932.8	1.35	1902.8	1.35	1832.8	1.35	1802.8	1.35	35
36	2114.3	1.36	2084.3	1.36	2014.3	1.36	1984.3	1.36	1914.3	1.36	1884.3	1.36	1814.3	1.36	1784.3	1.36	36
37	2095.3	1.37	2065.3	1.37	1995.3	1.37	1965.3	1.37	1895.3	1.37	1865.3	1.37	1795.3	1.37	1765.3	1.37	37
38	2075.8	1.38	2045.8	1.38	1975.8	1.38	1945.8	1.38	1875.8	1.38	1845.8	1.38	1775.8	1.38	1745.8	1.38	38
39	2055.8	1.39	2025.8	1.39	1955.8	1.39	1925.8	1.39	1855.8	1.39	1825.8	1.39	1755.8	1.39	1725.8	1.39	39
40	2035.3	1.40	2005.3	1.40	1935.3	1.40	1905.3	1.40	1835.3	1.40	1805.3	1.40	1735.3	1.40	1705.3	1.40	40
41	2014.3	1.41	1984.3	1.41	1914.3	1.41	1884.3	1.41	1814.3	1.41	1784.3	1.41	1714.3	1.41	1684.3	1.41	41
42	1992.8	1.42	1962.8	1.42	1892.8	1.42	1862.8	1.42	1792.8	1.42	1762.8	1.42	1692.8	1.42	1662.8	1.42	42
43	1970.8	1.43	1940.8	1.43	1870.8	1.43	1840.8	1.43	1770.8	1.43	1740.8	1.43	1670.8	1.43	1640.8	1.43	43
44	1948.3	1.44	1918.3	1.44	1848.3	1.44	1818.3	1.44	1748.3	1.44	1718.3	1.44	1648.3	1.44	1618.3	1.44	44
45	1925.3	1.45	1895.3	1.45	1825.3	1.45	1795.3	1.45	1725.3	1.45	1695.3	1.45	1625.3	1.45	1595.3	1.45	45
46	1901.8	1.46	1871.8	1.46	1801.8	1.46	1771.8	1.46	1701.8	1.46	1671.8	1.46	1601.8	1.46	1571.8	1.46	46
47	1877.8	1.47	1847.8	1.47	1777.8	1.47	1747.8	1.47	1677.8	1.47	1647.8	1.47	1577.8	1.47	1547.8	1.47	47
48	1853.3	1.48	1823.3	1.48	1753.3	1.48	1723.3	1.48	1653.3	1.48	1623.3	1.48	1553.3	1.48	1523.3	1.48	48
49	1828.3	1.49	1798.3	1.49	1728.3	1.49	1698.3	1.49	1628.3	1.49	1598.3	1.49	1528.3	1.49	1498.3	1.49	49
50	1802.8	1.50	1772.8	1.50	1702.8	1.50	1672.8	1.50	1602.8	1.50	1572.8	1.50	1502.8	1.50	1472.8	1.50	50
51	1776.8	1.51	1746.8	1.51	1676.8	1.51	1646.8	1.51	1576.8	1.51	1546.8	1.51	1476.8	1.51	1446.8	1.51	51
52	1750.3	1.52	1720.3	1.52	1650.3	1.52	1620.3	1.52	1550.3	1.52	1520.3	1.52	1450.3	1.52	1420.3	1.52	52
53	1723.3	1.53	1693.3	1.53	1623.3	1.53	1593.3	1.53	1523.3	1.53	1493.3	1.53	1423.3	1.53	1393.3	1.53	53
54	1695.8	1.54	1665.8	1.54	1595.8	1.54	1565.8	1.54	1495.8	1.54	1465.8	1.54	1395.8	1.54	1365.8	1.54	54
55	1667.8	1.55	1637.8	1.55	1567.8	1.55	1537.8	1.55	1467.8	1.55	1437.8	1.55	1367.8	1.55	1337.8	1.55	55
56	1639.3	1.56	1609.3	1.56	1539.3	1.56	1509.3	1.56	1439.3	1.56	1409.3	1.56	1339.3	1.56	1309.3	1.56	56
57	1610.3	1.57	1580.3	1.57	1510.3	1.57	1480.3	1.57	1410.3	1.57	1380.3	1.57	1310.3	1.57	1280.3	1.57	57
58	1580.8	1.58	1550.8	1.58	1480.8	1.58	1450.8	1.58	1380.8	1.58	1350.8	1.58	1280.8	1.58	1250.8	1.58	58
59	1550.8	1.59	1520.8	1.59	1450.8	1.59	1420.8	1.59	1350.8	1.59	1320.8	1.59	1250.8	1.59	1220.8	1.59	59
60	1520.3	1.60															

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.															
00	33 00.0	1.00 180.0	33 30.0	1.00 180.0	34 00.0	1.00 180.0	34 30.0	1.00 180.0	35 00.0	1.00 180.0	35 30.0	1.00 180.0	36 00.0	1.00 180.0	36 30.0	1.00 180.0	00
1	32 59.7	1.00 178.8	33 29.7	1.00 178.8	33 59.7	1.00 178.8	34 29.7	1.00 178.8	34 59.7	1.00 178.8	35 29.7	1.00 178.8	35 59.7	1.00 178.8	36 29.7	1.00 178.8	1
2	32 58.8	1.00 177.6	33 28.8	1.00 177.6	33 58.8	1.00 177.6	34 28.8	1.00 177.6	34 58.8	1.00 177.6	35 28.8	1.00 177.6	35 58.8	1.00 177.6	36 28.8	1.00 177.6	2
3	32 57.3	1.00 176.4	33 27.3	1.00 176.4	33 57.3	1.00 176.4	34 27.3	1.00 176.4	34 57.3	1.00 176.4	35 27.3	1.00 176.4	35 57.3	1.00 176.4	36 27.3	1.00 176.4	3
4	32 55.2	1.00 175.2	33 25.1	1.00 175.2	33 55.1	1.00 175.2	34 25.1	1.00 175.2	34 55.1	1.00 175.2	35 25.1	1.00 175.2	35 55.1	1.00 175.2	36 25.1	1.00 175.2	4
05	32 52.5	1.00 174.0	33 22.4	1.00 174.0	33 52.4	1.00 174.0	34 22.3	1.00 174.0	34 52.3	1.00 174.0	35 22.3	1.00 174.0	35 52.3	1.00 174.0	36 22.2	1.00 173.9	05
6	32 49.2	1.00 172.9	33 19.1	1.00 172.8	33 49.0	1.00 172.8	34 19.0	1.00 172.8	34 48.9	1.00 172.7	35 18.9	1.00 172.7	35 48.8	1.00 172.6	36 18.8	1.00 172.6	6
7	32 45.2	1.00 171.7	33 15.2	1.00 171.6	33 45.1	1.00 171.6	34 15.0	1.00 171.6	34 44.9	1.00 171.5	35 14.9	1.00 171.5	35 44.8	1.00 171.4	36 14.7	1.00 171.4	7
8	32 40.7	1.00 170.5	33 10.6	1.00 170.5	33 40.5	1.00 170.4	34 10.4	1.00 170.4	34 40.3	1.00 170.3	35 10.2	1.00 170.3	35 40.1	1.00 170.2	36 10.0	1.00 170.2	8
9	32 35.6	1.00 169.3	33 05.5	1.00 169.3	33 35.4	1.00 169.2	34 05.3	1.00 169.2	34 35.2	1.00 169.1	35 05.0	1.00 169.1	35 34.9	1.00 169.0	36 04.8	1.00 168.9	9
10	32 30.0	1.00 168.1	32 59.8	09 10 168.1	33 29.7	09 11 168.0	33 59.5	09 11 168.0	34 29.4	09 11 167.9	34 59.2	09 11 167.8	35 29.0	09 11 167.8	35 58.9	09 11 167.7	10
1	32 29.7	09 11 167.0	32 59.5	09 11 166.9	33 29.4	09 12 166.8	33 59.2	09 12 166.8	34 29.1	09 12 166.7	34 58.9	09 12 166.6	35 28.7	09 12 166.6	35 58.6	09 12 166.5	1
2	32 28.9	09 12 165.8	32 58.6	09 12 165.7	33 28.5	09 12 165.7	33 58.3	09 12 165.6	34 28.2	09 12 165.5	34 58.0	09 12 165.4	35 27.8	09 12 165.4	35 58.3	09 12 165.3	2
3	32 28.0	09 13 164.6	32 57.7	09 13 164.5	33 27.6	09 13 164.5	33 57.4	09 13 164.4	34 27.3	09 13 164.3	34 57.0	09 13 164.2	35 27.0	09 13 164.2	35 57.6	09 13 164.1	3
4	32 27.1	09 14 163.5	32 56.8	09 14 163.4	33 26.7	09 14 163.3	33 56.5	09 14 163.2	34 26.4	09 14 163.1	34 56.1	09 14 163.0	35 26.1	09 14 163.0	35 56.7	09 14 162.9	4
15	31 52.9	09 15 162.3	32 22.5	09 15 162.2	32 52.3	09 15 162.1	33 21.9	09 15 162.0	33 51.5	09 15 161.9	34 21.2	09 15 161.9	34 50.8	09 15 161.8	35 20.5	09 15 161.7	15
6	31 43.7	09 16 161.1	32 13.4	09 16 161.0	32 12.6	09 16 161.0	33 12.6	09 16 160.9	33 42.2	09 16 160.8	34 11.8	09 16 160.7	34 41.4	09 16 160.6	35 11.0	09 16 160.5	6
7	31 34.1	09 17 160.0	32 03.6	09 17 159.9	32 02.8	09 17 159.8	33 02.8	09 17 159.7	33 32.4	09 17 159.6	34 01.9	09 17 159.5	34 31.5	09 17 159.4	35 01.0	09 17 159.3	7
8	31 23.8	09 18 158.8	31 53.5	09 18 158.7	32 22.9	09 18 158.6	32 52.4	09 18 158.5	33 21.9	09 18 158.4	33 51.4	09 18 158.3	34 20.9	09 18 158.2	34 50.4	09 18 158.1	8
9	31 13.1	09 19 157.7	31 43.5	09 19 157.6	32 12.0	09 19 157.5	32 41.5	09 19 157.4	33 11.0	09 19 157.2	33 40.4	09 19 157.1	34 09.9	09 19 157.0	34 39.3	09 19 156.9	9
20	31 01.7	09 20 156.5	31 31.2	09 20 156.4	32 00.6	09 20 156.3	32 30.0	09 20 156.2	32 59.4	09 20 156.1	33 28.8	09 20 156.0	33 58.2	09 20 155.8	34 27.6	09 20 155.7	20
1	30 49.9	09 21 155.4	31 19.3	09 21 155.3	31 48.6	09 21 155.2	32 18.0	09 21 155.0	32 47.4	09 21 154.9	33 16.7	09 21 154.8	33 46.1	09 21 154.7	34 15.4	09 21 154.5	1
2	30 37.5	09 22 154.3	31 06.8	09 22 154.1	31 36.2	09 22 154.0	32 05.5	09 22 153.9	32 34.8	09 22 153.8	33 04.1	09 22 153.6	33 33.3	09 22 153.5	34 02.6	09 22 153.4	2
3	30 24.6	09 23 153.1	30 53.9	09 23 153.0	31 23.2	09 23 152.9	31 52.4	09 23 152.7	32 21.6	09 23 152.6	32 50.9	09 23 152.5	33 19.1	09 23 152.3	33 49.3	09 23 152.2	3
4	30 11.2	09 24 152.0	30 40.4	09 24 151.9	31 09.6	09 24 151.7	31 38.8	09 24 151.6	32 08.0	09 24 151.5	32 37.2	09 24 151.3	33 06.3	09 24 151.2	33 35.5	09 24 151.0	4
25	29 57.3	09 24 150.9	30 26.5	09 24 150.7	30 55.6	09 24 150.6	31 24.7	09 24 150.5	31 53.9	09 24 150.3	32 23.0	09 24 150.2	32 51.7	09 24 150.0	33 21.2	09 24 149.9	25
6	29 42.9	09 25 149.8	30 12.0	09 25 149.6	30 41.1	09 25 149.5	31 10.1	09 25 149.3	31 39.2	09 25 149.2	32 08.2	09 25 149.0	32 37.3	09 25 148.8	33 06.3	09 25 148.7	6
7	29 28.0	09 26 148.7	29 57.1	09 26 148.5	30 26.1	09 26 148.4	30 55.1	09 26 148.2	31 24.1	09 26 148.1	31 53.0	09 26 147.9	32 22.0	09 26 147.8	32 51.0	09 26 147.6	7
8	29 12.7	09 27 147.5	29 41.6	09 27 147.4	30 10.6	09 27 147.2	30 39.5	09 27 147.1	31 08.4	09 27 146.9	31 37.3	09 27 146.8	32 06.3	09 27 146.6	32 35.1	09 27 146.5	8
9	28 56.8	09 27 146.4	29 25.7	09 27 146.3	29 54.6	09 27 146.1	30 23.5	09 28 146.0	30 52.3	09 28 145.8	31 21.2	09 28 145.7	31 50.0	09 28 145.5	32 18.8	09 28 145.3	9
30	28 40.5	09 28 145.2	29 09.3	09 28 145.1	29 38.2	09 28 145.0	30 07.0	09 28 144.9	30 35.8	09 28 144.7	31 04.5	09 28 144.5	31 33.3	09 28 144.4	32 02.1	09 28 144.2	30
1	28 23.8	09 29 144.3	28 52.5	09 29 144.1	29 21.3	09 29 143.9	29 50.0	09 29 143.8	30 18.7	09 29 143.6	30 47.4	09 29 143.4	31 16.1	09 29 143.3	31 44.8	09 29 143.1	1
2	28 06.5	09 30 143.2	28 35.2	09 30 143.0	29 03.9	09 30 142.8	29 32.6	09 30 142.7	30 01.2	09 30 142.5	30 29.9	09 30 142.3	30 58.5	09 30 142.2	31 27.1	09 30 142.0	2
3	27 48.9	09 30 142.1	28 17.5	09 30 141.9	28 46.1	09 30 141.8	29 14.7	09 30 141.6	29 43.3	09 31 141.4	30 11.9	09 31 141.2	30 40.4	09 31 141.1	31 09.0	09 31 140.9	3
4	27 30.8	09 31 141.0	27 59.4	09 31 140.9	28 27.9	09 31 140.7	28 56.4	09 31 140.5	29 25.0	09 31 140.3	29 53.5	09 31 140.1	30 21.9	09 31 140.0	30 50.4	09 31 139.8	4
35	27 12.3	09 32 140.0	27 40.8	09 32 139.8	28 09.3	09 32 139.6	28 37.7	09 32 139.4	29 06.2	09 32 139.2	29 34.6	09 32 139.1	30 03.0	09 32 138.9	30 31.4	09 32 138.7	35
6	26 53.4	09 32 138.9	27 21.8	09 32 138.7	27 50.2	09 32 138.5	28 18.6	09 32 138.4	28 47.0	09 32 138.2	29 15.3	09 32 138.0	29 43.7	09 32 137.8	30 12.0	09 32 137.6	6
7	26 34.1	09 33 137.8	27 02.4	09 33 137.7	27 30.7	09 33 137.5	27 59.1	09 33 137.3	28 27.4	09 33 137.1	28 55.7	09 33 136.9	29 23.9	09 33 136.7	29 52.4	09 33 136.5	7
8	26 14.3	09 34 136.8	26 42.6	09 34 136.6	27 10.9	09 34 136.4	27 39.1	09 34 136.2	28 07.4	09 34 136.0	28 35.6	09 34 135.8	29 03.8	09 34 135.6	29 32.0	09 34 135.4	8
9	25 54.2	09 34 135.7	26 22.4	09 34 135.5	26 50.6	09 34 135.4	27 18.8	09 34 135.2	27 47.0	09 34 135.0	28 15.1	09 34 134.8	28 43.3	09 34 134.6	29 11.4	09 34 134.4	9
40	25 33.7	09 35 134.7	26 01.9	09 35 134.5	26 30.0	09 35 134.3	26 58.1	09 35 134.1	27 26.2	09 35 133.9	27 54.3	09 35 133.7	28 22.4	09 35 133.5	28 50.4	09 35 133.3	40
1	25 12.9	09 36 133.7	25 41.0	09 36 133.5	26 09.0	09 36 133.3	26 37.1	09 36 133.1	27 05.1	09 36 132.9	27 33.1	09 36 132.7	28 01.1	09 36 132.5	28 29.1	09 36 132.3	1
2	24 51.7	09 36 132.6	25 19.7	09 36 132.4	25 47.7	09 36 132.2	26 15.6	09 36 132.0	26 43.6	09 36 131.8	27 11.5	09 36 131.6	27 39.5	09 36 131.4	28 07.4	09 36 131.2	2
3	24 30.1	09 37 131.6	24 58.0	09 37 131.4	25 25.9	09 37 131.2	25 53.9	09 37 131.0	26 21.7	09 37 130.8	26 49.6	09 37 130.6	27 17.5	09 37 130.4	27 45.3	09 37 130.2	3
4	24 08.2	09 37 130.6	24 36.0	09 37 130.4	25 03.9	09 37 130.2	25 31.7	09 37 130.0	25 59.6	09 37 129.8	26 27.4	09 37 129.6	26 55.1	09 37 129.4	27 22.9	09 37 129.1	4
45	23 45.9	09 38 129.6	24 13.7	09 38 129.4	24 41.5	09 38 129.2	25 09.3	09 38 129.0	25 37.0	09 38 128.7	26 04.8	09 38 128.5	26 32.5	09 38 128.3	27 00.2	09 38 128.1	45
6	23 23.3	09 38 128.6	23 51.1	09 3													

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 61°

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.															
00	25 00.0	1.00 180.0	24 30.0	1.00 180.0	24 00.0	1.00 180.0	23 30.0	1.00 180.0	23 00.0	1.00 180.0	22 30.0	1.00 180.0	22 00.0	1.00 180.0	21 30.0	1.00 180.0	00
1	24 59.7	1.00 178.9	24 29.7	1.00 178.9	23 59.7	1.00 178.9	23 29.7	1.00 178.9	22 59.7	1.00 178.9	22 29.7	1.00 178.9	21 59.7	1.00 178.9	21 29.7	1.00 178.9	1
2	24 58.9	1.00 177.8	24 28.9	1.00 177.8	23 58.9	1.00 177.8	23 28.9	1.00 177.8	22 58.9	1.00 177.8	22 28.9	1.00 177.8	21 58.9	1.00 177.8	21 28.9	1.00 177.8	2
3	24 57.5	1.00 176.7	24 27.5	1.00 176.7	23 57.5	1.00 176.7	23 27.5	1.00 176.7	22 57.5	1.00 176.8	22 27.5	1.00 176.8	21 57.6	1.00 176.8	21 27.6	1.00 176.8	3
4	24 55.5	1.00 175.6	24 25.6	1.00 175.6	23 55.6	1.00 175.6	23 25.6	1.00 175.7	22 55.6	1.00 175.7	22 25.6	1.00 175.7	21 55.7	1.00 175.7	21 25.7	1.00 175.7	4
05	24 53.0	1.00 174.5	24 23.1	1.00 174.5	23 53.1	1.00 174.6	23 23.1	1.00 174.6	22 53.2	1.00 174.6	22 23.2	1.00 174.6	21 53.2	1.00 174.7	21 23.2	1.00 174.7	05
6	24 50.1	1.00 173.4	24 20.1	1.00 173.4	23 50.1	1.00 173.5	23 20.1	1.00 173.5	22 50.1	1.00 173.5	22 20.2	1.00 173.6	21 50.2	1.00 173.6	21 20.3	1.00 173.6	6
7	24 46.3	1.00 172.3	24 16.4	1.00 172.3	23 46.5	1.00 172.4	23 16.5	1.00 172.4	22 46.6	1.00 172.4	22 16.6	1.00 172.5	21 46.7	1.00 172.5	21 16.8	1.00 172.5	7
8	24 42.2	1.00 171.2	24 12.3	1.00 171.3	23 42.3	1.00 171.3	23 12.4	1.00 171.3	22 42.5	1.00 171.4	22 12.6	1.00 171.4	21 42.7	1.00 171.4	21 12.7	1.00 171.5	8
9	24 37.4	1.00 170.1	24 07.3	1.00 170.2	23 37.7	1.00 170.2	23 07.8	1.00 170.3	22 37.9	1.00 170.3	22 08.0	1.00 170.3	21 38.1	1.00 170.4	21 08.2	1.00 170.4	9
10	24 32.2	1.00 169.0	24 02.3	1.00 169.1	23 32.4	1.00 169.1	23 02.6	1.00 169.2	22 32.7	1.00 169.2	22 02.8	1.00 169.3	21 32.9	1.00 169.3	21 03.1	1.00 169.4	10
1	24 26.4	09 11 167.9	23 56.5	09 11 168.0	23 26.7	09 10 168.0	22 56.8	09 10 168.1	22 27.0	09 10 168.2	21 57.1	09 10 168.2	21 27.3	09 10 168.3	20 57.4	1.00 168.3	1
2	24 20.0	09 11 166.8	23 50.2	09 11 166.9	23 20.4	09 11 167.0	22 50.6	09 11 167.0	22 20.7	09 11 167.1	21 50.9	09 11 167.1	21 21.1	09 11 167.2	20 51.3	09 11 167.3	2
3	24 13.1	09 12 165.8	23 43.3	09 12 165.8	23 13.6	09 12 165.9	22 43.8	09 12 165.9	22 14.0	09 12 166.0	21 44.2	09 12 166.1	21 14.4	09 12 166.1	20 44.6	09 12 166.2	3
4	24 05.7	09 13 164.7	23 36.0	09 13 164.7	23 06.2	09 13 164.8	22 36.4	09 13 164.9	22 06.7	09 13 164.9	21 36.9	09 13 165.0	21 07.2	09 13 165.1	20 37.4	09 13 165.2	4
15	23 57.8	09 14 163.6	23 28.0	09 14 163.7	22 58.3	09 14 163.7	22 28.6	09 14 163.8	21 58.9	09 14 163.9	21 29.1	09 14 164.0	20 59.4	09 14 164.0	20 29.7	09 14 164.1	15
6	23 49.3	09 15 162.5	23 19.6	09 15 162.6	22 49.9	09 15 162.7	22 20.2	09 15 162.7	21 50.5	09 15 162.8	21 20.9	09 15 162.9	20 51.2	09 15 163.0	20 21.5	09 15 163.1	6
7	23 40.3	09 16 161.4	23 10.6	09 16 161.5	22 41.0	09 16 161.6	22 11.3	09 16 161.7	21 41.7	09 16 161.8	21 12.0	09 16 161.8	20 42.4	09 16 161.9	20 12.7	09 16 162.0	7
8	23 30.7	09 17 160.4	23 01.1	09 17 160.4	22 31.5	09 17 160.5	22 01.9	09 17 160.6	21 32.3	09 17 160.7	21 02.7	09 17 160.8	20 33.1	09 17 160.9	20 03.5	09 17 161.0	8
9	23 20.7	09 18 159.3	22 51.2	09 18 159.4	22 21.6	09 17 159.5	21 52.0	09 17 159.6	21 22.5	09 17 159.7	20 52.9	09 17 159.7	20 23.3	09 17 159.8	19 53.8	09 17 159.9	9
20	23 10.2	08 18 158.2	22 40.7	08 18 158.3	22 11.1	08 18 158.4	21 41.6	08 18 158.5	21 12.1	08 18 158.6	20 42.6	08 18 158.7	20 13.1	08 18 158.8	19 43.5	08 18 158.9	20
1	22 59.1	08 19 157.1	22 29.7	08 19 157.3	22 00.2	08 19 157.4	21 30.7	08 19 157.5	21 01.2	08 19 157.6	20 31.8	08 19 157.7	20 02.3	08 19 157.8	19 32.8	08 19 157.8	1
2	22 47.6	08 20 156.1	22 18.2	08 20 156.2	21 48.7	08 20 156.3	21 19.3	08 20 156.4	20 49.9	08 20 156.5	20 20.5	08 20 156.6	19 51.0	08 20 156.7	19 21.6	08 20 156.8	2
3	22 35.5	08 21 155.0	22 06.8	08 21 155.1	21 36.8	08 21 155.2	21 07.4	08 21 155.4	20 38.1	08 21 155.5	20 08.7	08 21 155.6	19 39.3	08 21 155.7	19 09.9	08 21 155.8	3
4	22 23.0	08 22 154.0	21 53.7	08 22 154.1	21 24.4	08 22 154.2	20 55.1	08 21 154.3	20 25.7	08 21 154.4	19 56.4	08 21 154.5	19 27.1	08 21 154.7	18 57.7	08 21 154.8	4
25	22 10.0	08 22 152.9	21 40.8	08 22 153.0	21 11.5	08 22 153.2	20 42.2	08 22 153.3	20 12.9	08 22 153.4	19 43.7	08 22 153.5	19 14.4	08 22 153.6	18 45.1	08 22 153.7	25
6	21 56.5	07 23 151.9	21 27.3	07 23 152.0	20 58.1	07 23 152.1	20 28.9	07 23 152.2	19 59.7	07 23 152.4	19 30.5	07 23 152.5	19 01.2	07 23 152.6	18 32.0	07 23 152.7	6
7	21 42.6	07 24 150.8	21 13.4	07 24 151.0	20 44.3	07 24 151.1	20 15.1	07 24 151.2	19 46.0	07 24 151.3	19 16.8	07 24 151.5	18 47.6	07 24 151.6	18 18.4	07 24 151.7	7
8	21 28.2	07 25 149.8	20 59.1	07 25 149.9	20 30.0	07 25 150.0	20 00.9	07 25 150.2	19 31.8	07 24 150.3	19 02.7	07 24 150.4	18 33.5	07 24 150.6	18 04.4	07 24 150.7	8
9	21 13.3	07 26 148.7	20 44.3	07 26 148.9	20 15.2	07 26 149.0	19 46.2	07 26 149.1	19 17.1	07 25 149.3	18 48.1	07 25 149.4	18 19.0	07 25 149.5	17 50.0	07 25 149.7	9
30	20 58.0	07 26 147.7	20 29.0	07 26 147.9	20 00.0	07 26 148.0	19 31.1	07 26 148.1	19 02.1	07 26 148.3	18 33.1	07 26 148.4	18 04.1	07 26 148.5	17 35.0	07 26 148.7	30
1	20 42.2	06 27 146.7	20 13.3	06 27 146.8	19 44.4	06 27 147.0	19 15.5	06 27 147.1	18 46.5	06 27 147.2	18 17.6	06 27 147.4	17 48.7	06 27 147.5	17 19.7	06 27 147.7	1
2	20 26.0	06 28 145.7	19 57.2	06 28 145.8	19 28.3	06 28 145.9	18 59.5	06 27 146.1	18 30.6	06 27 146.2	18 01.7	06 27 146.4	17 32.8	06 27 146.5	17 03.9	06 27 146.7	2
3	20 09.4	06 28 144.6	19 40.6	06 28 144.8	19 11.8	06 28 144.9	18 43.0	06 28 145.1	18 14.2	06 28 145.2	17 45.4	06 28 145.4	17 16.6	06 28 145.5	16 47.7	06 28 145.7	3
4	19 52.4	06 29 143.6	19 23.6	06 29 143.8	18 54.9	06 29 143.9	18 26.2	06 29 144.1	17 57.4	06 29 144.2	17 28.7	06 29 144.4	16 59.9	06 29 144.5	16 31.1	06 29 144.7	4
35	19 34.9	06 30 142.6	19 06.3	06 30 142.8	18 37.6	06 30 142.9	18 08.9	06 29 143.1	17 40.2	06 29 143.2	17 11.5	06 29 143.4	16 42.8	06 29 143.5	16 14.1	06 29 143.7	35
6	19 17.0	06 31 141.6	18 48.4	06 31 141.8	18 19.8	06 31 141.9	17 51.2	06 30 142.1	17 22.6	06 30 142.2	16 54.0	06 30 142.4	16 25.3	06 30 142.5	15 56.7	06 30 142.7	6
7	18 58.8	06 31 140.6	18 30.2	06 31 140.8	18 01.7	06 31 140.9	17 33.1	06 31 141.1	17 04.6	06 31 141.2	16 36.0	06 31 141.4	16 07.4	06 31 141.6	15 38.8	06 31 141.7	7
8	18 40.1	06 32 139.6	18 11.6	06 32 139.8	17 43.2	06 32 139.9	17 14.7	06 31 140.1	16 46.2	06 31 140.2	16 17.7	06 31 140.4	15 49.1	06 31 140.6	15 20.6	06 31 140.7	8
9	18 21.1	06 32 138.6	17 52.7	06 32 138.8	17 24.2	06 32 138.9	16 55.8	06 32 139.1	16 27.4	06 32 139.3	15 58.9	06 32 139.4	15 30.5	06 32 139.6	15 02.0	06 32 139.8	9
40	18 01.6	04 33 137.6	17 33.3	04 33 137.8	17 04.9	04 33 137.9	16 36.6	04 33 138.1	16 08.2	04 33 138.3	15 39.8	04 33 138.4	15 11.4	04 33 138.6	14 43.0	04 33 138.8	40
1	17 41.8	04 34 136.6	17 13.6	04 34 136.8	16 45.3	04 34 137.0	16 17.0	04 34 137.1	15 48.7	04 34 137.3	15 20.3	04 34 137.5	14 52.0	04 34 137.6	14 23.7	04 34 137.8	1
2	17 21.7	04 34 135.6	16 53.5	04 34 135.8	16 25.2	04 34 136.0	15 57.0	04 34 136.2	15 28.7	04 34 136.3	15 00.5	04 34 136.5	14 32.2	04 34 136.7	14 04.0	04 34 136.8	2
3	17 01.2	04 35 134.6	16 33.0	04 35 134.8	16 04.8	04 35 135.0	15 36.7	04 35 135.2	15 08.5	04 35 135.4	14 40.3	04 35 135.5	14 12.1	04 35 135.7	13 43.9	04 35 135.9	3
4	16 40.3	04 35 133.7	16 12.2	04 35 133.8	15 44.1	04 35 134.0	15 16.0	04 35 134.2	14 47.9	04 35 134.4	14 19.7	04 35 134.6	13 51.6	04 35 134.8	13 25.3	04 35 134.9	4
45	16 19.1	03 36 132.7	15 51.0	03 36 132.9	15 23.0	03 36 133.1	14 55.0	03 36 133.2	14 26.9	03 36 133.4	13 58.9	03 36 133.6	13 30.8	03 36 133.8	13 02.7	03 36 134.0	45
6	15 57																

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and declination values (8° 00' to 11° 30'). Each declination value is accompanied by its corresponding Altitude (Alt.) and Azimuth (Az.) values. The table is organized in a grid with 10 columns for declination and 10 columns for altitude/azimuth pairs.

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Ad At.															
00	21 00.0	1.00 180.0	20 30.0	1.00 180.0	20 00.0	1.00 180.0	19 30.0	1.00 180.0	19 00.0	1.00 180.0	18 30.0	1.00 180.0	18 00.0	1.00 180.0	17 30.0	1.00 180.0	00
1	20 59.7	1.00 178.9	20 29.7	1.00 178.9	19 59.7	1.00 178.9	19 29.7	1.00 179.0	18 59.7	1.00 179.0	18 29.7	1.00 179.0	17 59.7	1.00 179.0	17 29.7	1.00 179.0	1
2	20 58.9	1.00 177.9	20 28.9	1.00 177.9	19 58.9	1.00 177.9	19 28.9	1.00 177.9	18 58.9	1.00 177.9	18 28.9	1.00 177.9	17 58.9	1.00 177.9	17 28.9	1.00 177.9	2
3	20 57.6	1.00 176.8	20 27.6	1.00 176.8	19 57.6	1.00 176.8	19 27.6	1.00 176.9	18 57.6	1.00 176.9	18 27.6	1.00 176.9	17 57.6	1.00 176.9	17 27.6	1.00 176.9	3
4	20 55.7	1.00 175.8	20 25.7	1.00 175.8	19 55.7	1.00 175.8	19 25.8	1.00 175.8	18 55.8	1.00 175.8	18 25.8	1.00 175.9	17 55.8	1.00 175.9	17 25.8	1.00 175.9	4
05	20 53.3	1.00 174.7	20 23.3	1.00 174.7	19 53.3	1.00 174.7	19 23.4	1.00 174.8	18 53.4	1.00 174.8	18 23.4	1.00 174.8	17 53.5	1.00 174.8	17 23.5	1.00 174.9	05
6	20 50.3	1.00 173.6	20 20.4	1.00 173.7	19 50.4	1.00 173.7	19 20.5	1.00 173.7	18 50.5	1.00 173.8	18 20.5	1.00 173.8	17 50.6	1.00 173.8	17 20.6	1.00 173.8	6
7	20 46.8	1.00 172.6	20 16.9	1.00 172.6	19 47.0	1.00 172.7	19 17.0	1.00 172.7	18 47.1	1.00 172.7	18 17.1	1.00 172.7	17 47.2	1.00 172.8	17 17.2	1.00 172.8	7
8	20 42.8	1.00 171.5	20 12.9	1.00 171.6	19 43.0	1.00 171.6	19 13.0	1.00 171.6	18 43.1	1.00 171.7	18 13.2	1.00 171.7	17 43.3	1.00 171.8	17 13.3	1.00 171.8	8
9	20 38.3	1.00 170.5	20 08.4	1.00 170.5	19 38.5	1.00 170.6	19 08.6	1.00 170.6	18 38.7	1.00 170.6	18 08.7	1.00 170.7	17 38.8	1.00 170.7	17 08.9	1.00 170.8	9
10	20 33.2	1.00 169.4	20 03.3	1.00 169.5	19 33.4	1.00 169.5	19 03.5	1.00 169.6	18 33.7	1.00 169.6	18 03.8	1.00 169.7	17 33.9	1.00 169.7	17 04.0	1.00 169.7	10
1	20 27.6	1.00 168.4	19 57.7	1.00 168.4	19 27.9	1.00 168.5	18 58.0	1.00 168.5	18 28.2	1.00 168.6	17 58.3	1.00 168.6	17 28.4	1.00 168.7	16 58.6	1.00 168.7	1
2	20 21.5	09 11 167.3	19 51.6	09 11 167.4	19 21.8	09 11 167.4	18 52.0	09 11 167.5	18 22.1	09 11 167.5	17 52.3	09 11 167.6	17 22.5	09 11 167.7	16 52.6	09 11 167.7	2
3	20 14.8	09 12 166.3	19 45.0	09 12 166.3	19 15.2	09 12 166.4	18 45.4	09 12 166.4	18 15.6	09 12 166.5	17 45.8	09 12 166.6	17 16.0	09 12 166.6	16 46.2	09 12 166.7	3
4	20 07.6	09 13 165.2	19 37.9	09 13 165.3	19 08.1	09 13 165.3	18 38.3	09 13 165.4	18 08.6	09 13 165.5	17 38.8	09 13 165.5	17 09.0	09 13 165.6	16 39.2	09 13 165.7	4
15	20 00.0	09 14 164.2	19 30.2	09 14 164.2	19 00.5	09 14 164.3	18 30.8	09 14 164.4	18 01.0	09 14 164.5	17 31.3	09 14 164.5	17 01.5	09 14 164.6	16 31.8	09 14 164.7	15
6	19 51.8	09 14 163.1	19 22.1	09 14 163.2	18 52.4	09 14 163.3	18 22.7	09 14 163.4	17 53.0	09 14 163.4	17 23.3	09 14 163.5	16 53.6	09 14 163.6	16 23.9	09 14 163.6	6
7	19 43.1	09 15 162.1	19 13.4	09 15 162.2	18 43.8	09 15 162.2	18 14.1	09 15 162.3	17 44.4	09 15 162.4	17 14.8	09 15 162.5	16 45.1	09 15 162.6	16 15.4	09 15 162.6	7
8	19 33.9	09 16 161.0	19 04.3	09 16 161.1	18 34.6	09 16 161.2	18 05.0	09 16 161.3	17 35.4	09 16 161.4	17 05.8	09 16 161.5	16 36.1	09 16 161.5	16 06.5	09 16 161.6	8
9	19 24.2	09 17 160.0	18 54.6	09 17 160.1	18 25.0	09 17 160.2	17 55.4	09 17 160.3	17 25.9	09 17 160.4	16 56.3	09 17 160.4	16 26.7	09 17 160.5	15 57.1	09 17 160.6	9
20	19 14.0	08 18 159.0	18 44.5	08 18 159.1	18 14.9	08 18 159.2	17 45.4	08 18 159.3	17 15.8	08 18 159.3	16 46.3	08 18 159.4	16 16.7	08 18 159.5	15 47.2	08 18 159.6	20
1	19 03.3	08 19 157.9	18 33.8	08 19 158.0	18 04.3	08 19 158.1	17 34.8	08 19 158.2	17 05.3	08 19 158.3	16 35.8	08 19 158.4	16 06.3	08 19 158.5	15 36.8	08 19 158.6	1
2	18 52.2	08 19 156.9	18 22.7	08 19 157.0	17 53.3	08 19 157.1	17 23.8	08 19 157.2	16 54.4	08 19 157.3	16 24.9	08 19 157.4	15 55.4	08 19 157.5	15 26.0	08 19 157.6	2
3	18 40.5	08 20 155.9	18 11.1	08 20 156.0	17 41.7	08 20 156.1	17 12.3	08 20 156.2	16 42.9	08 20 156.3	16 13.5	08 20 156.4	15 44.1	08 20 156.5	15 14.7	08 20 156.6	3
4	18 28.4	08 21 154.9	17 59.0	08 21 155.0	17 29.7	08 21 155.1	17 00.3	08 21 155.2	16 31.0	08 21 155.3	16 01.6	08 21 155.4	15 32.3	08 21 155.5	15 02.9	08 21 155.6	4
25	18 15.8	08 22 153.9	17 46.5	08 22 154.0	17 17.2	08 22 154.1	16 47.9	08 22 154.2	16 18.6	08 22 154.3	15 49.3	08 22 154.4	15 20.0	08 22 154.5	14 50.7	08 22 154.6	25
6	18 02.8	08 22 152.8	17 33.5	08 22 153.0	17 04.3	08 22 153.1	16 35.0	08 22 153.2	16 05.8	08 22 153.3	15 36.5	08 22 153.4	15 07.2	08 22 153.5	14 38.0	08 22 153.6	6
7	17 49.2	08 23 151.8	17 20.1	08 23 151.9	16 50.9	08 23 152.1	16 21.7	08 23 152.2	15 52.5	08 23 152.3	15 23.3	08 23 152.4	14 54.0	08 23 152.5	14 24.8	08 23 152.7	7
8	17 35.3	08 24 150.8	17 06.2	08 24 150.9	16 37.0	08 24 151.1	16 07.9	08 24 151.2	15 38.7	08 24 151.3	15 09.6	08 24 151.4	14 40.4	08 24 151.5	14 11.3	08 24 151.7	8
9	17 20.9	08 25 149.8	16 51.8	08 25 149.9	16 22.7	08 25 150.1	15 53.6	08 25 150.2	15 24.5	08 25 150.3	14 55.4	08 25 150.4	14 26.3	08 25 150.6	13 57.2	08 25 150.7	9
30	17 06.0	08 26 148.8	16 37.0	08 26 148.9	16 08.0	08 26 149.1	15 38.9	08 26 149.2	15 09.9	08 26 149.3	14 40.9	08 26 149.5	14 11.8	08 26 149.6	13 42.8	08 26 149.7	30
1	16 50.7	08 27 147.8	16 21.8	08 27 147.9	15 52.8	08 27 148.1	15 23.8	08 27 148.2	14 54.9	08 27 148.3	14 25.9	08 27 148.5	13 56.9	08 27 148.6	13 27.9	08 27 148.7	1
2	16 35.0	08 27 146.8	16 06.1	08 27 146.9	15 37.2	08 27 147.1	15 08.3	08 27 147.2	14 39.4	08 27 147.4	14 10.5	08 27 147.5	13 41.5	08 27 147.6	13 12.6	08 27 147.8	2
3	16 18.9	08 28 145.8	15 50.0	08 28 146.0	15 21.2	08 28 146.1	14 52.3	08 28 146.2	14 23.5	08 28 146.4	13 54.6	08 28 146.5	13 25.7	08 28 146.7	12 56.9	08 28 146.8	3
4	16 02.3	08 28 144.8	15 33.6	08 28 145.0	15 04.8	08 28 145.1	14 36.0	08 28 145.3	14 07.2	08 28 145.4	13 38.4	08 28 145.5	13 09.5	08 28 145.7	12 40.7	08 28 145.8	4
35	15 45.4	08 29 143.8	15 16.6	08 29 144.0	14 47.9	08 29 144.1	14 19.2	08 29 144.3	13 50.4	08 29 144.4	13 21.7	08 29 144.6	12 52.9	08 29 144.7	12 24.2	08 29 144.9	35
6	15 28.0	08 30 142.8	14 59.3	08 30 143.0	14 30.7	08 30 143.2	14 02.0	08 30 143.3	13 33.3	08 30 143.5	13 04.6	08 30 143.6	12 35.9	08 30 143.8	12 07.3	08 30 143.9	6
7	15 10.2	08 30 141.9	14 41.6	08 30 142.2	14 13.0	08 30 142.2	13 44.4	08 30 142.3	13 15.8	08 30 142.5	12 47.2	08 30 142.6	12 18.6	08 30 142.8	11 49.9	08 30 142.9	7
8	14 52.1	08 31 140.9	14 23.5	08 31 141.1	13 55.0	08 31 141.2	13 26.5	08 31 141.4	12 57.9	08 31 141.5	12 29.3	08 31 141.7	12 00.8	08 31 141.8	11 32.2	08 31 142.0	8
9	14 33.5	08 32 139.9	14 05.1	08 32 140.1	13 36.6	08 32 140.2	13 08.1	08 32 140.4	12 39.6	08 32 140.6	12 11.1	08 32 140.7	11 42.6	08 32 140.9	11 14.1	08 32 141.0	9
40	14 14.6	08 32 138.9	13 46.2	08 32 139.1	13 17.8	08 32 139.3	12 49.4	08 32 139.4	12 20.9	08 32 139.6	11 52.5	08 32 139.8	11 24.1	08 32 139.9	10 55.6	08 32 140.1	40
1	13 55.3	08 33 138.0	13 27.0	08 33 138.2	12 58.6	08 33 138.3	12 30.3	08 33 138.5	12 01.9	08 33 138.7	11 33.5	08 33 138.8	11 05.2	08 33 139.0	10 36.8	08 33 139.2	1
2	13 35.7	08 33 137.0	13 07.4	08 33 137.2	12 39.1	08 33 137.4	12 10.8	08 33 137.5	11 42.5	08 33 137.7	11 14.2	08 33 137.9	10 45.9	08 33 138.0	10 17.6	08 33 138.2	2
3	13 15.7	08 34 136.1	12 47.5	08 34 136.2	12 19.2	08 34 136.4	11 51.0	08 34 136.6	11 22.8	08 34 136.8	10 54.5	08 34 136.9	10 26.3	08 34 137.1	9 58.0	08 34 137.3	3
4	12 55.3	08 34 135.1	12 27.5	08 34 135.3	11 59.0	08 34 135.5	11 30.8	08 34 135.6	11 02.7	08 34 135.8	10 34.5	08 34 136.0	10 06.3	08 34 136.2	9 38.1	08 34 136.3	4
45	12 34.6	08 35 134.2	12 06.5	08 35 134.3	11 38.4	08 35 134.5	11 10.3	08 35 134.7	10 42.2	08 35 134.9	10 14.1	08 35 135.0	9 46.0	08 35 135.2	9 17.8	08 35 135.4	45
6	12 13.6	08 36 133.2	11 45.6	08													

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	41 00.0	1.001	180.0	41 30.0	1.001	180.0	42 00.0	1.001	180.0	42 30.0	1.001	180.0	43 00.0	1.001	180.0	43 30.0	1.001	180.0	00
1	40 59.7	1.002	178.7	41 29.7	1.002	178.7	41 59.7	1.002	178.7	42 29.7	1.002	178.7	42 59.7	1.002	178.7	43 29.7	1.002	178.7	1
2	40 58.7	1.003	177.4	41 28.7	1.003	177.4	41 58.7	1.003	177.4	42 28.7	1.003	177.4	42 58.7	1.003	177.3	43 28.7	1.003	177.3	2
3	40 57.0	1.004	176.1	41 27.0	1.004	176.1	41 57.0	1.004	176.1	42 27.0	1.004	176.0	42 57.0	1.004	176.0	43 27.0	1.004	176.0	3
4	40 54.7	1.005	174.8	41 24.7	1.005	174.8	41 54.7	1.005	174.8	42 24.6	1.005	174.7	42 54.6	1.005	174.7	43 24.6	1.005	174.7	4
05	40 51.8	1.006	173.5	41 21.7	1.006	173.5	41 51.7	1.006	173.5	42 21.6	1.006	173.4	42 51.6	1.006	173.4	43 21.5	1.006	173.3	05
6	40 48.2	1.007	172.2	41 18.1	1.007	172.2	41 48.0	1.007	172.1	42 18.0	1.007	172.1	42 47.9	1.007	172.1	43 17.8	1.007	172.0	6
7	40 43.9	1.008	170.9	41 13.8	1.008	170.9	41 43.7	1.008	170.8	42 13.7	1.008	170.8	42 43.6	1.008	170.7	43 13.5	1.008	170.6	7
8	40 39.0	1.009	169.6	41 08.9	1.009	169.6	41 38.8	1.009	169.5	42 08.7	1.009	169.5	42 38.5	1.009	169.4	43 08.4	1.010	169.3	8
9	40 33.5	1.010	168.4	41 03.3	1.010	168.3	41 33.2	1.010	168.2	42 03.0	1.010	168.2	42 32.9	1.010	168.1	43 02.7	1.011	168.0	9
10	40 27.3	1.011	167.1	40 57.1	1.011	167.0	41 26.9	1.011	167.0	41 56.8	1.011	166.9	42 26.6	1.011	166.8	42 56.4	1.011	166.7	10
1	40 20.5	1.012	165.8	40 50.3	1.012	165.7	41 20.1	1.012	165.7	41 49.8	1.012	165.6	42 19.6	1.012	165.5	42 49.4	1.012	165.4	1
2	40 13.0	1.013	164.6	40 42.8	1.013	164.5	41 12.5	1.013	164.4	41 42.3	1.013	164.3	42 12.0	1.013	164.2	42 41.7	1.013	164.1	2
3	40 05.0	1.014	163.3	40 34.7	1.014	163.2	41 04.4	1.014	163.1	41 34.1	1.014	163.0	42 03.8	1.014	162.9	42 33.4	1.014	162.8	3
4	39 56.3	1.015	162.0	40 26.0	1.015	161.9	40 55.6	1.015	161.8	41 25.3	1.015	161.7	41 54.9	1.015	161.6	42 24.5	1.015	161.5	4
15	39 47.1	1.016	160.8	40 16.7	1.016	160.7	40 46.2	1.016	160.5	41 15.8	1.016	160.4	41 45.4	1.016	160.3	42 15.0	1.016	160.2	15
6	39 37.2	1.017	159.5	40 06.7	1.017	159.4	40 36.3	1.017	159.3	41 05.8	1.017	159.2	41 35.3	1.017	159.0	42 04.8	1.017	158.8	6
7	39 26.7	1.018	158.3	39 56.2	1.018	158.1	40 25.7	1.018	158.0	40 55.1	1.018	157.9	41 24.6	1.018	157.8	41 54.1	1.018	157.6	7
8	39 15.6	1.019	157.0	39 45.0	1.019	156.8	40 14.5	1.019	156.8	40 43.9	1.019	156.6	41 13.3	1.019	156.5	41 42.7	1.019	156.2	8
9	39 04.0	1.020	155.8	39 33.4	1.020	155.7	40 02.7	1.020	155.5	40 32.1	1.020	155.4	41 01.4	1.020	155.2	41 30.7	1.020	155.1	9
20	38 51.8	1.021	154.6	39 21.1	1.021	154.4	39 50.4	1.021	154.3	40 19.7	1.021	154.1	40 48.9	1.021	154.0	41 18.2	1.021	153.8	20
1	38 39.0	1.022	153.3	39 08.2	1.022	153.2	39 37.5	1.022	153.0	40 06.7	1.022	152.9	40 35.9	1.022	152.7	41 05.1	1.022	152.6	1
2	38 25.7	1.023	152.1	38 54.8	1.023	152.0	39 24.0	1.023	151.8	39 52.3	1.023	151.7	40 22.3	1.023	151.5	40 51.4	1.023	151.3	2
3	38 11.8	1.024	150.9	38 40.9	1.024	150.7	39 10.0	1.024	150.6	39 39.1	1.024	150.4	40 08.2	1.024	150.3	40 37.2	1.024	150.1	3
4	37 57.4	1.025	149.7	38 26.4	1.025	149.5	38 55.4	1.025	149.4	39 24.5	1.025	149.2	39 53.5	1.025	149.0	40 22.4	1.025	148.8	4
25	37 42.4	1.026	148.5	38 11.4	1.026	148.3	38 40.4	1.026	148.2	39 09.3	1.026	148.0	39 38.2	1.026	147.8	40 07.1	1.026	147.7	25
6	37 27.0	1.027	147.3	37 55.9	1.027	147.1	38 24.8	1.027	147.0	38 53.6	1.027	146.8	39 22.5	1.027	146.6	40 01.3	1.027	146.4	6
7	37 11.0	1.028	146.1	37 39.8	1.028	146.0	38 08.7	1.028	145.8	38 37.5	1.028	145.6	39 06.2	1.028	145.4	39 35.0	1.028	145.2	7
8	36 54.6	1.029	144.9	37 23.3	1.029	144.8	37 52.0	1.029	144.6	38 20.8	1.029	144.4	38 49.5	1.029	144.2	39 18.8	1.029	144.0	8
9	36 37.6	1.030	143.8	37 06.3	1.030	143.6	37 34.9	1.030	143.4	38 03.6	1.030	143.2	38 32.2	1.030	143.0	39 00.8	1.030	142.8	9
30	36 20.2	1.031	142.6	36 48.8	1.031	142.4	37 17.4	1.031	142.2	37 45.9	1.031	142.0	38 14.5	1.031	141.9	38 43.0	1.031	141.7	30
1	36 02.3	1.032	141.5	36 30.8	1.032	141.3	36 59.3	1.032	141.1	37 27.8	1.032	140.9	37 56.3	1.032	140.7	38 24.7	1.032	140.5	1
2	35 43.9	1.033	140.3	36 12.4	1.033	140.1	36 40.8	1.033	139.9	37 07.2	1.033	139.7	37 37.6	1.033	139.5	38 06.0	1.033	139.3	2
3	35 25.2	1.034	139.2	35 53.5	1.034	139.0	36 21.9	1.034	138.8	36 50.2	1.034	138.6	37 18.5	1.034	138.4	37 46.8	1.034	138.2	3
4	35 05.9	1.035	138.0	35 34.2	1.035	137.8	36 02.5	1.035	137.6	36 30.7	1.035	137.4	36 59.0	1.035	137.2	37 27.2	1.035	137.0	4
35	34 46.3	1.036	136.9	35 14.5	1.036	136.7	35 42.7	1.036	136.5	36 10.9	1.036	136.3	36 39.0	1.036	136.1	37 07.1	1.036	135.9	35
6	34 26.2	1.037	135.8	34 54.3	1.037	135.6	35 22.4	1.037	135.4	35 50.5	1.037	135.2	36 18.6	1.037	135.0	36 46.7	1.037	134.7	6
7	34 05.7	1.038	134.7	34 33.8	1.038	134.5	35 01.8	1.038	134.3	35 29.8	1.038	134.0	35 57.8	1.038	133.8	36 25.8	1.038	133.6	7
8	33 44.8	1.039	133.6	34 12.8	1.039	133.4	34 40.8	1.039	133.2	35 08.7	1.039	133.0	35 36.7	1.039	132.8	36 04.5	1.039	132.6	8
9	33 23.6	1.040	132.5	33 51.5	1.040	132.3	34 19.4	1.040	132.1	34 47.2	1.040	131.8	35 15.1	1.040	131.6	35 42.9	1.040	131.4	9
40	33 01.9	1.041	131.4	33 29.8	1.041	131.2	33 57.6	1.041	131.0	34 25.4	1.041	130.7	34 53.2	1.041	130.5	35 20.9	1.041	130.3	40
1	32 40.0	1.042	130.3	33 07.7	1.042	130.1	33 35.5	1.042	129.9	34 03.2	1.042	129.6	34 30.9	1.042	129.4	34 58.5	1.042	129.2	1
2	32 17.6	1.043	129.2	32 45.3	1.043	129.0	33 13.0	1.043	128.8	33 40.8	1.043	128.6	34 08.2	1.043	128.3	34 35.8	1.043	128.1	2
3	31 54.9	1.044	128.2	32 22.5	1.044	128.0	32 50.1	1.044	127.7	33 17.7	1.044	127.5	33 45.2	1.044	127.3	34 12.7	1.044	127.0	3
4	31 31.9	1.045	127.1	31 59.4	1.045	126.9	32 27.0	1.045	126.7	32 54.4	1.045	126.4	33 21.9	1.045	126.2	33 47.9	1.045	125.9	4
45	31 08.5	1.046	126.1	31 36.0	1.046	125.9	32 03.5	1.046	125.6	32 30.9	1.046	125.4	32 58.3	1.046	125.1	33 25.6	1.046	124.9	45
6	30 44.9	1.047	125.0	31 12.3	1.047	124.8	31 39.7	1.047	124.6	32 07.0	1.047	124.3	32 34.3	1.047	124.1	33 01.6	1.047	123.8	6
7	30 20.9	1.048	124.0	30 48.2	1.048	123.8	31 15.6	1.048	123.5	31 42.8	1.048	123.3	32 10.1	1.048	123.0	32 37.3	1.048	122.7	7
8	29 56.6	1.049	123.0	30 23.9	1.049	122.7	30 51.2	1.049	122.5	31 18.4	1.049	122.2	31 45.6	1.049	122.0	32 12.7	1.049	121.7	8
9	29 32.1	1.050	122.0	29 59.3	1.050	121.7	30 26.5	1.050	121.5	30 53.6	1.050	121.2	31 20.8	1.050	121.0	31 47.9	1.050	120.7	9
50	29 07.3	1.051	120.9	29 34.4	1.051	120.7	30 01.5	1.051	120.4	30 28.6	1.051	120.2	30 55.7	1.051	119.9	31 22.7	1.051	119.7	50
1	28 42.2	1.052	119.9	29 09.3	1.052	119.7	29 36.3	1.052	119.4	30 03.4	1.052	119.2	30 30.4	1.052	118.9	30 57.			

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
00	17 00.0	1 00 180.0	16 30.0	1 00 180.0	16 00.0	1 00 180.0	15 30.0	1 00 180.0	15 00.0	1 00 180.0	14 30.0	1 00 180.0	14 00.0	1 00 180.0	13 30.0	1 00 180.0	00
1	16 59.7	1 00 179.0	16 29.7	1 00 179.0	15 59.7	1 00 179.0	15 29.7	1 00 179.0	14 59.7	1 00 179.0	14 29.7	1 00 179.0	13 59.7	1 00 179.0	13 29.7	1 00 179.0	1
2	16 59.0	1 00 178.0	16 29.0	1 00 178.0	15 59.0	1 00 178.0	15 29.0	1 00 178.0	14 59.0	1 00 178.0	14 29.0	1 00 178.0	13 59.0	1 00 178.0	13 29.0	1 00 178.0	2
3	16 57.7	1 00 176.9	16 27.7	1 00 176.9	15 57.7	1 00 177.0	15 27.7	1 00 177.0	14 57.7	1 00 177.0	14 27.7	1 00 177.0	13 57.7	1 00 177.0	13 27.7	1 00 177.0	3
4	16 55.8	1 00 175.9	16 25.9	1 00 175.9	15 55.9	1 00 175.9	15 25.9	1 00 176.0	14 55.9	1 00 176.0	14 25.9	1 00 176.0	13 56.0	1 00 176.0	13 26.0	1 00 176.0	4
05	16 53.5	1 00 174.9	16 23.5	1 00 174.9	15 53.6	1 00 174.9	15 23.6	1 00 175.0	14 53.6	1 00 175.0	14 23.7	1 00 175.0	13 53.7	1 00 175.0	13 23.7	1 00 175.0	05
6	16 50.7	1 00 173.9	16 20.7	1 00 173.9	15 50.7	1 00 173.9	15 20.8	1 00 174.0	14 50.8	1 00 174.0	14 20.9	1 00 174.0	13 50.9	1 00 174.0	13 21.0	1 00 174.1	6
7	16 47.3	1 00 172.8	16 17.4	1 00 172.9	15 47.4	1 00 172.9	15 17.5	1 00 172.9	14 47.5	1 00 173.0	14 17.6	1 00 173.0	13 47.6	1 00 173.0	13 17.7	1 00 173.1	7
8	16 43.4	1 00 171.8	16 13.5	1 00 171.9	15 43.6	1 00 171.9	15 13.6	1 00 171.9	14 43.7	1 00 172.0	14 13.8	1 00 172.0	13 43.9	1 00 172.0	13 13.9	1 00 172.1	8
9	16 39.0	1 00 170.8	16 09.1	1 00 170.9	15 39.2	1 00 170.9	15 09.3	1 00 170.9	14 39.4	1 00 171.0	14 09.5	1 00 171.0	13 39.6	1 00 171.1	13 09.7	1 00 171.1	9
10	16 34.1	1 00 169.8	16 04.2	1 00 169.8	15 34.4	1 00 169.9	15 04.5	1 00 169.9	14 34.6	1 00 170.0	14 04.7	1 00 170.0	13 34.8	1 00 170.1	13 04.9	1 00 170.1	10
1	16 28.7	1 00 168.8	15 58.9	1 00 168.8	15 29.0	1 00 168.9	14 59.1	1 00 168.9	14 29.3	1 00 169.0	13 59.4	1 00 169.0	13 29.6	1 00 169.1	12 59.7	1 00 169.1	1
2	16 22.8	00 11 167.8	15 53.0	00 11 167.8	15 23.1	00 11 167.9	14 53.3	00 11 167.9	14 23.5	00 11 168.0	13 53.6	00 11 168.0	13 23.8	00 11 168.1	12 54.0	00 11 168.1	2
3	16 16.4	00 12 166.7	15 46.6	00 11 166.8	15 16.8	00 11 166.9	14 47.0	00 11 166.9	14 17.2	00 11 167.0	13 47.4	00 11 167.0	13 17.5	00 11 167.1	12 47.7	00 11 167.2	3
4	16 09.5	00 12 165.7	15 39.7	00 12 165.8	15 09.9	00 12 165.9	14 40.1	00 12 165.9	14 10.4	00 12 166.0	13 40.6	00 12 166.1	13 10.8	00 12 166.1	12 41.0	00 12 166.2	4
15	16 02.1	00 13 164.7	15 32.3	00 13 164.8	15 02.6	00 13 164.9	14 32.8	00 13 164.9	14 03.1	00 13 165.0	13 33.3	00 13 165.1	13 03.6	00 13 165.1	12 33.8	00 13 165.2	15
6	15 54.2	00 14 163.7	15 24.4	00 14 163.8	14 54.7	00 14 163.9	14 25.0	00 14 163.9	13 55.3	00 14 164.0	13 25.6	00 14 164.1	12 55.9	00 14 164.1	12 26.2	00 14 164.2	6
7	15 45.8	00 15 162.7	15 16.1	00 15 162.8	14 46.4	00 15 162.9	14 16.7	00 15 162.9	13 47.0	00 15 163.0	13 17.4	00 15 163.1	12 47.7	00 15 163.2	12 18.0	00 15 163.2	7
8	15 36.9	00 16 161.7	15 07.2	00 16 161.8	14 37.6	00 16 161.9	14 08.0	00 16 161.9	13 38.3	00 16 162.0	13 08.7	00 16 162.1	12 39.0	00 16 162.2	12 09.4	00 16 162.3	8
9	15 27.5	00 16 160.7	14 57.9	00 16 160.8	14 28.3	00 16 160.9	13 58.7	00 16 161.0	13 29.1	00 16 161.0	12 59.5	00 16 161.1	12 29.9	00 16 161.2	12 00.3	00 16 161.3	9
20	15 17.6	00 17 159.7	14 48.1	00 17 159.8	14 18.5	00 17 159.9	13 49.0	00 17 160.0	13 19.4	00 17 160.1	12 49.9	00 17 160.1	12 20.3	00 17 160.2	11 50.7	00 17 160.3	20
1	15 07.3	00 18 158.7	14 37.8	00 18 158.8	14 08.3	00 18 158.9	13 38.8	00 18 159.0	13 09.3	00 18 159.1	12 39.7	00 18 159.2	12 10.2	00 18 159.3	11 40.7	00 18 159.4	1
2	14 56.5	00 19 157.7	14 27.1	00 19 157.8	13 57.6	00 19 157.9	13 28.1	00 19 158.0	12 58.6	00 19 158.1	12 29.2	00 19 158.2	11 59.7	00 19 158.3	11 30.2	00 19 158.4	2
3	14 45.3	00 20 156.7	14 15.8	00 19 156.8	13 46.4	00 19 156.9	13 17.0	00 19 157.0	12 47.6	00 19 157.1	12 18.1	00 19 157.2	11 48.7	00 19 157.3	11 19.3	00 19 157.4	3
4	14 33.5	00 20 155.7	14 04.2	00 20 155.8	13 34.8	00 20 155.9	13 05.4	00 20 156.0	12 36.0	00 20 156.1	12 06.6	00 20 156.2	11 37.3	00 20 156.3	11 07.9	00 20 156.4	4
25	14 21.3	00 21 154.7	13 52.0	00 21 154.8	13 22.7	00 21 155.0	12 53.4	00 21 155.1	12 24.0	00 21 155.2	11 54.7	00 21 155.3	11 25.4	00 21 155.4	10 56.0	00 21 155.5	25
6	14 08.7	00 22 153.8	13 39.4	00 22 153.9	13 10.2	00 22 154.0	12 40.9	00 22 154.1	12 11.6	00 22 154.2	11 42.3	00 22 154.3	11 13.0	00 22 154.4	10 43.7	00 22 154.5	6
7	13 55.6	00 23 152.8	13 26.4	00 23 152.9	12 57.2	00 23 153.0	12 27.9	00 23 153.1	11 58.7	00 23 153.2	11 29.5	00 23 153.3	11 00.3	00 23 153.4	10 31.9	00 23 153.6	7
8	13 42.1	00 23 151.8	13 12.9	00 23 151.9	12 43.8	00 23 152.0	12 14.6	00 23 152.1	11 45.4	00 23 152.2	11 16.2	00 23 152.3	10 47.0	00 23 152.4	10 17.9	00 23 152.6	8
9	13 28.1	00 24 150.8	12 59.0	00 24 150.9	12 29.9	00 24 151.1	12 00.8	00 24 151.2	11 31.7	00 24 151.3	11 02.5	00 24 151.4	10 33.4	00 24 151.6	10 04.3	00 24 151.7	9
30	13 13.7	00 25 149.8	12 44.7	00 25 150.0	12 15.6	00 25 150.1	11 46.5	00 25 150.2	11 17.5	00 25 150.3	10 48.4	00 25 150.5	10 19.3	00 25 150.6	9 50.3	00 25 150.7	30
1	12 58.9	00 26 148.9	12 29.9	00 26 149.0	12 00.9	00 26 149.1	11 31.9	00 26 149.3	11 02.9	00 26 149.4	10 33.9	00 26 149.5	10 04.8	00 26 149.6	9 35.8	00 26 149.8	1
2	12 43.6	00 26 147.9	12 14.7	00 26 148.0	11 45.8	00 26 148.2	11 16.8	00 26 148.3	10 47.9	00 26 148.4	10 18.9	00 26 148.6	9 49.9	00 26 148.7	9 21.0	00 26 148.8	2
3	12 28.0	00 27 146.9	11 59.1	00 27 147.1	11 30.2	00 27 147.2	11 01.3	00 27 147.3	10 32.4	00 27 147.5	10 03.5	00 27 147.6	9 34.6	00 27 147.8	9 05.7	00 27 147.9	3
4	12 11.9	00 27 146.0	11 43.1	00 27 146.1	11 14.3	00 27 146.3	10 45.4	00 27 146.4	10 16.6	00 27 146.5	9 47.7	00 27 146.7	9 18.9	00 27 146.8	8 50.1	00 27 147.0	4
35	11 55.4	00 28 145.0	11 26.7	00 28 145.2	10 57.9	00 28 145.3	10 29.1	00 28 145.4	10 00.3	00 28 145.6	9 31.6	00 28 145.7	9 02.8	00 28 145.9	8 34.0	00 28 146.0	35
6	11 38.6	00 29 144.1	11 09.8	00 29 144.2	10 41.1	00 29 144.4	10 12.4	00 29 144.5	9 43.7	00 29 144.6	9 15.0	00 29 144.8	8 46.3	00 29 144.9	8 17.5	00 29 145.1	6
7	11 21.3	00 30 143.1	10 52.6	00 30 143.3	10 24.0	00 30 143.4	9 55.3	00 30 143.6	9 26.7	00 30 143.7	8 58.0	00 30 143.9	8 29.4	00 30 144.0	8 00.7	00 30 144.2	7
8	11 03.6	00 30 142.1	10 35.0	00 30 142.3	10 06.5	00 30 142.5	9 37.9	00 30 142.6	9 09.3	00 30 142.8	8 40.7	00 30 142.9	8 12.1	00 30 143.1	7 43.5	00 30 143.2	8
9	10 45.6	00 31 141.2	10 17.1	00 31 141.4	9 48.5	00 31 141.5	9 20.0	00 31 141.7	8 51.5	00 31 141.8	8 22.9	00 31 142.0	7 54.4	00 31 142.1	7 25.9	00 31 142.3	9
40	10 27.2	00 31 140.3	9 58.7	00 31 140.4	9 30.3	00 31 140.6	9 01.8	00 31 140.7	8 33.3	00 31 140.9	8 04.8	00 31 141.1	7 36.4	00 31 141.2	7 07.9	00 31 141.4	40
1	10 08.4	00 32 139.3	9 40.0	00 32 139.5	9 11.6	00 32 139.6	8 43.2	00 32 139.8	8 14.8	00 32 140.0	7 46.4	00 32 140.1	7 18.0	00 32 140.3	6 49.5	00 32 140.5	1
2	9 49.2	00 32 138.4	9 20.9	00 32 138.5	8 52.6	00 32 138.7	8 24.2	00 32 138.9	7 55.9	00 32 139.0	7 27.6	00 32 139.2	6 59.2	00 32 139.4	6 30.8	00 32 139.5	2
3	9 29.7	00 33 137.4	9 01.5	00 33 137.6	8 33.2	00 33 137.8	8 04.9	00 33 137.9	7 36.7	00 33 138.1	7 08.4	00 33 138.3	6 40.1	00 33 138.5	6 11.8	00 33 138.6	3
4	9 09.9	00 34 136.5	8 41.7	00 34 136.7	8 13.5	00 34 136.9	7 45.3	00 34 137.0	7 17.1	00 34 137.2	6 48.8	00 34 137.4	6 20.6	00 34 137.5	5 52.4	00 34 137.7	4
45	8 49.7	00 34 135.6	8 21.6	00 34 135.8	7 53.4	00 34 135.9	7 25.3	00 34 136.1	6 57.1	00 34 136.3	6 29.0	00 34 136.5	6 00.8	00 34 136.6	5 32.6	00 34 136.8	45
6	8 29.2	00 35 134.7	8 01.1	00 35 134.8	7 33.0	00 35 135.0	7 04.9	00 35 135.2	6 36.9</								

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., latitude (16° 00' to 19° 30'), and declination (Alt., Ad At, Az.). Rows are numbered 00 to 90.

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
00	13 00.0	1.00 180.0	12 30.0	1.00 180.0	12 00.0	1.00 180.0	11 30.0	1.00 180.0	11 00.0	1.00 180.0	10 30.0	1.00 180.0	10 00.0	1.00 180.0	9 30.0	1.00 180.0	00
1	12 59.8	1.00 179.0	12 29.8	1.00 179.0	11 59.8	1.00 179.0	11 29.8	1.00 179.0	10 59.8	1.00 179.0	10 29.8	1.00 179.0	9 59.8	1.00 179.0	9 29.8	1.00 179.0	1
2	12 59.0	1.00 178.0	12 29.0	1.00 178.0	11 59.0	1.00 178.0	11 29.0	1.00 178.1	10 59.0	1.00 178.1	10 29.0	1.00 178.1	9 59.0	1.00 178.1	9 29.0	1.00 178.1	2
3	12 57.7	1.00 177.0	12 27.8	1.00 177.1	11 57.8	1.00 177.1	11 27.8	1.00 177.1	10 57.8	1.00 177.1	10 27.8	1.00 177.1	9 57.8	1.00 177.1	9 27.8	1.00 177.1	3
4	12 56.0	1.00 176.1	12 26.0	1.00 176.1	11 56.0	1.00 176.1	11 26.0	1.00 176.1	10 56.1	1.00 176.1	10 26.1	1.00 176.1	9 56.1	1.00 176.2	9 26.1	1.00 176.2	4
05	12 53.7	1.00 175.1	12 23.8	1.00 175.1	11 53.8	1.00 175.1	11 23.8	1.00 175.1	10 53.9	1.00 175.2	10 23.9	1.00 175.2	9 53.9	1.00 175.2	9 23.9	1.00 175.2	05
6	12 51.0	1.00 174.1	12 21.0	1.00 174.1	11 51.1	1.00 174.1	11 21.1	1.00 174.2	10 51.2	1.00 174.2	10 21.2	1.00 174.2	9 51.2	1.00 174.2	9 21.3	1.00 174.3	6
7	12 47.7	1.00 173.1	12 17.8	1.00 173.1	11 47.9	1.00 173.2	11 17.9	1.00 173.2	10 48.0	1.00 173.2	10 18.0	1.00 173.3	9 48.1	1.00 173.3	9 18.1	1.00 173.3	7
8	12 44.0	1.00 172.1	12 14.1	1.00 172.2	11 44.2	1.00 172.2	11 14.2	1.00 172.2	10 44.3	1.00 172.3	10 14.4	1.00 172.3	9 44.4	1.00 172.3	9 14.5	1.00 172.4	8
9	12 39.8	1.00 171.1	12 10.9	1.00 171.2	11 40.0	1.00 171.2	11 10.0	1.00 171.3	10 40.1	1.00 171.3	10 10.2	1.00 171.3	9 40.3	1.00 171.4	9 10.4	1.00 171.4	9
10	12 35.0	1.00 170.2	12 05.2	1.00 170.2	11 35.3	1.00 170.2	11 05.4	1.00 170.3	10 35.5	1.00 170.3	10 05.6	1.00 170.4	9 35.7	1.00 170.4	9 05.8	1.00 170.5	10
1	12 29.8	1.00 169.2	12 00.0	1.00 169.2	11 30.1	1.00 169.3	11 00.2	1.00 169.3	10 30.4	1.00 169.4	10 00.5	1.00 169.4	9 30.6	1.00 169.5	9 00.7	1.00 169.5	1
2	12 24.1	99 10 168.2	11 54.3	99 10 168.2	11 24.4	99 10 168.3	11 04.6	99 10 168.3	10 24.7	99 10 168.4	9 54.9	99 10 168.5	9 25.1	99 10 168.5	8 55.2	99 10 168.6	2
3	12 17.9	99 11 167.2	11 48.1	99 11 167.3	11 18.3	99 11 167.3	11 08.5	99 11 167.4	10 18.7	99 11 167.4	9 48.8	99 11 167.5	9 19.0	99 11 167.6	8 49.2	99 11 167.6	3
4	12 11.2	99 12 166.2	11 41.5	99 12 166.3	11 11.7	99 12 166.4	11 01.9	99 12 166.4	10 12.1	99 12 166.5	9 42.3	99 12 166.5	9 12.5	99 12 166.6	8 42.7	99 12 166.7	4
15	12 04.1	99 13 165.3	11 34.3	99 13 165.3	11 04.6	99 13 165.4	11 04.8	99 13 165.5	10 05.1	99 13 165.5	9 35.3	99 13 165.6	9 05.5	99 13 165.7	8 35.8	99 13 165.7	15
6	11 56.4	99 14 164.3	11 26.7	99 13 164.4	10 57.0	99 13 164.4	10 27.3	99 13 164.5	9 57.6	99 13 164.6	9 27.8	99 13 164.6	8 58.1	99 13 164.7	8 28.4	99 13 164.8	6
7	11 48.3	99 14 163.3	11 18.6	99 14 163.4	10 49.0	99 14 163.5	10 19.3	99 14 163.5	9 49.6	99 14 163.6	9 19.9	99 14 163.7	8 50.2	99 14 163.8	8 20.5	99 14 163.8	7
8	11 39.7	99 15 162.3	11 10.1	99 15 162.4	10 40.4	99 15 162.5	10 10.8	99 15 162.6	9 41.1	99 15 162.7	9 11.5	99 15 162.7	8 41.8	99 15 162.8	8 12.2	99 15 162.9	8
9	11 30.7	99 16 161.4	11 01.1	99 16 161.5	10 31.5	99 16 161.5	10 01.8	99 16 161.6	9 32.2	99 16 161.7	9 02.6	99 16 161.8	8 33.0	99 16 161.9	8 03.4	99 16 161.9	9
20	11 21.2	99 17 160.4	10 51.6	99 17 160.5	10 22.0	99 16 160.6	9 52.4	99 16 160.7	9 22.9	99 16 160.7	8 53.3	99 16 160.8	8 23.7	99 16 160.9	7 54.1	99 16 161.0	20
1	11 11.2	98 17 159.4	10 41.6	98 17 159.5	10 12.1	98 17 159.6	9 42.6	98 17 159.7	9 13.1	98 17 159.8	8 43.5	98 17 159.9	8 14.0	98 17 160.0	7 44.5	98 17 160.1	1
2	11 00.7	98 18 158.5	10 31.2	98 18 158.6	10 01.8	98 18 158.7	9 32.3	98 18 158.8	9 02.8	98 18 158.9	8 33.3	98 18 158.9	8 03.8	98 18 159.0	7 34.3	98 18 159.1	2
3	10 49.8	98 19 157.5	10 20.4	98 19 157.6	9 51.0	98 19 157.7	9 21.5	98 19 157.8	8 52.1	98 19 157.9	8 22.6	98 19 158.0	7 53.2	98 18 158.1	7 23.7	98 18 158.2	3
4	10 38.5	98 20 156.6	10 09.1	98 20 156.7	9 39.7	98 20 156.8	9 10.3	98 19 156.9	8 40.9	98 19 157.0	8 11.5	98 19 157.1	7 42.1	98 19 157.2	7 12.7	98 19 157.3	4
25	10 26.7	98 20 155.6	9 57.3	98 20 155.7	9 28.0	98 20 155.8	8 58.7	98 20 155.9	8 29.3	98 20 156.0	8 00.0	98 20 156.1	7 30.6	98 20 156.2	7 01.2	98 20 156.3	25
6	10 14.4	98 21 154.6	9 45.2	98 21 154.8	9 15.9	98 21 154.9	8 46.6	98 21 155.0	8 17.3	98 21 155.1	7 48.0	98 21 155.2	7 18.7	98 21 155.3	6 49.4	98 21 155.4	6
7	10 01.8	97 22 153.7	9 32.5	97 22 153.8	9 03.3	97 22 153.9	8 34.0	97 22 154.0	8 04.8	97 22 154.1	7 35.5	97 22 154.3	7 06.3	97 22 154.4	6 37.0	97 22 154.5	7
8	9 48.7	97 23 152.7	9 19.5	97 22 152.9	8 50.3	97 22 153.0	8 21.1	97 22 153.1	7 51.9	97 22 153.2	7 22.7	97 22 153.3	6 53.5	97 22 153.4	6 24.3	97 22 153.6	8
9	9 35.1	97 23 151.8	9 06.0	97 23 151.9	8 36.9	97 23 152.0	8 07.7	97 23 152.2	7 38.6	97 23 152.3	7 09.4	97 23 152.4	6 40.3	97 23 152.5	6 11.1	97 23 152.6	9
30	9 21.2	97 24 150.8	8 52.1	97 24 151.0	8 23.0	97 24 151.1	7 53.9	97 24 151.2	7 24.8	97 24 151.3	6 55.7	97 24 151.5	6 26.6	97 23 151.6	5 57.6	97 23 151.7	30
1	9 06.8	97 25 149.9	8 37.8	97 25 150.0	8 08.7	97 24 150.2	7 39.7	97 24 150.3	7 10.7	97 24 150.4	6 41.6	97 24 150.5	6 12.6	97 24 150.7	5 43.6	97 24 150.8	1
2	8 52.0	97 25 149.0	8 23.0	97 25 149.1	7 54.1	97 25 149.2	7 25.1	97 25 149.4	6 56.1	97 25 149.5	6 27.1	97 25 149.6	5 58.2	97 25 149.7	5 29.2	97 25 149.9	2
3	8 36.8	96 26 148.0	8 07.9	96 26 148.2	7 39.0	96 26 148.3	7 10.1	96 26 148.4	6 41.1	96 26 148.6	6 12.2	96 26 148.7	5 43.3	96 26 148.8	5 14.4	96 26 149.0	3
4	8 21.2	96 27 147.1	7 52.3	96 27 147.2	7 23.5	96 26 147.4	6 54.6	96 26 147.5	6 25.8	96 26 147.6	5 56.9	96 26 147.8	5 28.0	96 26 147.9	5		4
35	8 05.2	96 27 146.2	7 36.4	96 27 146.3	7 07.6	96 27 146.4	6 38.8	96 27 146.6	6 10.0	96 27 146.7	5 41.2	96 27 146.9	5 12.4	96 27 147.0			35
6	7 48.8	96 28 145.2	7 20.1	96 28 145.4	6 51.3	96 28 145.5	6 22.6	96 28 145.7	5 53.9	96 28 145.8	5 25.1	96 27 146.0					6
7	7 32.0	96 29 144.3	7 03.3	96 28 144.4	6 34.7	96 28 144.6	6 06.0	96 28 144.7	5 37.3	96 28 144.9	5 08.6	96 28 145.0					7
8	7 14.9	96 29 143.4	6 46.2	96 29 143.5	6 17.6	96 29 143.7	5 49.0	96 29 143.8	5 20.4	96 29 144.0							8
9	6 57.3	96 30 142.5	6 28.8	96 30 142.6	6 00.2	96 30 142.8	5 31.7	96 30 142.9	5 03.1	96 30 143.1							9
40	6 39.4	96 30 141.5	6 10.9	96 30 141.7	5 42.4	96 30 141.8	5 13.9	96 30 142.0									40
1	6 21.1	96 31 140.6	5 52.7	96 31 140.8	5 24.3	96 31 140.9											1
2	6 02.5	96 32 139.7	5 34.1	96 32 139.9	5 05.8	96 31 140.0											2
3	5 43.5	96 32 138.8	5 15.2	96 32 139.0													3
4	5 24.2	96 32 137.9															4
45	5 04.5	96 32 137.0															45

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
91	13 28.2	87 48 81.2	13 54.2	87 48 81.0	14 20.2	87 48 80.7	14 46.2	87 48 80.5	15 12.1	86 48 80.2	15 38.1	86 48 79.9	16 04.0	86 48 79.7	16 29.9	86 48 79.4	91
2	12 59.5	87 48 80.4	13 25.5	87 48 80.1	13 51.5	87 48 79.9	14 17.5	87 48 79.6	14 43.5	87 48 79.3	15 09.5	86 48 79.1	15 35.4	86 48 78.8	16 01.3	86 47 78.6	2
3	12 30.9	87 48 79.5	12 56.9	87 48 79.3	13 22.9	87 48 79.0	13 49.0	87 48 78.8	14 15.0	87 47 78.5	14 40.9	87 47 78.2	15 06.9	87 47 78.0	15 32.8	86 47 77.7	3
4	12 02.3	87 47 78.7	12														

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.																						
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.																							
00	49 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	50 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	51 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	52 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	53 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	54 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0			
1	48 59.6	1.0 02	178.6	49 29.6	1.0 02	178.6	49 59.6	1.0 02	178.5	50 29.6	1.0 02	178.5	50 59.6	1.0 02	178.5	51 29.6	1.0 02	178.5	51 59.6	1.0 02	178.5	52 29.6	1.0 02	178.5	52 59.6	1.0 02	178.5	53 29.6	1.0 02	178.5	53 59.6	1.0 02	178.5	54 29.6	1.0 02	178.5	54 59.6	1.0 02	178.5
2	48 58.5	1.0 03	177.1	49 28.5	1.0 03	177.1	49 58.5	1.0 03	177.1	50 28.5	1.0 03	177.1	50 58.5	1.0 03	177.1	51 28.5	1.0 03	177.0	51 58.5	1.0 03	177.0	52 28.5	1.0 03	177.0	52 58.5	1.0 03	177.0	53 28.5	1.0 03	177.0	53 58.5	1.0 03	177.0	54 28.5	1.0 03	177.0	54 58.5	1.0 03	177.0
3	48 56.7	1.0 04	175.7	49 26.7	1.0 04	175.7	49 56.7	1.0 04	175.6	50 26.7	1.0 04	175.6	50 56.7	1.0 04	175.6	51 26.7	1.0 04	175.6	51 56.7	1.0 04	175.6	52 26.7	1.0 04	175.6	52 56.7	1.0 04	175.6	53 26.7	1.0 04	175.6	53 56.7	1.0 04	175.6	54 26.7	1.0 04	175.6	54 56.7	1.0 04	175.6
4	48 54.2	1.0 05	174.3	49 24.2	1.0 05	174.2	49 54.1	1.0 05	174.2	50 24.1	1.0 05	174.2	50 54.0	1.0 05	174.1	51 24.0	1.0 05	174.1	51 53.9	1.0 05	174.0	52 23.9	1.0 05	174.0	52 53.9	1.0 05	174.0	53 23.9	1.0 05	174.0	53 53.9	1.0 05	174.0	54 23.9	1.0 05	174.0	54 53.9	1.0 05	174.0
5	48 50.9	1.0 07	172.9	49 20.9	1.0 07	172.8	49 50.8	1.0 07	172.8	50 20.7	1.0 07	172.7	50 50.6	1.0 07	172.6	51 20.6	1.0 07	172.6	51 50.5	1.0 07	172.5	52 20.5	1.0 07	172.5	52 50.5	1.0 07	172.5	53 20.5	1.0 07	172.5	53 50.5	1.0 07	172.5	54 20.5	1.0 07	172.5	54 50.5	1.0 07	172.5
6	48 47.0	1.0 08	171.4	49 16.9	1.0 08	171.4	49 46.8	1.0 08	171.3	50 16.7	1.0 08	171.2	50 46.6	1.0 08	171.2	51 16.5	1.0 08	171.1	51 46.4	1.0 08	171.1	52 16.3	1.0 08	171.0	52 46.3	1.0 08	171.0	53 16.3	1.0 08	171.0	53 46.3	1.0 08	171.0	54 16.3	1.0 08	171.0	54 46.3	1.0 08	171.0
7	48 42.3	1.0 09	170.0	49 12.1	1.0 09	169.9	49 42.0	1.0 09	169.9	50 11.9	1.0 09	169.8	50 41.8	1.0 09	169.7	51 11.6	1.0 09	169.6	51 41.5	1.0 09	169.6	52 11.4	1.0 09	169.5	52 41.4	1.0 09	169.5	53 11.4	1.0 09	169.5	53 41.4	1.0 09	169.5	54 11.4	1.0 09	169.5	54 41.4	1.0 09	169.5
8	48 36.9	09 10	168.6	49 06.7	09 10	168.5	49 36.5	09 10	168.4	50 06.4	09 10	168.4	50 36.2	09 10	168.3	51 06.0	09 10	168.2	51 35.9	09 10	168.1	52 05.7	09 10	168.0	52 35.7	09 10	168.0	53 05.7	09 10	168.0	53 35.7	09 10	168.0	54 05.7	09 10	168.0	54 35.7	09 10	168.0
9	48 30.8	09 11	167.2	49 00.6	09 11	167.1	49 30.4	09 11	167.0	50 00.1	09 11	166.9	50 29.9	09 11	166.8	50 59.7	09 11	166.7	51 29.5	09 11	166.6	52 09.3	09 11	166.5	52 39.3	09 11	166.5	53 09.3	09 11	166.5	53 39.3	09 11	166.5	54 09.3	09 11	166.5	54 39.3	09 11	166.5
10	48 24.0	09 12	165.8	48 53.7	09 12	165.7	49 23.5	09 12	165.6	49 53.2	09 12	165.5	50 22.9	09 12	165.4	50 52.7	09 12	165.3	51 22.4	09 12	165.2	51 92.1	09 12	165.1	51 92.1	09 12	165.1	52 92.1	09 12	165.1	53 92.1	09 12	165.1	54 92.1	09 12	165.1	54 92.1	09 12	165.1
1	48 16.5	09 14	164.4	48 46.2	09 14	164.3	49 15.9	09 14	164.2	49 45.6	09 14	164.0	50 15.2	09 14	163.9	50 44.9	09 14	163.8	51 14.6	09 14	163.7	51 84.3	09 14	163.6	51 84.3	09 14	163.6	52 84.3	09 14	163.6	53 84.3	09 14	163.6	54 84.3	09 14	163.6	54 84.3	09 14	163.6
2	48 08.3	09 15	163.0	48 37.9	09 15	162.9	49 07.6	09 15	162.7	49 37.2	09 15	162.6	50 06.8	09 15	162.5	50 36.5	09 15	162.4	51 05.2	09 15	162.3	51 74.8	09 15	162.2	51 74.8	09 15	162.2	52 74.8	09 15	162.2	53 74.8	09 15	162.2	54 74.8	09 15	162.2	54 74.8	09 15	162.2
3	47 59.4	09 16	161.6	48 29.0	09 16	161.5	48 58.6	09 16	161.3	49 28.2	09 16	161.2	49 57.8	09 16	161.1	50 27.3	09 16	161.0	50 96.9	09 16	160.9	51 66.0	09 16	160.8	51 66.0	09 16	160.8	52 66.0	09 16	160.8	53 66.0	09 16	160.8	54 66.0	09 16	160.8	54 66.0	09 16	160.8
4	47 49.9	09 17	160.2	48 19.4	09 17	160.1	48 49.0	09 17	159.9	49 18.5	09 17	159.8	49 48.0	09 17	159.7	50 17.5	09 17	159.6	50 86.6	09 17	159.5	51 65.7	09 17	159.4	51 65.7	09 17	159.4	52 65.7	09 17	159.4	53 65.7	09 17	159.4	54 65.7	09 17	159.4	54 65.7	09 17	159.4
5	47 39.7	09 18	158.8	48 09.2	09 18	158.7	48 38.7	09 18	158.5	49 08.1	09 18	158.4	49 37.5	09 18	158.3	50 07.0	09 18	158.2	50 75.6	09 18	158.1	51 54.7	09 18	158.0	51 54.7	09 18	158.0	52 54.7	09 18	158.0	53 54.7	09 18	158.0	54 54.7	09 18	158.0	54 54.7	09 18	158.0
6	47 28.9	09 19	157.5	47 58.3	09 19	157.3	48 27.7	09 19	157.2	48 57.1	09 19	157.0	49 26.4	09 19	156.9	49 55.8	09 19	156.8	50 25.1	09 19	156.7	50 93.2	09 19	156.6	50 93.2	09 19	156.6	51 93.2	09 19	156.6	52 93.2	09 19	156.6	53 93.2	09 19	156.6	54 93.2	09 19	156.6
7	47 17.4	09 20	156.1	47 46.8	09 20	156.0	48 16.1	09 20	155.8	48 45.4	09 20	155.6	49 14.7	09 20	155.5	49 44.0	09 20	155.3	50 13.2	09 20	155.1	50 81.3	09 20	155.0	50 81.3	09 20	155.0	51 81.3	09 20	155.0	52 81.3	09 20	155.0	53 81.3	09 20	155.0	54 81.3	09 20	155.0
8	47 05.3	09 21	154.8	47 34.6	09 21	154.6	48 03.8	09 21	154.4	48 33.1	09 21	154.3	49 02.3	09 21	154.1	49 31.5	09 21	153.9	50 00.7	09 21	153.7	50 68.8	09 21	153.6	50 68.8	09 21	153.6	51 68.8	09 21	153.6	52 68.8	09 21	153.6	53 68.8	09 21	153.6	54 68.8	09 21	153.6
9	46 52.6	09 22	153.4	47 21.8	09 22	153.2	47 51.0	09 22	153.1	48 20.1	09 22	152.9	48 49.3	09 22	152.7	49 18.4	09 22	152.5	49 87.5	09 22	152.4	49 75.7	09 22	152.3	49 75.7	09 22	152.3	50 75.7	09 22	152.3	51 75.7	09 22	152.3	52 75.7	09 22	152.3	53 75.7	09 22	152.3
20	46 39.3	09 23	152.1	47 08.4	09 23	151.9	47 37.5	09 23	151.7	48 06.6	09 23	151.5	48 35.6	09 23	151.3	49 04.6	09 23	151.2	49 73.7	09 23	151.0	49 61.9	09 23	150.9	49 61.9	09 23	150.9	50 61.9	09 23	150.9	51 61.9	09 23	150.9	52 61.9	09 23	150.9	53 61.9	09 23	150.9
1	46 25.4	09 24	150.8	46 54.4	09 24	150.6	47 23.4	09 24	150.4	47 52.4	09 24	150.2	48 21.4	09 24	150.0	48 90.4	09 24	149.8	48 78.6	09 24	149.7	48 66.8	09 24	149.6	48 66.8	09 24	149.6	49 66.8	09 24	149.6	50 66.8	09 24	149.6	51 66.8	09 24	149.6	52 66.8	09 24	149.6
2	46 10.9	09 25	149.4	46 39.8	09 25	149.3	47 07.6	09 25	149.1	47 37.6	09 25	148.9	48 06.5	09 25	148.7	48 75.4	09 25	148.5	48 63.6	09 25	148.4	48 51.8	09 25	148.3	48 51.8	09 25	148.3	49 51.8	09 25	148.3	50 51.8	09 25	148.3	51 51.8	09 25	148.3	52 51.8	09 25	148.3
3	45 55.8	09 26	148.1	46 24.7	09 26	147.9	46 53.5	09 26	147.7	47 22.3	09 26	147.5	47 51.1	09 26	147.3	48 19.9	09 26	147.1	48 08.1	09 26	147.0	47 96.3	09 26	146.9	47 96.3	09 26	146.9	48 96.3	09 26	146.9	49 96.3	09 26	146.9	50 96.3	09 26	146.9	51 96.3	09 26	146.9
4	45 40.2	09 27	146.8	46 09.0	09 27	146.6	46 37.7	09 27	146.4	47 06.4	09 27	146.2	47 35.1	09 27	146.0	48 03.8	09 27	145.8	47 92.0	09 27	145.7	47 80.2	09 27	145.6	47 80.2	09 27	145.6	48 80.2	09 27	145.6	49 80.2	09 27	145.6	50 80.2	09 27	145.6	51 80.2	09 27	145.6
25	45 24.0	09 28	145.5	45 52.7	09 28	145.3	46 21.3	09 28	145.1	46 50.0	09 28	144.9	47 18.6	09 28	144.7	47 87.2																							

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.		
	Alt.	Az.																	
00	900.0	1.000	180.0	830.0	1.000	180.0	800.0	1.000	180.0	730.0	1.000	180.0	700.0	1.000	180.0	630.0	1.000	180.0	00
1	859.8	1.001	179.0	829.8	1.001	179.1	799.8	1.001	179.1	729.8	1.001	179.1	659.8	1.001	179.1	589.8	1.001	179.1	1
2	859.0	1.002	178.1	829.0	1.002	178.1	799.0	1.002	178.1	729.0	1.002	178.1	659.0	1.002	178.1	589.0	1.002	178.1	2
3	857.8	1.003	177.1	827.8	1.003	177.2	797.8	1.003	177.2	727.8	1.003	177.2	657.8	1.003	177.2	587.8	1.003	177.2	3
4	856.1	1.004	176.2	826.2	1.004	176.2	796.2	1.004	176.2	726.2	1.004	176.2	656.2	1.004	176.2	586.2	1.004	176.2	4
05	854.0	1.004	175.2	824.0	1.004	175.3	794.0	1.004	175.3	724.0	1.004	175.3	654.0	1.004	175.3	584.0	1.004	175.3	05
6	851.3	1.005	174.3	821.3	1.005	174.3	791.3	1.005	174.3	721.3	1.005	174.3	651.3	1.005	174.3	581.3	1.005	174.3	6
7	848.2	1.006	173.3	818.2	1.006	173.4	788.2	1.006	173.4	718.2	1.006	173.4	648.2	1.006	173.4	578.2	1.006	173.4	7
8	844.6	1.007	172.4	814.6	1.007	172.4	784.6	1.007	172.5	714.6	1.007	172.5	644.6	1.007	172.5	574.6	1.007	172.5	8
9	840.5	1.008	171.4	810.5	1.008	171.5	780.5	1.008	171.5	710.5	1.008	171.6	640.5	1.008	171.6	570.5	1.008	171.6	9
10	835.9	1.008	170.5	806.0	1.008	170.5	776.0	1.008	170.6	706.2	1.008	170.6	636.4	1.008	170.7	566.5	1.008	170.8	10
1	830.9	1.009	169.6	801.0	1.009	169.6	771.0	1.009	169.6	701.3	1.009	169.7	631.4	1.009	169.7	561.5	1.009	169.8	1
2	825.4	1.010	168.6	795.5	1.010	168.7	765.5	1.010	168.7	695.8	1.010	168.8	626.0	1.010	168.8	556.2	1.010	168.9	2
3	819.4	1.011	167.7	789.6	1.011	167.7	759.6	1.011	167.8	689.9	1.011	167.8	620.1	1.011	167.9	550.3	1.011	167.9	3
4	812.9	1.012	166.7	783.2	1.012	166.8	753.2	1.012	166.8	683.5	1.012	166.9	613.8	1.012	167.0	544.4	1.012	167.1	4
15	806.0	1.012	165.8	776.3	1.012	165.8	746.3	1.012	165.9	676.6	1.012	166.0	607.0	1.012	166.0	537.2	1.012	166.1	15
6	758.7	1.013	164.8	728.9	1.013	164.9	698.9	1.013	165.0	629.3	1.013	165.1	559.8	1.013	165.1	530.0	1.013	165.2	6
7	750.8	1.014	163.9	721.1	1.014	164.0	691.1	1.014	164.1	621.7	1.014	164.2	552.0	1.014	164.2	522.4	1.014	164.3	7
8	742.5	1.015	163.0	712.9	1.015	163.0	682.9	1.015	163.1	613.5	1.015	163.2	543.9	1.015	163.3	514.2	1.015	163.3	8
9	733.8	1.015	162.0	704.2	1.015	162.1	674.2	1.015	162.2	604.9	1.015	162.3	535.3	1.015	162.3	505.7	1.015	162.4	9
20	724.6	1.016	161.1	695.0	1.016	161.2	665.0	1.016	161.3	595.8	1.016	161.3	526.3	1.016	161.4				20
1	714.9	1.017	160.2	685.4	1.017	160.2	655.4	1.017	160.3	586.3	1.017	160.3	516.8	1.017	160.5				1
2	704.8	1.018	159.2	675.3	1.018	159.3	645.3	1.018	159.4	576.3	1.018	159.5	506.8	1.018	159.6				2
3	694.3	1.018	158.3	664.8	1.018	158.4	634.8	1.018	158.5	565.9	1.018	158.6	496.3	1.018	158.6				3
4	683.3	1.019	157.4	653.9	1.019	157.5	623.9	1.019	157.6	555.1	1.019	157.7	485.7	1.019	157.7				4
25	671.9	1.020	156.4	642.5	1.020	156.5	612.5	1.020	156.6	543.8	1.020	156.7							25
6	620.1	1.020	155.5	590.7	1.020	155.6	560.7	1.020	155.7	511.9	1.020	155.8							6
7	607.8	1.021	154.6	578.5	1.021	154.7	548.5	1.021	154.8	500.3	1.021	154.8							7
8	595.1	1.022	153.7	565.8	1.022	153.8	535.8	1.022	153.8										8
9	582.6	1.023	152.8	552.8	1.023	152.9	522.8	1.023	152.9										9
30	572.5	1.023	151.8																30
1	564.5	1.024	150.9																1
2	550.2	1.025	150.0																2

Lat. 61°

Lat. 62°

Lat. 63°

L. 6

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
91	1655.7	86 48	79.1	1721.6	86 48	78.9	1747.4	86 47	78.6	1813.2	86 47	78.3	1839.0	86 47	78.1	1904.8	86 47	77.8	1930.5	86 47	77.5	1956.2	86 47	77.3	91
2	1627.2	86 47	78.3	1653.1	86 47	78.0	1719.0	86 47	77.8	1744.8	86 47	77.5	1810.6	86 47	77.2	1836.4	86 47	77.0	1902.2	86 47	76.7	1927.9	86 47	76.4	2
3	1598.8	86 47	77.5	1624.7	86 47	77.2	1690.6	86 47	76.9	1716.4	86 47	76.7	1742.3	86 47	76.4	1808.1	86 47	76.1	1833.9	86 47	75.9	1859.7	86 47	75.6	3
4	1570.4	86 47	76.6	1596.4	86 47	76.3	1662.3	86 47	76.1	1648.2	86 47	75.8	1714.1	86 47	75.6	1739.9	86 47	75.3	1805.8	86 47	75.0	1831.6	86 47	74.8	4
95	1502.2	87 47	75.8	1528.2	87 47	75.5	1554.1	87 47	75.2	1620.0	87 47	75.0	1646.0	87 47	74.7	1711.8	87 47	74.5	1737.7	87 47	74.2	1803.6	87 46	73.9	95
6	1434.0	87 47	74.9	1460.0	87 47	74.7	1485.9	87 47	74.4	1552.0	87 47	74.1	1617.9	87 46	73.9	1643.9	87 46	73.6	1709.8	87 46	73.4	1735.7	87 46	73.1	6
7	1406.0	87 47	74.1	1432.0	87 46	73.8	1458.1	87 46	73.6	1524.1	87 46	73.3	1550.1	87 46	73.1	1616.0	87 46	72.8	1642.0	87 46	72.5	1707.9	87 46	72.3	7
8	1338.1	87 46	73.2	1404.2	87 46	73.0	1430.2	87 46	72.7	1456.3	87 46	72.5	1522.3	87 46	72.2	1548.3	87 46	72.0	1614.3	87 46	71.7	1640.3	87 46	71.4	8
9	1310.3	87 46	72.4	1336.4	87 46	72.1	1402.5	87 46	71.9	1428.6	87 46	71.6	1454.7	87 46	71.4	1529.7	87 46	71.1	1546.7	87 46	70.9	1612.8	87 46	70.6	9
100	1242.6	87 46	71.6	1308.8	87 46	71.3	1334.9	87 46	71.1	1401.1	87 46	70.8	1427.2	87 46	70.6	1453.3	87 46	70.3	1519.3	87 45	70.0	1545.4	87 45	69.8	100
1	1215.1	87 46	70.7	1241.3	87 46	70.5	1307.5	87 46	70.2	1333.7	87 45	70.0	1359.8	87 45	69.7	1425.9	87 45	69.5	1452.1	87 45	69.2	1518.2	87 45	69.0	1
2	1147.7	87 45	69.9	1214.0	87 45	69.6	1240.2	87 45	69.4	1306.4	87 45	69.1	1332.6	87 45	68.9	1358.8	87 45	68.6	1424.9	87 45	68.4	1451.1	87 45	68.1	2
3	1120.5	88 45	69.0	1146.8	88 45	68.8	1213.0	88 45	68.6	1239.3	87 45	68.3	1305.5	87 45	68.1	1331.8	87 45	67.8	1358.0	87 45	67.6	1424.2	87 45	67.3	3
4	1053.4	88 45	68.2	1119.7	88 45	68.0	1146.0	88 45	67.7	1212.3	88 45	67.5	1238.6	88 45	67.2	1304.9	88 44	67.0	1331.2	88 44	66.7	1357.4	87 44	66.5	4
105	1026.5	88 45	67.4	1052.8	88 45	67.1	1119.2	88 44	66.9	1145.6	88 44	66.6	1211.9	88 44	66.4	1238.2	88 44	66.1	1304.5	88 44	65.9	1330.8	88 44	65.6	105
6	959.7	88 44	66.5	1026.1	88 44	66.3	1052.5	88 44	66.0	1118.9	88 44	65.8	1145.3	88 44	65.6	1211.7	88 44	65.3	1238.1	88 44	65.1	1304.4	88 44	64.8	6
7	933.1	88 44	65.7	959.6	88 44	65.4	1026.1	88 44	65.2	1052.5	88 44	65.0	1118.9	88 44	64.7	1145.4	88 44	64.5	1211.8</						

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and declination values (e.g., 24° 00', 24° 30', 25° 00', 25° 30', 26° 00', 26° 30', 27° 00', 27° 30'). Each cell contains numerical data for altitude and azimuth.

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
91	20 21.9	86 47	77.0	20 47.6	86 47	76.7	21 13.2	85 47	76.4	21 38.9	85 47	76.2	22 04.4	85 47	75.9	22 30.0	85 47	75.6	22 55.5	85 47	75.3	23 21.0	85 47	75.0	91
2	19 53.6	86 47	76.2	20 19.3	86 47	75.9	20 45.0	86 47	75.6	21 10.7	86 47	75.3	21 36.3	86 47	75.0	22 01.9	86 47	74.8	22 27.4	86 47	74.5	22 53.0	86 47	74.2	2
3	19 25.5	86 47	75.3	19 51.2	86 47	75.0	20 16.9	86 47	74.8	20 42.6	86 47	74.5	21 08.2	86 47	74.2	21 33.9	86 46	73.9	21 59.5	86 46	73.7	22 25.0	86 46	73.4	3
4	18 57.4	86 47	74.5	19 23.1	86 47	74.2	19 48.9	86 46	73.9	20 14.6	86 46	73.7	20 40.3	86 46	73.4	21 06.0	86 46	73.1	21 31.6	86 46	72.8	21 57.2	86 46	72.6	4
95	18 29.4	86 46	73.7	18 55.2	86 46	73.4	19 21.0	86 46	73.1	19 46.7	86 46	72.8	20 12.5	86 46	72.6	20 38.2	86 46	72.3	21 03.9	86 46	72.0	21 29.5	86 46	71.7	95
6	18 01.5	86 46	72.8	18 27.4	86 46	72.6	18 53.2	86 46	72.3	19 19.0	86 46	72.0	19 44.8	86 46	71.8	20 10.5	86 46	71.5	20 36.3	86 46	71.2	21 02.0	86 46	70.9	6
7	17 33.8	86 46	72.0	17 59.7	86 46	71.7	18 25.6	86 46	71.5	18 51.4	86 46	71.2	19 17.2	86 46	70.9	19 43.0	86 46	70.7	20 08.8	86 46	70.4	20 34.6	86 46	70.1	7
8	17 06.2	86 46	71.2	17 32.1	86 46	70.9	17 58.1	86 46	70.6	18 23.9	86 46	70.4	18 49.8	86 45	70.1	19 15.7	86 45	69.8	19 41.5	86 45	69.6	20 07.3	86 45	69.3	8
9	16 38.8	87 46	70.4	17 04.7	87 45	70.1	17 30.7	86 45	69.8	17 56.6	86 45	69.6	18 22.5	86 45	69.3	18 48.4	86 45	69.0	19 14.3	86 45	68.8	19 40.1	86 45	68.5	9
100	16 11.4	87 45	69.5	16 37.5	87 45	69.3	17 03.5	87 45	69.0	17 29.4	87 45	68.7	17 55.4	86 45	68.5	18 21.3	86 45	68.2	18 47.2	86 45	67.9	19 13.1	86 45	67.7	100
1	15 44.3	87 45	68.7	16 10.3	87 45	68.4	16 36.4	87 45	68.2	17 02.4	87 45	67.9	17 28.4	87 45	67.7	17 54.4	87 45	67.4	18 20.4	87 45	67.1	18 46.3	87 44	66.9	1
2	15 17.2	87 45	67.9	15 43.3	87 45	67.6	16 09.4	87 45	67.4	16 35.5	87 45	67.1	17 01.6	87 44	66.8	17 27.6	87 44	66.6	17 53.6	87 44	66.3	18 19.6	87 44	66.1	2
3	14 50.4	87 44	67.1	15 16.5	87 44	66.8	15 42.7	87 44	66.5	16 08.8	87 44	66.3	16 34.9	87 44	66.0	17 01.0	87 44	65.8	17 27.1	87 44	65.5	17 53.1	87 44	65.3	3
4	14 23.7	87 44	66.2	14 49.9	87 44	66.0	15 16.1	87 44	65.7	15 42.3	87 44	65.5	16 08.4	87 44	65.2	16 34.6	87 44	65.0	17 00.7	87 44	64.7	17 26.8	87 44	64.4	4
105	13 57.1	88 44	65.4	14 23.4	88 44	65.2	14 49.6	87 44	64.9	15 15.9	87 44	64.7	15 42.1	87 44	64.4	16 08.3	87 43	64.1	16 34.5	87 43	63.9	17 00.7	87 43	63.6	105
6	13 30.8	88 44	64.6	13 57.1	88 44	64.3	14 23.4	88 43	64.1	14 49.7	88 43	63.8	15 16.0	88 43	63.6	15 42.2	88 43	63.3	16 08.5	87 43	63.1	16 34.7	87 43	62.8	6
7	13 04.6	88 43	63.8	13 31.0	88 43	63.5	13 57.3	88 43	63.3	14 23.7	88 43	63.0	14 50.0	88 43	62.8	15 16.3	88 43	62.5	15 42.6	88 43	62.3	16 08.9	88 43	62.0	7
8	12 38.6	88 43	62.9	13 05.0	88 43	62.7	13 31.4	88 43	62.4	13 57.8	88 43	62.2	14 24.2	88 43	62.0	14 50.6	88 43	61.7	15 17.0	88 42	61.5	15 43.3	88 42	61.2	8
9	12 12.8	88 43	62.1	12 39.3	88 43	61.9	13 05.7	88 42	61.6	13 32.2	88 42	61.4	13 58.7	88 42	61.1	14 25.1	88 42	60.9	14 51.5	88 42	60.6	15 17.9	88 42	60.4	9
110	11 47.2	89 42	61.3	12 13.7	89 42	61.0	12 40.3	88 42	60.8	13 06.8	88 42	60.6	13 33.3	88 42	60.3	13 59.8	88 42	60.1	14 26.3	88 42	59.8	14 52.7	88 42	59.6	110
1	11 21.8	89 42	60.4	11 48.4	89 42	60.2	12 15.0	89 42	60.0	12 41.5	89 42	59.7	13 08.1	89 42	59.5	13 34.7	89 41	59.3	14 01.2	89 41	59.0	14 27.7	89 41	58.8	1
2	10 56.6	89 42	59.6	11 23.2	89 42	59.4	11 49.9	89 41	59.2	12 16.5	89 41	58.9	12 43.2	89 41	58.7	13 09.8	89 41	58.4	13 36.4	89 41	58.2	14 03.0	89 41	58.0	2
3	10 31.6	89 41	58.8	10 58.3	89 41	58.6	11 25.0	89 41	58.3	11 51.7	89 41	58.1	12 18.4	89 41	57.9	12 45.1	89 41	57.6	13 11.8	89 41	57.4	13 38.4	89 41	57.2	3
4	10 06.8	89 41	58.0	10 33.6	89 41	57.7	11 00.4	89 41	57.5	11 27.1	89 41	57.3	11 53.9	89 40	57.0	12 20.6	89 40	56.8	12 47.4	89 40	56.6	13 14.1	89 40	56.3	4
115	9 42.3	90 41	57.1	10 09.1	90 40	56.9	10 36.0	90 40	56.7	11 02.8	90 40	56.5	11 29.6	90 40	56.2	11 56.4	90 40	56.0	12 23.2	90 40	55.8	12 50.0	90 40	55.5	115
6	9 17.9	90 40	56.3	9 44.9	90 40	56.1	10 11.8	90 40	55.9	10 38.7	90 40	55.6	11 05.5	90 40	55.4	11 32.4	90 40	55.2	11 59.3	90 40	55.0	12 26.1	90 39	54.7	6
7	8 53.9	90 40	55.5	9 20.8	90 40	55.3	9 47.8	90 40	55.0	10 14.8	90 39	54.8	10 41.7	90 39	54.6	11 08.7	90 39	54.4	11 35.6	90 39	54.1	12 02.5	90 39	53.9	7
8	8 30.0	90 39	54.6	8 57.1	90 39	54.4	9 24.1	90 39	54.2	9 51.1	90 39	54.0	10 18.1	90 39	53.8	10 45.1	90 39	53.5	11 12.1	90 39	53.3	11 39.1	90 39	53.1	8
9	8 06.4	90 39	53.8	8 33.5	90 39	53.6	9 00.6	90 39	53.4	9 27.7	90 39	53.2	9 54.8	90 38	52.9	10 21.9	90 38	52.7	10 48.9	90 38	52.5	11 16.0	90 38	52.3	9
120	7 43.1	91 38	53.0	8 10.2	91 38	52.8	8 37.4	91 38	52.5	9 04.6	91 38	52.3	9 31.7	90 38	52.1	9 58.8	90 38	51.9	10 26.0	90 38	51.7	10 53.1	90 38	51.5	120
1	7 29.0	91 38	52.1	7 47.2	91 38	51.9	8 14.4	91 38	51.7	8 41.7	91 38	51.5	9 08.9	91 38	51.3	9 36.1	91 38	51.1	10 03.3	91 37	50.9	10 30.5	91 37	50.6	1
2	6 57.1	91 38	51.3	7 24.4	91 38	51.1	7 51.7	91 37	50.9	8 19.0	91 37	50.7	8 46.3	91 37	50.5	9 13.6	91 37	50.3	9 40.9	91 37	50.0	10 06.1	91 37	49.8	2
3	6 34.6	91 37	50.5	7 01.9	91 37	50.3	7 29.3	91 37	50.1	7 56.7	91 37	49.8	8 24.0	91 37	49.6	8 51.4	91 37	49.4	9 18.7	91 36	49.2	9 46.0	91 36	49.0	3
4	6 12.3	91 37	49.6	6 39.7	91 37	49.4	7 07.1	91 36	49.2	7 34.6	91 36	49.0	8 02.0	91 36	48.8	8 29.4	91 36	48.6	8 56.8	91 36	48.4	9 24.2	91 36	48.2	4
125	5 50.2	92 36	48.8	6 17.7	92 36	48.6	6 45.2	92 36	48.4	7 12.7	92 36	48.2	7 40.2	92 36	48.0	8 07.7	92 36	47.8	8 35.2	92 36	47.6	9 02.7	92 35	47.4	125
6	5 28.5	92 36	47.9	5 56.1	92 36	47.7	6 23.6	92 36	47.5	6 51.2	92 36	47.3	7 18.8	92 36	47.1	7 46.3	92 36	46.9	8 13.9	92 36	46.7	8 41.4	92 36	46.5	6
7	5 07.1	92 36	47.1	5 34.7	92 36	46.9	6 02.3	92 36	46.7	6 30.0	92 36	46.5	6 57.6	92 36	46.3	7 25.2	92 36	46.1	7 52.8	92 36	45.9	8 20.4	92 34	45.7	7
8				5 13.6	92 36	46.1	5 41.3	92 36	45.9	6 09.0	92 34	45.7	6 36.7	92 34	45.5	7 04.4	92 34	45.3	7 32.1	92 34	45.1	7 59.7	92 34	44.9	8
9							5 20.6	93 34	45.0	5 48.3	93 34	44.8	6 16.1	93 34	44.6	6 43.9	93 34	44.5	7 11.6	93 34	44.3	7 39.4	92 33	44.1	9
130							5 00.1	93 34	44.2	5 28.0	93 33	44.0	5 55.8	93 33	43.8	6 23.6	93 33	43.6	6 51.5	93 33	43.4	7 19.3	93 33	43.2	130
1										5 35.8	93 33	43.0	6 03.7	93 33	42.8	6 31.6	93 33	42.6	6 59.5	93 33	42.4	7 19.3	93 33	42.4	1
2													5 44.1	93 33	41.9	6 12.1	93 32	41.8	6 40.0	93 32	41.6	7 19.3	93 32		

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	57 00.0	1.001	180.0	57 30.0	1.001	180.0	58 00.0	1.001	180.0	59 00.0	1.001	180.0	60 00.0	1.001	180.0	61 00.0	1.001	180.0	00
1	56 59.6	1.002	178.4	57 29.6	1.002	178.4	57 59.6	1.002	178.3	58 59.6	1.002	178.3	60 59.6	1.002	178.2	62 59.6	1.002	178.2	01
2	56 58.4	1.003	176.8	57 28.4	1.003	176.7	57 58.4	1.003	176.7	58 58.4	1.004	176.6	60 58.4	1.004	176.4	62 58.4	1.004	176.4	02
3	56 56.3	1.005	175.1	57 26.3	1.005	175.1	57 56.2	1.005	175.1	58 56.2	1.005	174.8	60 56.0	1.005	174.5	62 55.8	1.005	174.5	03
4	56 53.4	1.006	173.5	57 23.4	1.006	173.5	57 53.3	1.006	173.4	58 53.2	1.006	173.3	60 52.9	1.007	173.0	62 52.6	1.007	172.7	04
05	56 49.7	1.008	171.9	57 19.7	1.008	171.8	57 49.6	1.008	171.8	58 49.6	1.008	171.6	60 48.9	1.008	171.3	62 48.5	1.008	170.9	05
6	56 45.2	1.009	170.3	57 15.1	1.009	170.2	57 45.0	1.009	170.1	58 44.7	1.009	170.1	60 44.1	1.009	169.6	62 43.4	1.009	169.1	06
7	56 39.9	1.010	168.7	57 09.8	1.010	168.6	57 39.6	1.010	168.5	58 39.2	1.010	168.3	60 38.4	1.010	167.8	62 37.5	1.010	167.3	07
8	56 33.9	1.011	167.1	57 03.6	1.011	167.0	57 33.4	1.011	166.9	58 32.9	1.011	166.6	60 31.8	1.011	166.1	62 30.6	1.011	165.5	08
9	56 27.0	1.012	165.5	56 56.7	1.012	165.4	57 26.4	1.012	165.3	58 25.8	1.012	165.0	60 24.4	1.012	164.4	62 22.9	1.012	163.8	09
10	56 19.3	1.013	163.9	56 49.0	1.013	163.8	57 18.6	1.013	163.7	58 17.9	1.013	163.4	60 16.2	1.013	162.7	62 14.4	1.013	162.0	10
1	56 10.9	1.014	162.4	56 40.5	1.014	162.2	57 10.0	1.014	162.1	58 09.1	1.014	161.8	60 07.2	1.014	161.0	62 04.9	1.014	160.3	11
2	56 01.7	1.015	160.8	56 31.2	1.015	160.7	57 00.7	1.015	160.5	57 59.6	1.015	160.1	59 57.3	1.015	159.4	61 54.7	1.015	158.5	12
3	55 51.8	1.016	159.3	56 21.2	1.016	159.1	56 50.6	1.016	158.9	57 49.4	1.016	158.5	59 46.7	1.016	157.7	61 43.7	1.016	156.8	13
4	55 41.1	1.017	157.7	56 10.5	1.017	157.5	56 39.8	1.017	157.4	57 38.4	1.017	157.0	59 35.3	1.017	156.1	61 31.8	1.017	155.1	14
15	55 29.7	1.018	156.2	55 59.0	1.018	156.0	56 28.2	1.018	155.8	57 26.6	1.018	155.4	59 23.1	1.018	154.5	61 19.2	1.018	153.4	15
6	55 17.7	1.019	154.7	55 46.8	1.019	154.5	56 15.9	1.019	154.3	57 14.1	1.019	153.8	59 10.2	1.019	152.9	61 05.8	1.019	151.8	16
7	55 04.9	1.020	153.2	55 33.9	1.020	153.0	56 03.0	1.020	152.7	57 01.0	1.020	152.3	58 56.6	1.020	151.3	60 51.7	1.020	150.1	17
8	54 51.4	1.021	151.7	55 20.4	1.021	151.5	55 49.3	1.021	151.2	56 47.1	1.021	150.8	58 42.3	1.021	149.7	60 36.8	1.021	148.5	18
9	54 37.3	1.022	150.2	55 06.2	1.022	150.0	55 35.0	1.022	149.7	56 32.5	1.022	149.2	58 27.2	1.022	148.1	60 21.3	1.022	146.9	19
20	54 22.6	1.023	148.8	54 51.3	1.023	148.5	55 20.0	1.023	148.3	56 17.3	1.023	147.7	58 11.6	1.023	146.6	60 05.1	1.023	145.4	20
1	54 07.2	1.024	147.3	54 35.8	1.024	147.1	55 04.4	1.024	146.8	56 01.5	1.024	146.3	57 55.2	1.024	145.1	59 48.2	1.024	143.8	21
2	53 51.1	1.025	145.9	54 19.7	1.025	145.6	54 48.2	1.025	145.4	55 45.0	1.025	144.8	57 38.3	1.025	143.6	59 30.7	1.025	142.3	22
3	53 34.5	1.026	144.5	54 03.0	1.026	144.2	54 31.3	1.026	143.9	55 28.0	1.026	143.4	57 20.7	1.026	142.1	59 12.6	1.026	140.7	23
4	53 17.4	1.027	143.1	53 45.7	1.027	142.8	54 13.9	1.027	142.5	55 10.3	1.027	141.9	57 02.6	1.027	140.7	58 53.9	1.027	139.2	24
25	52 59.6	1.028	141.7	53 27.8	1.028	141.4	53 55.9	1.028	141.1	54 52.1	1.028	140.5	56 43.8	1.028	139.2	58 34.7	1.028	137.8	25
6	52 41.3	1.029	140.3	53 09.4	1.029	140.0	53 37.4	1.029	139.7	54 33.3	1.029	139.1	56 24.6	1.029	137.8	58 14.8	1.029	136.3	26
7	52 22.5	1.030	139.0	52 50.9	1.030	138.7	53 18.3	1.030	138.4	54 14.0	1.030	137.7	56 04.7	1.030	136.4	57 54.5	1.030	134.9	27
8	52 03.5	1.031	137.6	52 30.9	1.031	137.3	52 58.7	1.031	137.0	53 54.2	1.031	136.4	55 44.4	1.031	135.0	57 33.6	1.031	133.5	28
9	51 43.2	1.032	136.3	52 11.0	1.032	136.0	52 38.7	1.032	135.7	53 33.9	1.032	135.0	55 23.6	1.032	133.6	57 12.3	1.032	132.1	29
30	51 22.9	1.033	135.0	51 50.5	1.033	134.7	52 18.1	1.033	134.3	53 13.1	1.033	133.7	55 02.3	1.033	132.3	56 50.5	1.033	130.7	30
1	51 02.1	1.034	133.7	51 29.6	1.034	133.4	51 57.1	1.034	133.0	52 51.8	1.034	132.4	54 40.6	1.034	130.9	56 28.2	1.034	129.4	31
2	50 40.8	1.035	132.4	51 08.2	1.035	132.1	51 35.6	1.035	131.7	52 30.1	1.035	131.1	54 18.4	1.035	129.6	56 05.0	1.035	128.0	32
3	50 19.1	1.036	131.1	50 46.4	1.036	130.8	51 13.7	1.036	130.5	52 07.9	1.036	129.8	53 55.8	1.036	128.3	55 42.4	1.036	126.7	33
4	49 57.0	1.037	129.9	50 24.2	1.037	129.6	50 51.3	1.037	129.2	51 45.4	1.037	128.5	53 32.7	1.037	127.1	55 18.9	1.037	125.4	34
35	49 34.5	1.038	128.6	50 01.6	1.038	128.3	50 28.6	1.038	128.0	51 22.4	1.038	127.3	53 09.3	1.038	125.8	54 55.0	1.038	124.2	35
6	49 11.6	1.039	127.4	49 38.6	1.039	127.1	50 05.5	1.039	126.7	50 59.1	1.039	126.0	52 45.5	1.039	124.5	54 30.8	1.039	122.9	36
7	48 48.3	1.040	126.2	49 15.2	1.040	125.9	49 42.0	1.040	125.5	50 35.4	1.040	124.8	52 21.4	1.040	123.3	54 06.2	1.040	121.7	37
8	48 24.7	1.041	125.0	48 51.4	1.041	124.7	49 18.1	1.041	124.3	50 11.3	1.041	123.6	51 56.9	1.041	122.1	53 41.3	1.041	120.5	38
9	48 00.7	1.042	123.8	48 27.3	1.042	123.5	48 53.9	1.042	123.1	49 47.0	1.042	122.4	51 32.1	1.042	120.9	53 16.0	1.042	119.3	39
40	47 36.3	1.043	122.7	48 02.9	1.043	122.3	48 29.4	1.043	122.0	49 22.2	1.043	121.3	51 07.0	1.043	119.7	52 50.5	1.043	118.1	40
1	47 11.7	1.044	121.5	47 38.2	1.044	121.2	48 04.6	1.044	120.8	48 57.2	1.044	120.1	50 41.8	1.044	118.6	52 24.7	1.044	116.9	41
2	46 46.8	1.045	120.4	47 13.1	1.045	120.0	47 39.5	1.045	119.7	48 31.9	1.045	118.9	50 15.9	1.045	117.4	51 58.7	1.045	115.8	42
3	46 21.5	1.046	119.2	46 47.8	1.046	118.9	47 14.1	1.046	118.5	48 06.3	1.046	117.8	49 50.0	1.046	116.3	51 32.3	1.046	114.6	43
4	45 56.0	1.047	118.1	46 22.2	1.047	117.8	46 48.4	1.047	117.4	47 40.5	1.047	116.7	49 23.8	1.047	115.2	51 05.8	1.047	113.5	44
45	45 30.2	1.048	117.0	45 56.3	1.048	116.7	46 22.4	1.048	116.3	47 14.3	1.048	115.6	48 57.3	1.048	114.0	50 39.0	1.048	112.4	45
6	45 04.2	1.049	115.9	45 30.2	1.049	115.6	45 56.2	1.049	115.2	46 48.0	1.049	114.5	48 30.6	1.049	113.0	50 12.0	1.049	110.3	46
7	44 37.9	1.050	114.9	45 03.9	1.050	114.5	45 29.8	1.050	114.1	46 21.4	1.050	113.4	48 03.8	1.050	111.9	49 44.8	1.050	110.2	47
8	44 11.4	1.051	113.8	44 37.3	1.051	113.4	45 03.1	1.051	113.1	45 54.6	1.051	112.3	47 36.7	1.051	110.8	49 17.4	1.051	108.7	48
9	43 44.7	1.052	112.7	44 10.5	1.052	112.4	44 36.3	1.052	112.0	45 27.6	1.052	111.3	47 09.4	1.052	109.4	48 49.8	1.052	107.1	49
50	43 17.7	1.053	111.7	43 43.5	1.053	111.3	44 09.2	1.053	111.0	45 00.4	1.053	110.2	46 41.9	1.053	108.7	48 22.1	1.053	106.6	50
1	42 50.6	1.054	110.6	43 16.3	1.054	110.3	43 41.9	1.054	109.9	44 33.0	1.054	109.2	4						

## DECLINATION SAME NAME AS LATITUDE

43

H.A.	28° 00'			28° 30'			29° 00'			30° 00'			32° 00'			34° 00'			34° 30'			35° 30'			H.A.	Lat. 61°
	Ait.	Ad At	As.																							
91	23 46.5	85 47	74.7	24 11.9	85 47	74.4	24 37.3	85 47	74.1	25 28.0	84 46	73.6	27 06.9	84 46	72.3	28 49.2	83 46	71.1	29 14.2	83 46	70.8	30 04.0	83 46	70.1	91	
2	23 18.5	85 46	73.9	23 43.9	85 46	73.6	24 09.4	85 46	73.3	25 00.1	85 46	72.7	26 41.3	84 46	71.5	28 21.8	83 46	70.3	28 46.8	83 46	70.0	29 36.7	83 46	69.4	2	
3	22 50.6	85 46	73.1	23 16.1	85 46	72.8	23 41.6	85 46	72.5	24 32.4	85 46	71.9	26 13.7	84 46	70.8	27 54.5	84 46	69.5	28 19.5	84 46	69.2	29 09.6	83 46	68.6	3	
4	22 22.8	85 46	72.3	22 48.4	85 46	72.0	23 13.9	85 46	71.7	24 04.8	85 46	71.1	25 46.3	84 46	70.0	27 27.3	84 46	68.7	27 52.4	84 46	68.4	28 42.5	83 46	67.8	4	
95	21 55.2	85 46	71.5	22 20.8	85 46	71.2	22 46.3	85 46	70.9	23 37.4	85 46	70.3	25 19.1	85 46	69.2	27 00.2	84 46	68.0	27 25.4	84 46	67.7	28 15.7	84 46	67.0	95	
6	21 27.6	85 46	70.7	21 53.3	85 46	70.4	22 18.9	85 46	70.1	23 10.1	85 46	69.5	24 52.0	85 46	68.4	26 33.3	84 46	67.2	26 58.6	84 46	66.9	27 49.0	84 46	66.3	6	
7	21 00.3	85 46	69.8	21 26.0	85 46	69.6	21 51.6	85 46	69.3	22 42.9	85 46	68.7	24 25.0	85 46	67.6	26 06.6	84 46	66.4	26 31.9	84 46	66.1	27 22.4	84 46	65.5	7	
8	20 33.0	85 46	69.0	20 58.8	85 46	68.8	21 24.5	85 46	68.5	22 15.8	85 46	67.9	23 58.2	85 46	66.8	25 40.0	85 46	65.6	26 05.4	85 46	65.3	26 56.0	84 46	64.7	8	
9	20 05.9	85 46	68.2	20 31.7	85 46	68.0	20 57.5	85 46	67.7	21 49.0	85 46	67.1	23 31.5	85 46	66.0	25 13.6	85 46	64.8	25 39.1	85 46	64.6	26 29.8	84 46	64.0	9	
100	19 39.0	85 46	67.4	20 04.9	85 46	67.1	20 30.7	85 46	66.9	21 22.2	85 46	66.3	23 05.1	85 46	65.2	24 47.4	85 46	64.1	25 12.9	85 46	63.8	26 03.8	85 46	63.2	100	
1	19 12.2	85 46	66.6	19 38.1	85 46	66.3	20 04.0	85 46	66.1	20 55.7	85 46	65.5	22 38.7	85 46	64.4	24 21.3	85 46	63.3	24 46.9	85 46	63.0	25 37.9	85 46	62.4	1	
2	18 45.6	87 44	65.8	19 11.6	85 44	65.5	19 37.5	85 44	65.3	20 29.3	85 44	64.7	22 12.6	85 44	63.6	23 55.4	85 44	62.5	24 21.0	85 44	62.2	25 12.2	85 44	61.7	2	
3	18 19.2	87 44	65.0	18 45.2	87 44	64.7	19 11.2	87 44	64.5	20 03.1	86 43	63.9	21 46.6	86 43	62.9	23 29.7	86 43	61.7	23 55.4	86 43	61.5	24 46.7	85 43	60.9	3	
4	17 52.9	87 44	64.2	18 19.0	87 43	63.9	18 45.0	87 43	63.7	19 37.0	87 43	63.1	21 20.8	86 43	62.1	23 04.2	86 43	61.0	23 29.9	86 43	60.7	24 21.4	86 42	60.1	4	
105	17 26.8	87 43	63.4	17 52.9	87 43	63.1	18 19.0	87 43	62.9	19 11.2	87 43	62.3	20 55.2	87 42	61.3	22 38.8	86 42	60.2	23 04.7	86 42	59.9	23 56.3	86 42	59.4	105	
6	17 00.9	87 43	62.6	17 27.1	87 43	62.3	17 53.2	87 43	62.1	18 45.5	87 42	61.5	20 29.8	87 42	60.5	22 13.7	86 42	59.4	22 39.6	86 41	59.1	23 31.3	86 41	58.6	6	
7	16 35.2	88 43	61.8	17 01.4	87 43	61.5	17 27.6	87 43	61.3	18 20.0	87 42	60.7	20 04.6	87 42	59.7	21 48.7	87 41	58.6	22 14.7	87 41	58.4	23 06.6	86 41	57.8	7	
8	16 09.6	88 42	61.0	16 35.9	88 42	60.7	17 02.2	88 42	60.5	17 54.8	87 42	60.0	19 39.6	87 41	58.9	21 24.0	87 41	57.9	21 59.1	87 41	57.6	22 42.1	87 41	57.1	8	
9	15 44.3	88 42	60.2	16 10.7	88 42	59.9	16 37.0	88 42	59.7	17 29.7	88 41	59.2	19 14.8	87 41	58.1	20 59.5	87 41	57.1	21 25.6	87 40	56.8	22 17.8	87 40	56.3	9	
110	15 19.2	88 42	59.3	15 45.6	88 41	59.1	16 12.0	88 41	58.9	17 04.8	88 41	58.4	18 50.2	88 41	57.4	20 35.2	87 40	56.3	21 01.4	87 40	56.1	21 53.7	87 40	55.5	110	
1	14 54.3	88 41	58.5	15 20.8	88 41	58.3	15 47.2	88 41	58.1	16 49.2	88 41	57.6	18 25.8	88 40	56.6	20 11.1	88 40	55.5	20 37.3	88 40	55.3	21 29.8	87 39	54.8	1	
2	14 29.6	88 41	57.7	14 55.1	88 41	57.5	15 22.7	88 41	57.3	16 15.7	88 40	56.8	18 01.6	88 40	55.8	19 47.2	88 39	54.8	20 13.5	88 39	54.5	21 06.2	88 39	54.0	2	
3	14 05.1	88 40	56.9	14 31.7	88 40	56.7	14 58.3	88 40	56.4	15 51.5	88 40	56.0	17 37.7	88 40	55.0	19 23.5	88 39	54.0	19 50.0	88 39	53.7	20 42.7	88 39	53.2	3	
4	13 40.8	88 40	56.1	14 07.5	88 40	55.9	14 34.2	88 40	55.6	15 27.5	88 40	55.2	17 14.0	88 39	54.2	19 09.1	88 39	53.2	19 26.6	88 38	53.0	20 19.6	88 38	52.5	4	
115	13 16.8	88 40	55.3	13 43.5	88 40	55.1	14 10.3	88 39	54.8	15 03.7	88 39	54.4	16 50.5	88 39	53.4	18 36.9	88 38	52.5	19 03.5	88 38	52.2	19 56.6	88 38	51.7	115	
6	12 53.0	88 39	54.5	13 19.8	88 39	54.3	13 46.6	88 39	54.0	14 40.2	88 39	53.6	16 27.2	88 38	52.6	18 14.0	88 38	51.7	18 40.7	88 38	51.4	19 33.9	88 37	50.9	6	
7	12 29.4	88 39	53.7	12 56.3	88 39	53.5	13 23.2	88 39	53.2	14 16.9	88 38	52.8	16 04.2	88 38	51.8	17 51.3	88 37	50.9	18 18.0	88 37	50.7	19 11.4	88 37	50.2	7	
8	12 06.1	88 38	52.9	12 33.1	88 38	52.6	13 00.0	88 38	52.4	13 53.9	88 38	52.0	15 41.5	88 38	51.1	17 28.9	88 37	50.1	17 55.7	88 37	49.9	18 49.2	88 37	49.4	8	
9	11 43.0	88 38	52.1	12 10.1	88 38	51.8	12 37.1	88 38	51.6	13 31.1	88 38	51.2	15 19.0	88 37	50.3	17 06.7	88 37	49.3	17 33.5	88 36	49.1	18 27.2	88 36	48.6	9	
120	11 20.2	88 38	51.2	11 47.3	88 37	51.0	12 14.4	88 37	50.8	13 08.6	88 37	50.4	14 56.8	88 37	49.5	16 44.7	88 36	48.6	17 11.7	88 36	48.3	18 05.5	88 36	47.9	120	
1	10 57.7	88 37	50.4	11 24.8	88 37	50.2	11 52.0	88 37	50.0	12 46.3	88 37	49.6	14 34.8	88 36	48.7	16 23.0	88 36	47.8	16 50.1	88 36	47.6	17 44.1	88 36	47.1	1	
2	10 35.4	88 37	49.6	11 02.6	88 37	49.4	11 29.9	88 37	49.2	12 24.1	88 36	48.8	14 13.1	88 36	47.9	16 01.6	88 36	47.0	16 28.7	88 35	46.8	17 22.9	88 35	46.3	2	
3	10 13.3	88 36	48.8	10 40.7	88 36	48.6	11 08.0	88 36	48.4	12 02.6	88 36	48.0	13 51.6	88 36	47.1	15 40.5	88 35	46.2	16 07.7	88 35	46.0	17 02.0	88 34	45.6	3	
4	9 51.6	88 36	48.0	10 19.0	88 36	47.8	10 46.4	88 36	47.6	11 41.1	88 36	47.2	13 39.4	88 35	46.3	15 19.6	88 34	45.5	15 46.9	88 34	45.2	16 41.4	88 34	44.8	4	
125	9 30.1	88 35	47.2	9 57.6	88 35	47.0	10 25.0	88 35	46.8	11 19.9	88 35	46.3	13 09.5	88 34	45.5	14 50.0	88 34	44.7	15 26.4	88 34	44.5	16 11.0	88 34	44.0	125	
6	9 08.9	88 35	46.3	9 36.5	88 35	46.1	10 04.0	88 35	45.9	10 59.0	88 34	45.5	12 48.9	88 34	44.7	14 38.7	88 34	43.9	15 06.1	88 34	43.7	16 00.9	88 34	43.3	6	
7	8 48.0	88 34	45.5	9 15.6	88 34	45.3	9 43.2	88 34	45.1	10 38.4	88 34	44.7	12 28.6	88 33	43.9	14 18.7	88 33	43.1	14 46.2	88 33	42.9	15 41.2	88 33	42.5	7	
8	8 27.4	88 34	44.7	8 55.1	88 34	44.5	9 22.8	88 34	44.3	10 18.1	88 33	43.9	12 08.6	88 33	43.1	13 59.0	88 32	42.3	14 26.5	88 32	42.1	15 21.7	88 32	41.7	8	
9	8 07.1	88 33	43.9	8 34.9	88 33	43.7	9 02.6	88 33	43.5	9 58.0	88 33	43.1	11 48.8	88 32	42.3	13 39.5	88 32	41.5	14 07.2	88 32	41.3	15 02.4	88 32	40.9	9	
130	7 47.1	88 33	43.1	8 14.9	88 33	42.9	8 42.7	88 33	42.7	9 38.3	88 32	42.3	11 29.4	88 32	41.5	13 20.4	88 31	40.7	13 48.1	88 31	40.5	14 43.5	88 31	40.2	130	

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., 36° 00', 37° 00', 38° 30', 40° 00', 42° 00', 42° 30', 43° 00', 45° 00', and H.A. Each column contains sub-columns for Alt., Ad At., and Az. The table lists astronomical data for various declinations and latitudes.

Main table with columns for H.A., Alt., Az., and H.A. for various declination values (36° 00' to 45° 00').

Lat. 61°

Lat. 62°

Lat. 63°

Lat. 64°

Lat. 65°

Lat. 66°

Lat. 67°

Lat. 68°

Lat. 69°

Lat. 70°

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and values for declinations from 46° 00' to 84° 00'. Each declination section contains 4 rows of data.

Main table with columns for H.A., latitude (46° 00' to 54° 00'), and declination (61° to 64°). Each cell contains numerical values representing astronomical data.

Lat. 61°

Lat. 62°

Lat. 63°

Lat. 64°

L 6

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and Az. for various declination values (54° 30' to 59° 30'). Each cell contains numerical data representing astronomical coordinates.

DECLINATION SAME NAME AS LATITUDE

HA.	54° 30'		55° 00'		56° 00'		56° 30'		57° 00'		57° 30'		59° 00'		59° 30'		H.A.								
	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At									
91	45 00.1	73 40	55.2	45 21.9	72 39	54.7	46 05.1	72 39	53.7	46 26.4	71 39	52.2	46 47.7	71 38	52.2	47 08.8	70 38	50.6	48 11.3	69 37	50.6	48 31.8	68 37	50.0	91
2	44 36.3	73 39	54.6	44 58.2	73 39	54.1	45 41.7	72 39	53.1	46 03.2	72 38	52.6	46 24.7	71 38	52.1	46 45.9	71 38	51.6	47 07.2	70 37	50.0	47 29.6	69 37	49.5	2
3	44 12.7	74 39	54.0	44 34.7	73 39	53.5	45 18.5	73 38	52.6	45 40.2	73 38	52.1	46 01.8	72 38	51.6	46 23.2	71 38	51.1	46 44.7	70 37	49.5	47 07.6	69 36	49.0	3
4	43 49.2	74 39	53.4	44 11.4	74 39	52.9	44 55.5	73 38	52.0	45 17.4	73 38	51.5	45 39.1	72 38	51.0	46 00.7	72 37	50.5	46 22.2	71 37	49.0	47 04.7	70 36	48.5	4
95	43 26.9	75 38	52.8	43 43.8	74 38	52.3	44 32.7	74 38	51.4	44 54.7	73 38	50.9	45 16.6	73 37	50.4	45 38.3	72 37	50.0	46 01.8	71 36	48.4	46 22.8	71 36	47.9	95
6	43 02.9	75 38	52.2	43 25.4	75 38	51.8	44 10.0	74 37	50.8	44 32.2	74 37	50.4	44 54.2	73 37	49.9	45 16.1	73 37	49.4	45 39.7	72 36	47.9	46 21.1	72 36	47.4	6
7	42 40.0	75 38	51.6	43 02.6	75 38	51.2	43 47.6	75 37	50.3	44 09.9	74 37	49.8	44 32.1	74 37	49.3	44 54.1	73 36	48.8	45 29.5	72 36	47.4	46 21.2	72 35	46.9	7
8	42 17.3	76 38	51.0	42 40.1	76 37	50.6	43 25.3	75 37	49.7	43 47.8	75 37	49.2	44 10.1	74 36	48.3	44 32.3	74 36	47.8	45 08.3	73 35	46.8	46 00.1	72 35	46.3	8
9	41 54.8	77 37	50.4	42 17.7	76 37	50.0	43 03.2	76 36	49.1	43 25.8	75 36	48.2	44 07.4	74 36	47.7	44 30.7	74 36	47.2	45 07.2	73 35	46.3	45 39.1	72 35	45.8	9
100	41 32.5	77 37	49.8	41 55.5	77 37	49.4	42 41.3	76 36	48.5	43 04.1	76 36	48.1	43 26.7	75 36	47.6	43 49.3	75 36	47.2	44 26.3	74 35	45.8	45 18.3	73 34	45.3	100
1	41 10.3	77 37	49.2	41 33.5	77 36	48.8	42 19.6	77 36	47.9	42 42.5	76 36	47.5	43 05.3	76 35	47.1	43 28.1	76 35	46.6	44 05.5	75 34	45.2	44 57.8	74 34	44.8	1
2	40 48.4	78 36	48.6	41 11.7	78 36	48.2	41 58.1	77 36	47.4	42 21.2	77 36	46.9	42 44.2	76 35	46.5	43 07.0	76 35	46.1	43 47.0	75 34	44.7	44 37.4	75 34	44.2	2
3	40 26.7	78 36	48.0	40 50.1	78 36	47.6	41 36.8	78 35	46.8	42 00.0	77 35	46.4	42 23.2	77 35	45.9	42 46.2	77 34	45.5	43 29.4	76 34	44.2	44 17.2	75 33	43.7	3
4	40 05.1	79 36	47.4	40 28.8	79 36	47.0	41 15.7	78 35	46.2	41 39.1	78 35	45.8	42 02.4	77 34	45.4	42 25.5	77 34	44.9	43 01.4	76 33	43.6	43 57.2	76 33	43.2	4
105	39 43.8	79 35	46.8	40 07.6	79 35	46.4	40 54.8	78 34	45.6	41 18.3	78 34	45.2	41 41.8	78 34	44.8	42 05.1	78 34	44.4	42 48.5	77 33	43.1	43 37.4	76 33	42.6	105
6	39 22.7	80 35	46.2	39 46.6	80 35	45.8	40 34.2	79 34	45.0	40 57.8	79 34	44.6	41 21.4	78 34	44.2	41 44.8	78 33	43.8	42 32.1	77 32	42.5	43 17.8	77 32	42.1	6
7	39 01.8	80 34	45.6	39 25.8	80 34	45.2	40 13.7	79 34	44.5	40 37.5	79 34	44.1	41 01.2	79 33	43.7	41 24.8	79 33	43.2	42 16.1	78 32	42.0	42 58.4	77 32	41.6	7
8	38 41.1	81 34	45.0	39 05.3	80 34	44.7	39 53.4	80 34	43.9	40 17.3	80 33	43.5	40 41.2	79 33	43.1	41 05.0	79 33	42.7	41 48.5	78 32	41.4	42 39.2	77 32	41.0	8
9	38 20.7	81 34	44.4	38 45.0	81 34	44.1	39 33.3	80 33	43.3	39 57.4	80 33	42.9	40 25.4	80 33	42.5	40 45.8	80 32	42.1	41 29.1	79 32	40.9	42 20.2	78 31	40.5	9
110	38 00.4	82 33	43.8	38 24.8	81 33	43.5	39 13.5	81 33	42.7	39 37.7	81 32	42.3	40 01.9	80 32	41.9	40 26.0	80 32	41.6	41 00.4	79 31	40.4	42 01.4	79 31	39.9	110
1	37 40.4	82 33	43.2	38 04.9	82 33	42.9	38 53.9	81 32	42.1	39 18.3	81 32	41.8	39 42.6	81 32	41.4	40 06.8	81 32	41.0	40 31.1	80 31	39.8	41 42.9	80 31	39.4	1
2	37 20.6	82 33	42.6	37 45.3	82 32	42.3	38 34.5	82 32	41.5	38 59.0	82 32	41.2	39 23.4	81 31	40.8	39 47.8	81 31	40.4	40 00.4	80 30	39.3	41 24.5	80 30	38.9	2
3	37 01.0	83 32	42.0	37 25.8	83 32	41.7	38 15.3	83 32	41.0	38 40.0	83 31	40.6	39 04.5	82 31	40.2	39 29.1	82 31	39.9	40 02.2	81 30	38.7	41 06.4	81 30	38.3	3
4	36 41.6	83 32	41.4	37 06.6	83 32	41.1	37 56.4	83 31	40.4	38 21.1	83 31	40.0	38 45.9	82 31	39.7	39 10.5	82 30	39.3	40 24.1	81 30	38.2	40 48.4	81 30	37.8	4
115	36 22.5	84 31	40.8	36 47.4	84 31	40.5	37 37.6	83 31	39.8	38 02.6	83 31	39.4	38 27.4	83 30	39.1	38 52.2	83 30	38.7	40 06.2	82 29	37.6	40 30.7	82 29	37.2	115
6	36 03.6	84 31	40.2	36 28.8	84 31	39.9	37 19.1	84 30	39.2	37 44.2	83 30	38.9	38 09.2	83 30	38.5	38 34.1	83 30	38.1	39 48.6	82 29	37.1	40 13.2	82 29	36.7	6
7	35 44.9	85 31	39.6	36 10.3	84 30	39.3	37 00.9	84 30	38.6	37 26.1	84 30	38.3	37 51.2	84 30	37.9	38 16.3	84 29	37.6	39 31.1	83 29	36.5	39 56.0	83 28	36.1	7
8	35 26.5	85 30	39.0	35 52.0	85 30	38.7	36 42.8	85 30	38.0	37 06.2	84 29	37.7	37 35.3	84 29	37.3	37 58.7	84 29	37.0	39 14.0	83 28	36.0	39 38.9	83 28	35.6	8
9	35 08.3	86 30	38.4	35 33.9	85 30	38.1	36 25.0	85 29	37.4	36 50.5	85 29	37.1	37 17.9	85 29	36.8	37 41.3	84 29	36.4	38 57.0	84 28	35.4	39 22.1	84 28	35.0	9
120	34 50.4	86 30	37.8	35 16.1	86 29	37.5	36 07.5	86 29	36.8	36 33.1	86 29	36.5	36 58.6	86 28	36.2	37 24.1	86 28	35.9	38 40.3	84 28	34.8	39 05.5	84 27	34.5	120
1	34 32.7	86 29	37.2	34 58.5	86 29	36.9	35 50.1	86 28	36.2	36 15.9	86 28	35.9	36 41.6	86 28	35.6	37 07.2	86 28	35.3	38 23.3	85 27	34.3	38 49.2	85 27	33.9	1
2	34 15.2	87 29	36.6	34 41.2	87 28	36.3	35 33.1	86 28	35.7	35 58.9	86 28	35.3	36 24.8	86 28	35.0	36 50.5	86 27	34.7	38 07.5	85 27	33.7	38 33.0	85 26	33.4	2
3	33 58.0	87 28	36.0	34 24.1	87 28	35.7	35 16.2	87 28	35.1	35 42.2	87 27	34.8	36 08.2	86 27	34.4	36 34.1	86 27	34.1	37 51.5	85 26	33.2	38 17.1	85 26	32.8	3
4	33 41.0	88 28	35.3	34 07.3	87 28	35.1	34 59.7	87 27	34.5	35 25.8	87 27	34.2	35 51.8	87 27	33.9	36 17.9	87 27	33.6	37 35.7	85 26	32.6	38 01.5	85 26	32.3	4
125	33 24.3	88 27	34.7	33 50.7	88 27	34.5	34 43.3	88 27	33.9	35 09.6	88 27	33.6	35 35.8	88 26	33.3	36 01.9	88 26	33.0	37 20.1	87 26	32.0	37 46.1	86 26	31.7	125
6	33 07.9	88 27	34.1	33 34.4	88 27	33.8	34 27.2	88 26	33.3	34 53.6	88 26	33.0	35 19.9	88 26	32.7	35 46.2	88 26	32.4	37 04.8	87 26	31.5	37 30.9	87 26	31.2	6
7	32 51.7	89 27	33.5	33 18.3	89 26	33.2	34 11.4	88 26	32.7	34 37.9	88 26	32.4	35 04.3	88 26	32.1	35 30.8	88 26	31.8	36 49.7	87 26	30.9	37 16.0	87 24	30.6	7
8	32 35.8	89 26	32.9	33 02.5	89 26	32.6	33 55.8	89 26	32.1	34 22.4	89 26	31.8	34 49.0	89 26	31.5	35 15.5	89 26	31.2	36 34.9	87 25	30.4	37 01.3	87 24	30.1	8
9	32 19.1	90 26	32.3	32 46.9	89 26	32.0	33 40.0	89 26	31.5	34 07.2	89 26	31.2	34 33.9	89 26	30.9	35 00.6	89 24	30.7	36 20.3	88 24	29.8	36 46.8	88 24	29.5	9
130	32 04.7	90 25	31.7	32 31.6	90 25	31.4	33 25.4	90 25	30.9	33 52.3	90 24	30.6	34 19.1	90 24	30.3	34 45.9	90 24	30.1	36 06.0	89 25	29.2	36 32.6	89 25	28.9	130
1	31 49.6	90 25	31.1	32 16.6	90 25	30.8	33 10.6	90 24	30.3	33 37.6	90 24	30.0	34 04.5	90 24	29.8	34 31.4	90 24	29.5	35 51.9						

DECLINATION SAME NAME AS LATITUDE

H.A.	60° 00'			60° 30'			62° 00'			62° 30'			63° 00'			69° 00'			69° 30'			74° 30'			H.A.
	Alt.	Ad At	As.	Alt.	Ad At	As.	Alt.	Ad At	As.	Alt.	Ad At	As.	Alt.	Ad At	As.	Alt.	Ad At	As.	Alt.	Ad At	As.	Alt.	Ad At	As.	
00	89 00.0	1.0 11	180.0	89 30.0	1.0 20	180.0	89 00.0	1.0 11	00.0	88 30.0	1.0 07	00.0	88 00.0	1.0 06	00.0	82 00.0	1.0 01	00.0	81 30.0	1.0 01	00.0	76 30.0	1.0 00	00.0	00
1	88 53.2	90 20	153.3	89 18.1	72 40	135.2	88 53.5	90 27	25.1	88 25.6	90 20	17.1	87 56.7	97 16	12.8	81 59.4	1.0 08	02.6	81 29.4	1.0 08	02.6	76 29.7	1.0 01	01.1	1
2	88 35.8	72 38	134.6	88 54.1	47 45	116.2	88 37.1	71 36	42.8	88 13.6	84 20	31.4	87 47.4	90 24	24.3	81 57.4	90 05	05.1	81 27.6	90 05	04.7	76 28.8	1.0 02	02.3	2
3	88 13.0	58 42	122.8	88 27.1	34 47	107.5	88 15.3	58 41	53.8	87 56.1	71 35	42.1	87 33.3	80 30	33.8	81 54.2	98 07	07.7	81 24.6	99 07	07.0	76 27.4	99 03	03.4	3
4	87 47.5	48 45	115.2	87 59.0	28 48	102.6	87 57.0	44 43	60.6	87 35.1	60 39	49.9	87 15.4	71 24	41.4	81 49.7	97 10	10.1	81 20.9	97 09	09.3	76 25.8	99 04	04.6	4
05	87 20.6	41 46	109.9	87 30.4	24 48	99.4	87 24.8	35 45	65.1	87 12.0	50 41	55.4	86 55.1	62 37	47.4	81 43.9	96 12	12.5	81 15.2	96 11	11.6	76 22.8	98 05	05.7	05
6	86 52.9	36 47	106.1	87 01.6	21 48	97.1	86 58.1	20 45	68.1	86 47.4	43 42	59.5	86 32.8	54 39	52.0	81 37.0	94 13	14.9	81 08.8	94 12	13.8	76 19.6	98 06	06.8	6
7	86 24.8	33 47	103.1	86 32.7	20 48	95.3	86 30.9	23 46	70.3	86 21.9	36 44	62.6	86 09.4	47 41	55.6	81 29.0	92 15	17.2	81 01.4	93 14	15.9	76 15.9	97 07	07.9	7
8	85 56.3	30 48	100.7	86 04.8	19 48	93.8	86 03.4	19 46	71.8	85 55.8	31 44	64.9	85 44.9	41 42	58.5	81 19.9	90 17	19.3	80 52.9	90 16	17.9	76 11.6	96 08	09.0	8
9	85 27.6	29 48	98.8	85 34.7	18 48	92.5	85 35.7	16 46	73.0	85 29.3	27 45	66.7	85 19.8	36 43	60.7	81 09.8	87 18	21.4	80 43.5	88 17	19.9	76 06.8	96 09	10.0	9
10	84 58.8	27 48	97.1	85 05.6	18 48	91.5	85 07.8	13 47	73.8	85 02.4	23 45	68.1	84 54.2	32 43	62.6	80 58.7	84 20	23.4	80 33.2	86 19	21.7	76 01.5	94 10	11.1	10
1	84 29.9	26 48	95.6	84 36.5	18 48	90.5	84 39.8	10 47	74.4	84 35.4	19 45	69.0	84 28.2	28 44	64.0	80 46.7	82 21	25.3	80 20.0	83 20	23.5	75 55.7	92 11	12.1	1
2	84 01.0	26 48	94.3	84 07.4	18 48	89.6	84 11.8	08 47	74.9	84 08.1	16 46	70.1	84 02.0	24 44	65.2	80 33.9	79 28	27.0	80 09.9	81 21	25.2	75 49.3	91 11	13.1	2
3	83 31.9	26 48	93.2	83 38.3	18 48	88.8	83 43.7	06 47	75.2	83 40.7	14 46	70.6	83 35.4	21 44	66.2	80 20.3	76 24	28.7	79 57.2	78 22	26.8	75 42.5	90 12	14.1	3
4	83 02.9	26 48	92.1	83 09.3	18 48	88.0	83 15.5	04 47	75.4	83 13.2	11 46	71.1	83 08.7	18 45	67.0	80 06.0	73 25	30.3	79 43.7	75 24	28.4	75 35.2	88 13	15.1	4
15	82 33.8	26 48	91.1	82 40.2	18 48	87.3	82 47.4	02 47	75.5	82 45.7	09 46	71.5	82 41.9	16 45	67.6	79 51.0	70 26	31.8	79 29.5	73 25	29.8	75 27.4	87 14	16.0	15
6	82 04.7	24 48	90.2	82 11.1	18 48	86.6	82 19.2	01 47	75.5	82 18.1	07 46	71.8	82 15.0	13 45	68.1	79 35.4	67 27	33.1	79 14.8	70 26	31.2	75 19.1	85 14	16.9	6
7	81 35.6	24 48	89.4	81 42.1	19 48	86.0	81 51.1	01 47	75.5	81 50.4	05 46	72.0	81 47.9	11 45	68.5	79 19.2	64 28	34.4	78 59.5	67 28	32.4	75 10.5	83 15	17.8	7
8	81 06.5	25 48	88.5	81 13.1	19 48	85.4	81 22.9	02 47	75.5	81 22.7	08 46	72.2	81 20.8	09 45	68.8	79 02.5	62 29	35.6	78 43.6	64 27	33.6	75 01.4	81 16	18.6	8
9	80 37.5	25 48	87.8	80 44.1	20 48	84.7	80 54.7	04 47	75.4	80 55.0	02 46	72.2	80 53.7	07 45	69.1	78 45.3	59 29	36.7	78 27.3	61 28	34.7	74 51.9	80 16	19.5	9
20	80 08.4	25 48	87.0	80 15.2	20 48	84.2	80 26.6	05 47	75.3	80 27.3	00 46	72.3	80 26.5	05 45	69.2	78 27.7	66 30	37.8	78 10.5	59 29	35.8	74 42.0	78 17	20.3	20
1	79 39.3	25 48	86.3	79 46.2	21 48	83.6	79 58.5	06 47	75.1	79 59.6	01 46	72.2	79 59.3	04 45	69.4	78 09.7	63 31	38.8	77 53.3	58 29	36.7	74 31.7	76 18	21.0	1
2	79 10.3	26 48	85.6	79 17.4	21 48	83.0	79 30.8	06 47	74.9	79 31.9	08 46	72.2	79 32.1	02 45	69.4	77 51.3	60 31	39.6	77 35.7	53 30	37.6	74 21.1	74 18	21.8	2
3	78 41.4	26 48	84.9	78 48.5	22 48	82.4	79 02.3	09 47	74.7	79 04.2	04 46	72.1	79 04.8	00 45	69.5	77 32.6	48 32	40.5	77 17.8	51 30	38.5	74 10.1	72 19	22.5	3
4	78 12.4	26 48	84.3	78 19.7	22 48	81.9	78 34.2	10 47	74.5	78 36.6	06 46	72.0	78 37.6	01 45	69.4	77 13.5	45 32	41.2	76 59.5	48 31	39.3	73 58.8	70 19	23.2	4
25	77 43.5	27 48	83.6	77 50.9	23 48	81.4	78 06.2	11 47	74.3	78 08.9	07 46	71.8	78 10.4	03 45	69.4	76 54.2	43 33	41.9	76 41.0	48 31	40.0	73 47.2	68 20	23.9	25
6	77 14.6	27 48	83.0	77 22.2	24 48	80.8	77 38.3	12 47	74.0	77 41.3	08 46	71.7	77 43.1	04 45	69.3	76 34.6	40 33	42.6	76 22.1	43 32	40.6	73 35.3	66 20	24.5	6
7	76 45.7	28 48	82.4	76 53.5	24 48	80.3	77 10.3	13 47	73.7	77 13.7	09 46	71.5	77 15.9	06 45	69.2	76 14.8	38 33	43.2	76 03.1	41 32	41.3	73 23.1	64 21	25.1	7
8	76 16.9	28 48	81.8	76 24.8	25 48	79.8	76 42.4	14 46	73.4	76 46.1	11 46	71.3	76 48.7	07 45	69.1	75 54.8	35 34	43.7	75 43.8	38 32	41.8	73 10.6	62 21	25.7	8
9	75 48.1	29 48	81.2	75 56.2	25 48	79.3	76 14.5	15 46	73.1	76 18.6	12 46	71.1	76 21.6	08 45	69.0	75 34.6	33 34	44.2	75 24.3	36 33	42.4	72 57.9	60 22	26.2	9
30	75 19.4	29 48	80.7	75 27.7	26 48	78.8	75 46.7	16 46	72.8	75 51.1	13 46	70.8	75 54.4	09 45	68.8	75 14.3	31 34	44.4	75 04.6	34 33	42.8	72 44.9	58 22	26.8	30
1	74 50.7	30 48	80.1	74 59.2	27 47	78.2	75 19.0	17 46	72.5	75 23.6	14 46	70.6	75 27.3	11 45	68.6	74 53.7	29 34	45.1	74 44.7	32 33	43.3	72 31.7	56 22	27.3	1
2	74 22.1	30 48	79.5	74 30.7	27 47	77.7	74 51.2	18 46	72.2	74 56.2	15 46	70.3	75 00.3	12 45	68.4	74 33.1	26 35	45.5	74 24.7	29 34	43.7	72 18.2	53 23	27.8	2
3	73 53.5	31 48	79.0	74 02.3	28 47	77.2	74 23.6	19 46	71.9	74 28.9	16 46	70.0	74 33.2	13 45	68.2	74 14.3	24 35	45.8	74 04.5	27 34	44.0	72 04.6	51 23	28.2	3
4	73 25.0	31 47	78.4	73 34.0	29 47	76.7	73 55.9	20 46	71.5	74 01.6	17 45	69.8	74 06.3	14 45	68.0	73 51.4	22 35	46.1	73 44.3	25 34	44.4	71 50.7	49 23	28.7	4
35	72 56.5	32 47	77.9	73 05.7	29 47	76.2	73 28.4	21 46	71.2	73 34.3	18 45	69.5	73 39.3	15 45	67.7	73 30.3	20 35	46.4	73 23.9	23 34	44.7	71 36.7	47 24	29.1	35
6	72 28.1	32 47	77.3	72 37.5	30 47	75.7	73 00.9	22 46	70.8	73 07.1	19 45	68.2	73 12.4	16 45	67.5	73 09.2	18 35	46.6	73 03.4	21 34	44.9	71 22.5	45 24	29.5	6
7	71 59.8	33 47	76.8	72 09.3	31 47	75.3	72 33.4	23 46	70.5	72 39.9	20 45	68.9	72 45.6	18 45	67.2	72 48.1	16 35	46.8	72 42.8	19 34	45.2	71 08.1	43 24	29.8	7
8	71 31.5	34 47	76.3	71 41.2	31 47	74.8	72 06.0	24 46	70.1	72 12.8	21 45	68.5	72 18.8	19 45	66.9	72 26.8	14 36	47.0	72 22.1	17 35	45.4	70 53.5	41 24	30.2	8
9	71 03.3	34 47	75.7	71 13.2	32 47	74.3	71 38.7	25 45	69.8	71 45.8	22 45	68.2	71 52.1	20 44	66.6	72 05.5	12 36	47.2	72 01.4	15 35	45.6	70 38.8	39 25	30.5	9
40	70 35.1	35 47	75.2	70 45.2	33 46	73.8	71 11.5	26 45	69.4	71 18.8	23 45	67.9	71 25.4	21 44											

DECLINATION SAME NAME AS LATITUDE

Main table with columns for H.A., Lat., and declination values (60° 00', 60° 30', 62° 00', 62° 30', 63° 00', 69° 00', 69° 30', 74° 30').

Lat. 61°, Lat. 62°, Lat. 63°, Lat. 64°

# STAR IDENTIFICATION TABLE

## ALTITUDE

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.																					
00	33	180	37	180	41	180	45	180	49	180	53	180	57	180	61	180	65	180	69	180	73	180	00
4	33	175	37	175	41	175	45	175	49	174	53	174	57	174	61	173	65	172	69	171	73	170	4
8	33	171	37	170	41	170	45	169	49	169	53	168	57	167	61	166	64	165	68	163	72	161	8
12	32	166	36	165	40	165	44	164	48	163	52	162	56	161	60	159	64	158	68	155	72	152	12
16	32	161	36	160	40	160	44	159	47	157	51	156	55	155	59	153	63	151	67	148	71	144	16
20	31	157	35	156	39	155	43	153	47	152	51	151	54	149	58	147	62	144	66	141	69	136	20
24	30	152	34	151	38	150	42	148	46	147	49	145	53	143	57	141	61	138	64	134	68	129	24
28	29	148	33	146	37	145	41	143	45	142	48	140	52	138	56	135	59	132	63	128	66	123	28
32	28	143	32	142	36	140	40	139	43	137	47	135	51	132	54	130	58	126	61	122	65	117	32
36	27	139	31	137	34	136	38	134	42	132	46	130	49	127	53	125	56	121	60	117	63	112	36
40	26	135	29	133	33	131	37	130	40	128	44	125	48	123	51	120	55	116	58	112	61	107	40
44	24	131	28	129	32	127	35	125	39	123	42	121	46	118	49	115	53	112	56	108	59	103	44
48	23	127	26	125	30	123	34	121	37	119	41	116	44	114	48	111	51	107	54	104	57	99	48
52	21	123	25	121	28	119	32	117	35	115	39	112	42	110	46	107	49	103	52	99	55	95	52
56	19	119	23	117	27	115	30	113	34	111	37	108	41	106	44	103	47	99	50	96	53	91	56
60	18	115	21	113	25	111	28	109	32	107	35	104	39	102	42	99	45	96	48	92	51	88	60
64	16	111	19	109	23	107	26	105	30	103	33	101	37	98	40	95	43	92	46	89	50	85	64
68	14	108	18	106	21	104	25	101	28	99	31	97	35	94	38	92	41	88	45	85	48	81	68
72	12	104	16	102	19	100	23	98	26	96	30	93	33	91	36	88	39	85	43	82	46	78	72
76	10	100	14	98	17	96	21	94	24	92	28	90	31	87	34	85	38	82	41	79	44	75	76
80	08	97	12	95	15	93	19	91	22	89	26	86	29	84	32	81	36	79	39	75	42	72	80
84	06	93	10	91	13	89	17	87	20	85	24	83	27	81	30	78	34	75	37	72	40	69	84
88	04	90	08	88	11	86	15	84	18	82	22	79	25	77	29	75	32	72	35	69	38	66	88
92	03	86	06	84	10	82	13	80	16	78	20	76	23	74	27	72	30	69	33	66	37	63	92
96	01	83	04	81	08	79	11	77	15	75	18	73	21	71	25	68	28	66	32	63	35	61	96
100	01	79	02	77	06	75	09	74	13	72	16	70	20	67	23	65	26	63	30	60	33	58	100
104	03	76	00	74	04	72	07	70	11	68	14	66	18	64	21	62	25	60	28	57	32	55	104
108	05	72	02	70	02	69	06	67	09	65	13	63	16	61	20	59	23	57	27	55	30	52	108
112	07	69	03	67	00	65	04	63	07	61	11	60	14	58	18	56	22	54	25	52	28	49	112
116	09	65	05	63	01	62	02	60	06	58	09	56	13	54	16	53	20	51	24	49	27	47	116
120	10	61	07	60	03	58	00	56	04	55	08	53	11	51	15	49	19	48	22	46	26	44	120
124	12	58	08	56	05	54	01	53	03	51	06	50	10	48	14	46	17	45	21	43	24	41	124
128	14	54	10	52	06	51	03	49	01	48	05	46	08	45	12	43	16	41	19	40	23	38	128
132	15	50	12	49	08	47	04	46	00	44	03	43	07	41	11	40	15	38	18	37	22	35	132
136	17	46	13	45	09	43	05	42	02	41	02	39	06	38	10	37	13	35	17	34	21	32	136
140	18	42	14	41	10	40	07	38	03	37	01	36	05	35	09	33	12	32	16	31	20	29	140
144	19	38	15	37	12	36	08	35	04	34	00	32	04	31	08	30	11	29	15	28	19	27	144
148	20	34	17	33	13	32	09	31	05	30	01	29	03	28	07	27	10	26	14	25	18	24	148
152	21	30	18	29	14	28	10	27	06	26	02	25	02	25	06	24	10	23	14	22	17	21	152
156	22	26	18	25	15	24	11	23	07	23	03	22	01	21	05	20	09	19	13	19	17	18	156
160	23	22	19	21	15	20	11	20	07	19	03	18	00	18	04	17	08	16	12	16	16	15	160
164	24	17	20	17	16	16	12	16	08	15	04	15	00	14	04	14	08	13	12	12	16	12	164
168	24	13	20	13	16	12	12	12	08	11	04	11	00	11	04	10	07	10	11	09	15	09	168
172	25	09	21	08	17	08	13	08	09	08	05	07	01	07	03	07	07	07	11	06	15	06	172
176	25	04	21	04	17	04	13	04	09	04	05	04	01	04	03	03	07	03	11	03	15	03	176
180	25	00	21	00	17	00	13	00	09	00	05	00	01	00	03	00	07	00	11	00	15	00	180

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

# STAR IDENTIFICATION TABLE

## ALTITUDE

53

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

Lat. 61°

Lat. 62°

Lat. 63°

Lat. 64°

La 65

L 66

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

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.		
	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At			
00	28 00.0	1.000	180.0	28 30.0	1.000	180.0	29 00.0	1.000	180.0	29 30.0	1.000	180.0	30 00.0	1.000	180.0	30 30.0	1.000	180.0	00
1	27 59.7	1.001	178.9	28 29.7	1.001	178.9	28 59.7	1.001	178.9	29 29.7	1.001	178.9	29 59.7	1.001	178.8	30 29.7	1.001	178.8	01
2	27 58.9	1.002	177.7	28 28.9	1.002	177.7	28 58.9	1.002	177.7	29 28.9	1.002	177.7	29 58.9	1.002	177.7	30 28.9	1.002	177.7	02
3	27 57.5	1.003	176.6	28 27.5	1.003	176.6	28 57.5	1.003	176.6	29 27.5	1.003	176.6	29 57.5	1.003	176.5	30 27.5	1.003	176.5	03
4	27 55.5	1.004	175.5	28 25.5	1.004	175.5	28 55.5	1.004	175.4	29 25.5	1.004	175.4	29 55.5	1.004	175.4	30 25.4	1.004	175.3	04
05	27 53.0	1.005	174.3	28 23.0	1.005	174.3	28 53.0	1.005	174.3	29 23.0	1.005	174.2	29 52.9	1.005	174.2	30 22.9	1.005	174.2	05
6	27 50.0	1.006	173.2	28 19.9	1.006	173.2	28 49.9	1.006	173.1	29 19.8	1.006	173.1	29 49.7	1.006	173.0	30 19.7	1.006	173.0	06
7	27 46.4	1.007	172.1	28 16.3	1.007	172.0	28 46.3	1.007	172.0	29 16.2	1.007	171.9	29 46.0	1.007	171.9	30 16.0	1.007	171.8	07
8	27 42.2	1.008	171.0	28 12.2	1.008	170.9	28 42.1	1.008	170.8	29 12.0	1.008	170.8	29 41.9	1.008	170.7	30 11.8	1.008	170.7	08
9	27 37.5	1.009	169.8	28 07.4	1.009	169.8	28 37.3	1.009	169.7	29 07.2	1.009	169.7	29 37.1	1.009	169.6	30 07.0	1.009	169.5	09
10	27 32.3	1.010	168.7	28 02.2	1.010	168.7	28 32.0	1.010	168.6	29 01.9	1.010	168.5	29 31.8	1.010	168.4	30 01.6	1.010	168.4	10
1	27 26.5	09 11	167.6	27 56.3	09 11	167.5	28 26.2	09 11	167.5	28 56.0	09 11	167.4	29 25.9	09 11	167.3	30 25.6	09 11	167.2	01
2	27 20.2	09 11	166.5	27 50.0	09 12	166.4	28 19.8	09 12	166.3	28 49.6	09 12	166.3	29 19.4	09 12	166.2	30 19.1	09 12	166.1	02
3	27 13.3	09 12	165.3	27 43.1	09 12	165.3	28 12.9	09 12	165.2	28 42.7	09 12	165.1	29 12.5	09 12	165.0	30 12.0	09 12	164.9	03
4	27 05.9	09 13	164.2	27 35.7	09 13	164.2	28 05.4	09 13	164.1	28 35.2	09 13	164.0	29 04.9	09 13	163.9	30 04.4	09 13	163.8	04
15	26 58.0	09 14	163.1	27 27.7	09 14	163.0	27 57.4	09 14	162.9	28 27.2	09 14	162.8	28 56.9	09 14	162.7	29 26.6	09 14	162.6	05
6	26 49.6	09 15	162.0	27 19.3	09 15	161.9	27 48.9	09 15	161.8	28 18.6	09 15	161.7	28 48.3	09 15	161.6	29 17.9	09 15	161.5	06
7	26 40.6	09 16	160.9	27 10.3	09 16	160.8	27 39.9	09 16	160.7	28 09.5	09 16	160.6	28 39.2	09 16	160.5	29 08.8	09 16	160.4	07
8	26 31.1	09 17	159.8	27 00.7	09 17	159.7	27 30.3	09 17	159.6	27 59.9	09 17	159.5	28 29.5	09 17	159.4	28 59.1	09 17	159.3	08
9	26 21.2	09 17	158.7	26 50.7	09 18	158.6	27 20.3	09 18	158.5	27 49.8	09 18	158.4	28 19.4	09 18	158.3	28 48.9	09 18	158.2	09
20	26 10.7	08 18	157.6	26 40.2	08 18	157.5	27 09.7	08 18	157.3	27 39.2	08 18	157.2	28 08.7	08 18	157.1	28 38.2	08 18	157.0	10
1	25 59.7	08 19	156.5	26 29.2	08 19	156.4	26 58.6	08 19	156.3	27 28.1	08 19	156.2	27 57.5	08 19	156.1	28 27.0	08 19	156.0	01
2	25 48.2	08 20	155.4	26 17.6	08 20	155.3	26 47.0	08 20	155.2	27 16.5	08 20	155.1	27 45.9	08 20	155.0	28 15.3	08 20	154.9	02
3	25 36.2	08 21	154.3	26 05.6	08 21	154.2	26 35.0	08 21	154.1	27 04.3	08 21	154.0	27 33.7	08 21	153.9	28 03.0	08 21	153.8	03
4	25 23.8	08 22	153.2	25 53.1	08 22	153.1	26 22.4	08 22	153.0	26 51.7	08 22	152.9	27 21.0	08 22	152.8	27 50.3	08 22	152.7	04
25	25 10.9	08 22	152.2	25 40.2	08 22	152.0	26 09.4	08 22	151.9	26 38.7	08 22	151.8	27 07.9	08 22	151.7	27 37.2	08 22	151.6	05
6	24 57.5	08 23	151.1	25 26.7	08 23	151.0	25 55.9	08 23	150.8	26 25.1	08 23	150.7	26 54.3	08 23	150.6	27 23.5	08 23	150.5	06
7	24 43.6	08 24	150.0	25 12.8	08 24	149.9	25 42.0	08 24	149.8	26 11.1	08 24	149.7	26 40.2	08 24	149.5	27 09.4	08 24	149.4	07
8	24 29.3	08 25	148.8	24 58.4	08 25	148.8	25 27.5	08 25	148.7	25 56.6	08 25	148.5	26 25.7	08 25	148.4	26 54.8	08 25	148.3	08
9	24 14.6	08 27	147.7	24 43.6	08 27	147.7	25 12.7	08 27	147.6	25 41.7	08 27	147.5	26 10.7	08 27	147.3	26 39.7	08 27	147.2	09
30	23 59.4	08 28	146.6	24 28.4	08 28	146.6	24 57.4	08 28	146.5	25 26.3	08 28	146.4	25 55.3	08 28	146.2	26 24.3	08 28	146.0	10
1	23 43.8	08 27	145.8	24 12.7	08 27	145.6	24 41.6	08 27	145.5	25 10.5	08 27	145.3	25 39.4	08 27	145.2	26 08.3	08 27	145.0	01
2	23 27.7	08 27	144.7	23 56.6	08 28	144.6	24 26.4	08 28	144.4	24 54.3	08 28	144.3	25 23.1	08 28	144.1	25 52.0	08 28	144.0	02
3	23 11.2	08 28	143.7	23 40.0	08 28	143.5	24 05.8	08 28	143.4	24 37.6	08 28	143.2	25 06.4	08 28	143.1	25 35.2	08 28	142.9	03
4	22 54.3	08 29	142.6	23 23.1	08 29	142.5	23 51.8	08 29	142.3	24 20.5	08 29	142.2	24 49.3	08 29	142.0	25 18.0	08 29	141.8	04
35	22 37.0	08 30	141.6	23 05.7	08 30	141.4	23 34.4	08 30	141.3	24 03.1	08 30	141.1	24 31.7	08 30	140.9	25 00.4	08 30	140.8	05
6	22 19.3	08 30	140.6	22 47.9	08 30	140.4	23 16.6	08 30	140.2	23 45.2	08 30	140.1	24 13.8	08 30	139.9	24 42.4	08 30	139.7	06
7	22 01.2	08 31	139.5	22 29.8	08 31	139.4	22 58.3	08 31	139.2	23 26.9	08 31	139.0	23 55.4	08 31	138.8	24 24.0	08 31	138.7	07
8	21 42.7	08 31	138.5	22 11.3	08 32	138.3	22 39.7	08 32	138.2	23 08.2	08 32	138.0	23 36.7	08 32	137.8	24 05.2	08 32	137.6	08
9	21 23.9	08 32	137.5	21 52.3	08 32	137.3	22 20.8	08 32	137.1	22 49.2	08 32	137.0	23 17.6	08 32	136.8	23 46.0	08 32	136.6	09
40	21 04.7	08 33	136.5	21 33.1	08 33	136.3	22 01.4	08 33	136.1	22 29.8	08 33	135.9	22 58.1	08 33	135.8	23 26.5	08 33	135.6	10
1	20 45.1	08 33	135.4	21 13.4	08 33	135.3	21 41.7	08 33	135.1	22 10.0	08 33	134.9	22 38.3	08 33	134.7	23 06.6	08 33	134.6	01
2	20 25.1	08 34	134.4	20 53.4	08 34	134.3	21 21.7	08 34	134.1	21 49.9	08 34	133.9	22 18.1	08 34	133.7	22 46.3	08 34	133.5	02
3	20 04.9	08 34	133.4	20 33.1	08 34	133.3	21 01.2	08 34	133.1	21 29.4	08 34	132.9	21 57.6	08 34	132.7	22 25.7	08 34	132.5	03
4	19 44.2	08 35	132.4	20 12.4	08 35	132.3	20 40.5	08 35	132.1	21 08.6	08 35	131.9	21 36.7	08 35	131.7	22 04.8	08 35	131.5	04
45	19 23.3	08 35	131.4	19 51.4	08 36	131.3	20 19.4	08 36	131.1	20 47.5	08 36	130.9	21 15.5	08 36	130.7	21 43.5	08 36	130.5	05
6	19 02.0	08 36	130.5	19 30.0	08 36	130.3	20 08.0	08 36	130.1	20 36.0	08 36	129.9	21 04.0	08 36	129.7	21 32.0	08 36	129.5	06
7	18 40.4	08 36	129.5	19 08.4	08 37	129.3	19 36.3	08 37	129.1	20 04.3	08 37	128.9	20 32.2	08 37	128.7	21 00.1	08 37	128.5	07
8	18 18.5	08 37	128.5	18 46.4	08 37	128.3	19 14.3	08 37	128.1	19 42.2	08 37	127.9	20 10.0	08 37	127.7	20 37.9	08 37	127.5	08
9	17 56.3	08 38	127.5	18 24.2	08 38	127.3	18 52.0	08 38	127.1	19 19.8	08 38	126.9	19 47.6	08 38	126.7	20 15.4	08 38	126.5	09
50	17 33.8	08 38	126.5	18 01.6	08 38	126.3	18 29.4	08 38	126.1	18 57.1	08 38	125.9	19 24.9	08 38	125.7	19 52.6	08 38	125.5	10
1	17 11.1	08 38	125.6	17 38.8	08 38	125.4	18 06.5	08 38	125.2	18 34.2	08 38	125.0	19						

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 62°

Lat. 62°

Lat. 63°

Lat. 64°

Lat. 65°

Lat. 66°

Lat. 67°

Lat. 68°

Lat. 69°

Lat. 70°

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 60° to 75°.

Vertical text on the left margin containing additional data or corrections.

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.		
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.			
00	32 00.0	1.00	180.0	32 30.0	1.00	180.0	33 00.0	1.00	180.0	33 30.0	1.00	180.0	34 00.0	1.00	180.0	35 00.0	1.00	180.0	00
1	31 59.7	1.00	178.8	32 29.7	1.00	178.8	32 59.7	1.00	178.8	33 29.7	1.00	178.8	34 59.7	1.00	178.8	35 29.7	1.00	178.8	1
2	31 58.8	1.02	177.6	32 28.8	1.02	177.6	32 58.8	1.02	177.6	33 28.8	1.02	177.6	34 58.8	1.02	177.6	35 28.8	1.02	177.6	2
3	31 57.4	1.03	176.5	32 27.4	1.03	176.5	32 57.4	1.03	176.4	33 27.4	1.03	176.4	34 57.3	1.03	176.4	35 27.3	1.03	176.3	3
4	31 55.4	1.04	175.3	32 25.4	1.04	175.3	32 55.3	1.04	175.2	33 25.3	1.04	175.2	34 55.2	1.04	175.2	35 25.2	1.04	175.1	4
05	31 52.8	1.06	174.1	32 22.7	1.06	174.1	32 52.7	1.06	174.0	33 22.7	1.06	174.0	34 52.6	1.06	173.9	35 22.5	1.06	173.9	05
6	31 49.6	1.08	173.0	32 19.6	1.08	172.9	32 49.5	1.08	172.8	33 19.5	1.08	172.8	34 49.3	1.08	172.7	35 19.2	1.08	172.7	6
7	31 45.9	1.07	171.8	32 15.8	1.07	171.7	32 45.7	1.07	171.7	33 15.7	1.07	171.7	34 45.4	1.07	171.5	35 15.4	1.07	171.5	7
8	31 41.6	1.08	170.6	32 11.5	1.08	170.6	32 41.4	1.08	170.5	33 11.3	1.08	170.5	34 41.1	1.08	170.3	35 11.0	1.08	170.3	8
9	31 36.7	1.09	169.4	32 06.6	1.09	169.4	32 36.4	1.09	169.3	33 06.3	1.09	169.3	34 06.1	1.09	169.1	35 05.9	1.09	169.1	9
10	31 31.2	1.10	168.3	32 01.1	1.10	168.2	32 31.0	1.10	168.2	33 00.8	1.10	168.1	34 00.5	1.10	167.9	35 00.2	1.10	167.9	10
1	31 25.2	1.11	167.1	31 55.1	1.11	167.0	32 24.9	1.11	167.0	32 54.7	1.11	166.9	33 54.4	1.11	166.7	34 54.0	1.11	166.7	1
2	31 18.7	1.12	166.0	31 48.5	1.12	165.9	32 18.3	1.12	165.8	32 48.1	1.12	165.7	33 47.7	1.12	165.5	34 47.2	1.12	165.5	2
3	31 11.6	1.13	164.8	31 41.3	1.13	164.7	32 11.1	1.13	164.6	32 40.9	1.13	164.6	33 40.4	1.13	164.4	34 39.9	1.13	164.3	3
4	31 03.9	1.14	163.6	31 33.6	1.14	163.5	32 03.4	1.14	163.5	32 33.1	1.14	163.4	33 32.5	1.14	163.2	34 32.0	1.14	163.1	4
15	30 55.7	1.15	162.5	31 25.4	1.15	162.4	31 55.1	1.15	162.3	32 24.8	1.15	162.2	33 24.4	1.15	162.0	34 23.5	1.15	161.9	15
6	30 46.9	1.16	161.3	31 16.6	1.16	161.2	31 46.2	1.16	161.1	32 15.9	1.16	161.1	33 15.2	1.16	160.9	34 14.4	1.16	160.7	6
7	30 37.7	1.17	160.2	31 07.3	1.17	160.1	31 36.9	1.17	160.0	32 06.5	1.17	159.9	33 06.7	1.17	159.7	34 04.9	1.17	159.5	7
8	30 27.8	1.18	159.0	30 57.4	1.18	158.9	31 27.0	1.18	158.8	31 56.5	1.18	158.7	32 56.6	1.18	158.5	33 54.7	1.18	158.3	8
9	30 17.5	1.19	157.9	30 47.0	1.19	157.8	31 16.6	1.19	157.7	31 46.1	1.19	157.6	32 45.6	1.19	157.4	33 44.1	1.19	157.2	9
20	30 06.7	1.20	156.8	30 36.1	1.20	156.7	31 05.6	1.20	156.6	31 35.1	1.20	156.4	32 04.5	1.20	156.2	33 03.4	1.20	156.0	20
1	29 55.3	1.20	155.6	30 24.7	1.20	155.5	30 54.1	1.20	155.4	31 23.6	1.20	155.3	31 53.0	1.20	155.2	32 51.8	1.20	154.9	1
2	29 43.4	1.21	154.5	30 12.8	1.21	154.4	30 42.2	1.21	154.3	31 11.5	1.21	154.2	31 40.9	1.21	154.0	32 39.6	1.21	153.7	2
3	29 31.0	1.21	153.4	30 00.4	1.21	153.3	30 29.7	1.21	153.1	30 59.0	1.21	153.0	31 28.3	1.21	152.8	32 27.9	1.21	152.5	3
4	29 18.2	1.22	152.3	29 47.5	1.22	152.1	30 16.7	1.22	152.0	30 46.0	1.22	151.9	31 15.2	1.22	151.7	32 13.7	1.22	151.5	4
25	29 04.8	1.23	151.2	29 34.1	1.23	151.0	30 03.3	1.23	150.9	30 32.5	1.23	150.8	31 01.6	1.23	150.6	32 00.0	1.23	150.4	25
6	28 51.0	1.24	150.0	29 20.2	1.24	149.9	29 49.3	1.24	149.8	30 18.5	1.24	149.6	30 47.6	1.24	149.5	31 16.7	1.24	149.2	6
7	28 36.7	1.25	148.9	29 05.8	1.25	148.8	29 34.9	1.25	148.7	30 04.0	1.25	148.5	30 33.1	1.25	148.4	31 02.1	1.25	148.1	7
8	28 22.0	1.26	147.8	28 51.0	1.26	147.7	29 20.0	1.26	147.6	29 49.0	1.26	147.4	30 18.1	1.26	147.3	30 47.1	1.26	147.0	8
9	28 06.7	1.27	146.7	28 35.7	1.27	146.6	29 04.7	1.27	146.5	29 33.6	1.27	146.3	30 02.6	1.27	146.2	30 31.5	1.27	145.8	9
30	27 51.1	1.27	145.7	28 20.0	1.27	145.5	28 48.9	1.27	145.4	29 17.8	1.27	145.2	29 46.7	1.27	145.0	30 15.6	1.27	144.9	30
1	27 35.0	1.28	144.6	28 03.8	1.28	144.4	28 32.7	1.28	144.3	29 01.5	1.28	144.1	29 30.3	1.28	143.9	29 59.1	1.28	143.6	1
2	27 18.4	1.29	143.5	27 47.2	1.29	143.3	28 16.0	1.29	143.2	28 44.8	1.29	143.0	29 13.5	1.29	142.9	29 42.3	1.29	142.5	2
3	27 01.4	1.29	142.4	27 30.2	1.29	142.3	27 58.9	1.29	142.1	28 27.6	1.29	141.9	28 56.3	1.29	141.8	29 25.0	1.29	141.5	3
4	26 44.1	1.30	141.3	27 12.7	1.30	141.2	27 41.4	1.30	141.0	28 10.0	1.30	140.8	28 38.7	1.30	140.7	29 07.3	1.30	140.5	4
35	26 26.3	1.30	140.3	26 54.9	1.30	140.1	27 23.5	1.30	139.9	27 52.0	1.30	139.8	28 20.6	1.30	139.6	28 49.2	1.30	139.4	35
6	26 08.1	1.31	139.2	26 36.6	1.31	139.0	27 05.1	1.31	138.9	27 33.6	1.31	138.7	28 02.1	1.31	138.5	28 30.6	1.31	138.3	6
7	25 49.5	1.32	138.2	26 17.9	1.32	138.0	26 46.4	1.32	137.8	27 14.9	1.32	137.6	27 43.3	1.32	137.5	28 11.7	1.32	137.3	7
8	25 30.5	1.33	137.1	25 58.9	1.33	136.9	26 27.3	1.33	136.8	26 55.7	1.33	136.6	27 24.1	1.33	136.4	27 52.4	1.33	136.2	8
9	25 11.1	1.33	136.1	25 39.5	1.33	135.9	26 07.8	1.33	135.7	26 36.1	1.33	135.5	27 04.4	1.33	135.3	27 32.7	1.33	135.2	9
40	24 51.4	1.34	135.0	25 19.7	1.34	134.8	25 48.0	1.34	134.7	26 16.2	1.34	134.5	26 44.5	1.34	134.3	27 12.7	1.34	134.1	40
1	24 31.3	1.34	134.0	24 59.5	1.34	133.8	25 27.8	1.34	133.6	25 55.9	1.34	133.4	26 24.1	1.34	133.2	26 52.3	1.34	133.0	1
2	24 10.9	1.35	133.0	24 39.0	1.35	132.8	25 07.2	1.35	132.6	25 35.3	1.35	132.4	26 03.4	1.35	132.2	26 31.5	1.35	132.0	2
3	23 50.1	1.35	131.9	24 18.2	1.35	131.8	24 46.3	1.35	131.6	25 14.3	1.35	131.4	25 42.6	1.35	131.2	26 10.4	1.35	131.0	3
4	23 29.0	1.36	130.9	23 57.0	1.36	130.7	24 25.0	1.36	130.5	24 53.0	1.36	130.3	25 21.0	1.36	130.1	25 49.0	1.36	129.9	4
45	23 07.5	1.36	129.9	23 35.5	1.36	129.7	24 03.5	1.36	129.5	24 31.4	1.36	129.3	24 59.3	1.36	129.1	25 27.2	1.36	128.9	45
6	22 45.8	1.37	128.9	23 13.7	1.37	128.7	23 41.6	1.37	128.5	24 09.5	1.37	128.3	24 37.3	1.37	128.1	25 05.2	1.37	127.9	6
7	22 23.7	1.37	127.9	22 51.5	1.37	127.7	23 19.4	1.37	127.5	23 47.2	1.37	127.3	24 15.0	1.37	127.1	24 42.8	1.37	126.9	7
8	22 01.3	1.38	126.9	22 29.1	1.38	126.7	22 56.9	1.38	126.5	23 24.6	1.38	126.3	23 52.4	1.38	126.1	24 20.1	1.38	125.9	8
9	21 38.7	1.38	125.9	22 06.4	1.38	125.7	22 34.1	1.38	125.5	23 01.8	1.38	125.3	23 29.5	1.38	125.1	23 57.1	1.38	124.9	9
50	21 15.7	1.39	124.9	21 43.4	1.39	124.7	22 11.0	1.39	124.5	22 38.7	1.39	124.3	23 06.3	1.39	124.1	23 33.9	1.39	123.9	50
1	20 52.5	1.39	123.9	21 20.1	1.39	123.7	21 47.7	1.39	123.5	22 15.2	1.39	123.3	22 42.8	1.39	123.1	23 10.4	1.39	122.9	1
2	20 29.0	1.40	123.0	20 56.5	1.40	122.7	21 24.0	1.40	122.5	21 51.6	1.40	122.3	22 19.1	1.40	122.1	22 46.6	1.40	121.9	2
3	20 05.2	1.40	122.0	20															

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.	Alt.	Az.													
00	2100.0	1.00 180.0	2330.0	1.00 180.0	2500.0	1.00 180.0	2630.0	1.00 180.0	2700.0	1.00 180.0	2830.0	1.00 180.0	2900.0	1.00 180.0	3030.0	1.00 180.0	00
1	2359.7	1.01 178.9	2529.7	1.01 178.9	2659.7	1.01 178.9	2789.7	1.01 178.9	2859.7	1.01 178.9	2989.7	1.01 178.9	3059.7	1.01 178.9	3189.7	1.01 178.9	1
2	2558.9	1.02 177.8	2688.9	1.02 177.8	2818.9	1.02 177.8	2948.9	1.02 177.8	3018.9	1.02 177.9	3148.9	1.02 177.9	3218.9	1.02 177.9	3348.9	1.02 177.9	2
3	2757.6	1.03 176.7	2887.6	1.03 176.7	3017.6	1.03 176.8	3147.6	1.03 176.8	3217.6	1.03 176.8	3347.6	1.03 176.8	3417.6	1.03 176.8	3547.6	1.03 176.8	3
4	2955.7	1.04 175.5	3085.7	1.04 175.5	3215.7	1.04 175.7	3345.7	1.04 175.7	3415.7	1.04 175.7	3545.7	1.04 175.7	3615.7	1.04 175.7	3745.7	1.04 175.7	4
05	3153.3	1.05 174.5	3283.3	1.05 174.6	3413.3	1.05 174.6	3543.3	1.05 174.6	3613.3	1.05 174.6	3743.3	1.05 174.6	3813.3	1.05 174.6	3943.3	1.05 174.6	05
6	3350.4	1.06 173.5	3480.4	1.06 173.5	3608.4	1.06 173.5	3738.4	1.06 173.5	3808.4	1.06 173.6	3938.4	1.06 173.6	4008.4	1.06 173.6	4138.4	1.06 173.6	6
7	3469.1	1.07 172.4	3599.1	1.07 172.4	3727.1	1.07 172.4	3857.1	1.07 172.5	3927.1	1.07 172.5	4057.1	1.07 172.5	4127.1	1.07 172.5	4257.1	1.07 172.5	7
8	3529.1	1.08 171.3	3659.1	1.08 171.3	3787.1	1.08 171.4	3917.1	1.08 171.4	3987.1	1.08 171.5	4117.1	1.08 171.5	4187.1	1.08 171.5	4317.1	1.08 171.5	8
9	3583.3	1.08 170.2	3713.3	1.08 170.2	3841.3	1.08 170.3	3971.3	1.08 170.3	4041.3	1.08 170.4	4171.3	1.08 170.4	4241.3	1.08 170.4	4371.3	1.08 170.5	9
10	3633.3	1.09 169.1	3763.3	1.09 169.2	3891.3	1.09 169.2	4021.3	1.09 169.3	4091.3	1.09 169.3	4221.3	1.09 169.3	4291.3	1.09 169.3	4421.3	1.09 169.4	10
1	3727.1	1.10 168.0	3857.1	1.10 168.1	3985.1	1.10 168.1	4115.1	1.10 168.2	4185.1	1.10 168.2	4315.1	1.10 168.2	4385.1	1.10 168.2	4515.1	1.10 168.3	1
2	3811.0	1.11 166.9	3941.0	1.11 167.0	4069.0	1.11 167.1	4209.0	1.11 167.1	4279.0	1.11 167.2	4409.0	1.11 167.2	4479.0	1.11 167.2	4609.0	1.11 167.3	2
3	3895.0	1.12 165.9	4025.0	1.12 166.0	4153.0	1.12 166.0	4293.0	1.12 166.1	4363.0	1.12 166.1	4493.0	1.12 166.2	4563.0	1.12 166.2	4693.0	1.12 166.3	3
4	3979.0	1.13 164.8	4109.0	1.13 164.9	4237.0	1.13 164.9	4377.0	1.13 165.0	4447.0	1.13 165.1	4577.0	1.13 165.1	4647.0	1.13 165.2	4777.0	1.13 165.2	4
15	4200.0	1.14 163.7	4330.0	1.14 163.8	4460.0	1.14 163.9	4590.0	1.14 164.0	4660.0	1.14 164.0	4790.0	1.14 164.1	4860.0	1.14 164.1	4990.0	1.14 164.2	15
6	4250.0	1.14 162.6	4380.0	1.14 162.7	4510.0	1.14 162.8	4640.0	1.14 162.9	4710.0	1.14 162.9	4840.0	1.14 163.0	4910.0	1.14 163.0	5040.0	1.14 163.1	6
7	4299.7	1.15 161.6	4429.7	1.15 161.6	4559.7	1.15 161.7	4689.7	1.15 161.8	4759.7	1.15 161.8	4889.7	1.15 161.9	4959.7	1.15 161.9	5089.7	1.15 162.0	7
8	4349.1	1.16 160.5	4479.1	1.16 160.5	4609.1	1.16 160.7	4739.1	1.16 160.8	4809.1	1.16 160.8	4939.1	1.16 160.9	5009.1	1.16 161.0	5139.1	1.16 161.1	8
9	4398.3	1.17 159.4	4528.3	1.17 159.5	4658.3	1.17 159.6	4788.3	1.17 159.7	4858.3	1.17 159.7	4988.3	1.17 159.8	5058.3	1.17 159.9	5188.3	1.17 160.0	9
20	4448.0	1.18 158.4	4578.0	1.18 158.5	4708.0	1.18 158.6	4838.0	1.18 158.7	4908.0	1.18 158.7	5038.0	1.18 158.8	5108.0	1.18 158.9	5238.0	1.18 159.0	20
1	4531.9	1.19 157.3	4661.9	1.19 157.4	4791.9	1.19 157.5	4921.9	1.19 157.6	4991.9	1.19 157.6	5121.9	1.19 157.7	5191.9	1.19 157.8	5321.9	1.19 157.9	1
2	4615.8	1.20 156.3	4745.8	1.20 156.4	4875.8	1.20 156.5	5005.8	1.20 156.6	5075.8	1.20 156.6	5205.8	1.20 156.7	5275.8	1.20 156.8	5405.8	1.20 156.9	2
3	4699.7	1.21 155.2	4829.7	1.21 155.3	4959.7	1.21 155.4	5089.7	1.21 155.5	5159.7	1.21 155.5	5289.7	1.21 155.6	5359.7	1.21 155.7	5489.7	1.21 155.8	3
4	4783.6	1.22 154.1	4913.6	1.22 154.2	5043.6	1.22 154.3	5173.6	1.22 154.4	5243.6	1.22 154.4	5373.6	1.22 154.5	5443.6	1.22 154.5	5573.6	1.22 154.6	4
25	4867.5	1.23 153.1	5000.0	1.23 153.2	5130.0	1.23 153.3	5260.0	1.23 153.4	5330.0	1.23 153.4	5460.0	1.23 153.5	5530.0	1.23 153.5	5660.0	1.23 153.6	25
6	4951.4	1.24 152.1	5084.0	1.24 152.2	5214.0	1.24 152.3	5344.0	1.24 152.4	5414.0	1.24 152.4	5544.0	1.24 152.5	5614.0	1.24 152.5	5744.0	1.24 152.6	6
7	5035.3	1.25 151.1	5167.6	1.25 151.1	5297.3	1.25 151.3	5427.3	1.25 151.4	5497.3	1.25 151.4	5627.3	1.25 151.5	5697.3	1.25 151.5	5827.3	1.25 151.6	7
8	5119.2	1.26 150.1	5251.2	1.26 150.1	5381.2	1.26 150.2	5511.2	1.26 150.3	5581.2	1.26 150.3	5711.2	1.26 150.4	5781.2	1.26 150.4	5911.2	1.26 150.5	8
9	5203.1	1.27 149.0	5335.1	1.27 149.1	5465.1	1.27 149.2	5595.1	1.27 149.3	5665.1	1.27 149.3	5795.1	1.27 149.4	5865.1	1.27 149.4	5995.1	1.27 149.5	9
30	5287.0	1.28 147.9	5419.0	1.28 148.0	5549.0	1.28 148.1	5679.0	1.28 148.2	5749.0	1.28 148.2	5879.0	1.28 148.3	5949.0	1.28 148.3	6079.0	1.28 148.4	30
1	5370.9	1.29 146.9	5502.9	1.29 147.0	5632.9	1.29 147.2	5762.9	1.29 147.3	5832.9	1.29 147.3	5962.9	1.29 147.4	6032.9	1.29 147.4	6162.9	1.29 147.5	1
2	5454.8	1.30 145.9	5586.8	1.30 146.0	5716.8	1.30 146.1	5846.8	1.30 146.2	5916.8	1.30 146.2	6046.8	1.30 146.3	6116.8	1.30 146.3	6246.8	1.30 146.4	2
3	5538.7	1.31 144.8	5670.7	1.31 145.0	5800.7	1.31 145.1	5930.7	1.31 145.2	6000.7	1.31 145.2	6130.7	1.31 145.3	6200.7	1.31 145.3	6330.7	1.31 145.4	3
4	5622.6	1.32 143.8	5754.6	1.32 144.0	5884.6	1.32 144.1	6014.6	1.32 144.2	6084.6	1.32 144.2	6214.6	1.32 144.3	6284.6	1.32 144.3	6414.6	1.32 144.4	4
35	5706.5	1.33 142.8	5838.5	1.33 143.0	5968.5	1.33 143.1	6098.5	1.33 143.2	6168.5	1.33 143.2	6298.5	1.33 143.3	6368.5	1.33 143.3	6498.5	1.33 143.4	35
6	5790.4	1.34 141.8	5922.4	1.34 142.0	6052.4	1.34 142.1	6182.4	1.34 142.2	6252.4	1.34 142.2	6382.4	1.34 142.3	6452.4	1.34 142.3	6582.4	1.34 142.4	6
7	5874.3	1.35 140.8	6006.3	1.35 141.0	6136.3	1.35 141.1	6266.3	1.35 141.2	6336.3	1.35 141.2	6466.3	1.35 141.3	6536.3	1.35 141.3	6666.3	1.35 141.4	7
8	5958.2	1.36 139.8	6090.2	1.36 140.0	6220.2	1.36 140.1	6350.2	1.36 140.2	6420.2	1.36 140.2	6550.2	1.36 140.3	6620.2	1.36 140.3	6750.2	1.36 140.4	8
9	6042.1	1.37 138.8	6174.1	1.37 139.0	6304.1	1.37 139.1	6434.1	1.37 139.2	6504.1	1.37 139.2	6634.1	1.37 139.3	6704.1	1.37 139.3	6834.1	1.37 139.4	9
40	6126.0	1.38 137.8	6258.0	1.38 138.0	6388.0	1.38 138.1	6518.0	1.38 138.2	6588.0	1.38 138.2	6718.0	1.38 138.3	6788.0	1.38 138.3	6918.0	1.38 138.4	40
1	6210.0	1.39 136.8	6342.0	1.39 137.0	6472.0	1.39 137.1	6602.0	1.39 137.2	6672.0	1.39 137.2	6802.0	1.39 137.3	6872.0	1.39 137.3	7002.0	1.39 137.4	1
2	6293.9	1.40 135.8	6426.0	1.40 136.0	6556.0	1.40 136.1	6686.0	1.40 136.2	6756.0	1.40 136.2	6886.0	1.40 136.3	6956.0	1.40 136.3	7086.0	1.40 136.4	2
3	6377.8	1.41 134.8	6510.0	1.41 135.0	6640.0	1.41 135.1	6770.0	1.41 135.2	6840.0	1.41 135.2	6970.0	1.41 135.3	7040.0	1.41 135.3	7170.0	1.41 135.4	3
4	6461.7	1.42 133.8	6594.0	1.42 134.0	6724.0	1.42 134.1	6854.0	1.42 134.2	6924.0	1.42 134.2	7054.0	1.42 134.3	7124.0	1.42 134.3	7254.0	1.42 134.4	4
45	6545.6	1.43 132.8	6678.0	1.43 133.0	6808.0	1.43 133.1	6938.0	1.43 133.2	7008.0	1.43 133.2	7138.0	1.43 133.3	7208.0	1.43 133.3	7338.0	1.43 133.4	45
6	6629.5	1.44 131.8	6762.0	1.44 132.0	6892.0	1.44 132.1	7022.0	1.44 132.2	7092.0	1.44 132.2	7222.0	1.44 132.3	7292.0	1.44 132.3	7422.0	1.44 132.4	6
7	6713.4	1.45 130.8	6846.0	1.45 131.0	6976.0	1.45 131.1	7106.0	1.45 131.2	7176.0	1.45 131.2	7306.0	1.45 131.3	7376.0	1.45 131.3	7506.0	1.45 131.4	7
8	6797.3	1.46 129.8	6930.0	1.46 130.0	7060.0	1.46 130.1	7190.0	1.46 130.2	7260.0	1.46 130.2	7390.0	1.46 130.3	7460.0	1.46 130.3	7590.0</		

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.		
	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.			
00	36 00.0	1.00	180.0	36 30.0	1.00	180.0	37 00.0	1.00	180.0	37 30.0	1.00	180.0	38 00.0	1.00	180.0	38 30.0	1.00	180.0	00
1	35 59.7	1.00	178.8	36 29.7	1.00	178.8	36 59.7	1.00	178.8	37 29.7	1.00	178.8	37 59.7	1.00	178.8	38 29.7	1.00	178.8	1
2	35 58.8	1.00	177.5	36 28.8	1.00	177.5	36 58.8	1.00	177.5	37 28.8	1.00	177.5	37 58.8	1.00	177.5	38 28.8	1.00	177.5	2
3	35 57.3	1.00	176.3	36 27.3	1.00	176.3	36 57.3	1.00	176.3	37 27.3	1.00	176.3	37 57.3	1.00	176.3	38 27.3	1.00	176.3	3
4	35 55.1	1.00	175.1	36 25.2	1.00	175.1	36 55.1	1.00	175.1	37 25.1	1.00	175.0	37 55.1	1.00	175.0	38 25.1	1.00	175.0	4
05	35 52.5	1.00	173.9	36 22.5	1.00	173.9	36 52.4	1.00	173.8	37 22.4	1.00	173.8	37 52.3	1.00	173.8	38 22.3	1.00	173.8	05
6	35 49.2	1.00	172.7	36 19.1	1.00	172.6	36 49.1	1.00	172.6	37 19.0	1.00	172.6	37 48.9	1.00	172.6	38 18.9	1.00	172.6	6
7	35 45.3	1.00	171.4	36 15.2	1.00	171.4	36 45.1	1.00	171.4	37 15.1	1.00	171.3	37 44.9	1.00	171.3	38 14.9	1.00	171.3	7
8	35 40.8	1.00	170.2	36 10.7	1.00	170.2	36 40.6	1.00	170.1	37 10.5	1.00	170.1	37 40.4	1.00	170.0	38 10.3	1.00	170.0	8
9	35 35.7	1.00	169.0	36 05.6	1.00	169.0	36 35.5	1.00	168.9	37 05.4	1.00	168.8	37 35.2	1.00	168.8	38 05.1	1.00	168.8	9
10	35 30.1	0.10	167.8	35 59.9	0.10	167.7	36 29.8	0.10	167.7	36 59.6	0.10	167.6	37 29.5	0.10	167.6	37 59.3	0.10	167.6	10
1	35 23.8	0.10	166.6	35 53.7	0.10	166.5	36 23.5	0.10	166.5	36 53.3	0.10	166.4	37 23.1	0.10	166.4	37 52.9	0.10	166.4	1
2	35 17.0	0.10	165.4	35 46.8	0.10	165.3	36 16.6	0.10	165.2	36 46.4	0.10	165.2	37 16.1	0.10	165.1	37 45.9	0.10	165.0	2
3	35 09.6	0.10	164.2	35 39.4	0.10	164.1	36 09.1	0.10	164.0	36 38.9	0.10	163.9	37 08.6	0.10	163.9	37 38.3	0.10	163.8	3
4	35 01.7	0.10	163.0	35 31.4	0.10	162.9	36 01.1	0.10	162.8	36 30.8	0.10	162.7	37 00.5	0.10	162.6	37 30.2	0.10	162.6	4
15	34 53.2	0.10	161.8	35 22.8	0.10	161.7	35 52.5	0.10	161.6	36 22.1	0.10	161.5	36 51.8	0.10	161.4	37 21.4	0.10	161.3	15
6	34 44.1	0.10	160.6	35 13.7	0.10	160.5	35 43.3	0.10	160.4	36 12.9	0.10	160.3	36 42.5	0.10	160.2	37 12.1	0.10	160.1	6
7	34 34.4	0.10	159.4	35 04.0	0.10	159.3	35 33.6	0.10	159.2	36 03.2	0.10	159.1	36 32.7	0.10	159.0	37 02.3	0.10	158.9	7
8	34 24.3	0.10	158.2	34 53.8	0.10	158.1	35 23.3	0.10	158.0	35 52.8	0.10	157.9	36 22.4	0.10	157.8	36 51.9	0.10	157.7	8
9	34 13.6	0.10	157.1	34 43.0	0.10	156.9	35 12.5	0.10	156.8	35 42.0	0.10	156.7	36 11.4	0.10	156.6	36 40.9	0.10	156.5	9
20	34 02.3	0.20	155.9	34 31.7	0.20	155.8	35 01.2	0.20	155.8	35 30.6	0.20	155.5	36 00.0	0.20	155.4	35 29.4	0.20	155.3	20
1	33 50.5	0.20	154.7	34 19.9	0.20	154.6	34 49.3	0.20	154.5	35 18.6	0.20	154.3	35 48.0	0.20	154.2	35 17.3	0.20	154.1	1
2	33 38.2	0.20	153.5	34 07.6	0.20	153.4	34 36.9	0.20	153.3	35 06.2	0.20	153.2	35 35.5	0.20	153.0	35 04.7	0.20	152.8	2
3	33 25.4	0.20	152.4	33 54.7	0.20	152.2	34 23.9	0.20	152.1	34 53.2	0.20	152.0	35 22.4	0.20	151.8	35 31.7	0.20	151.6	3
4	33 12.1	0.20	151.2	33 41.3	0.20	151.1	34 10.5	0.20	150.9	34 39.7	0.20	150.8	35 08.9	0.20	150.7	35 38.0	0.20	150.5	4
25	32 58.3	0.20	150.1	33 27.5	0.20	149.9	33 56.6	0.20	149.8	34 25.7	0.20	149.6	34 54.8	0.20	149.5	35 23.9	0.20	149.4	25
6	32 44.0	0.20	148.9	33 13.1	0.20	148.8	33 42.2	0.20	148.6	34 11.2	0.20	148.5	34 40.3	0.20	148.3	35 09.3	0.20	148.2	6
7	32 29.2	0.20	147.8	32 58.3	0.20	147.6	33 27.3	0.20	147.5	33 56.3	0.20	147.3	34 25.3	0.20	147.2	34 54.2	0.20	147.0	7
8	32 14.0	0.20	146.7	32 43.0	0.20	146.5	33 11.9	0.20	146.3	33 40.8	0.20	146.2	34 09.8	0.20	146.0	34 38.7	0.20	145.9	8
9	31 58.3	0.20	145.5	32 27.2	0.20	145.4	32 56.1	0.20	145.2	33 24.9	0.20	145.1	33 53.8	0.20	144.9	34 22.6	0.20	144.6	9
30	31 42.1	0.20	144.4	32 10.9	0.20	144.2	32 39.8	0.20	144.1	33 08.6	0.20	143.9	33 37.4	0.20	143.7	34 06.1	0.20	143.6	30
1	31 25.5	0.20	143.3	31 54.3	0.20	143.1	32 23.0	0.20	143.0	32 51.8	0.20	142.8	33 20.5	0.20	142.6	33 49.2	0.20	142.4	1
2	31 06.4	0.20	142.2	31 37.1	0.20	142.0	32 05.8	0.20	141.8	32 34.5	0.20	141.7	33 03.2	0.20	141.5	33 31.8	0.20	141.3	2
3	30 51.0	0.20	141.1	31 19.6	0.20	140.9	31 48.5	0.20	140.7	32 16.8	0.20	140.6	32 45.4	0.20	140.4	33 14.0	0.20	140.2	3
4	30 33.1	0.20	140.0	31 01.6	0.20	139.8	31 30.2	0.20	139.6	31 58.7	0.20	139.4	32 27.2	0.20	139.3	32 55.7	0.20	139.1	4
35	30 14.7	0.20	138.9	30 43.2	0.20	138.7	31 11.7	0.20	138.5	31 40.2	0.20	138.3	32 08.6	0.20	138.2	32 37.1	0.20	138.0	35
6	29 56.0	0.20	137.8	30 24.4	0.20	137.6	30 52.9	0.20	137.4	31 21.3	0.20	137.2	31 49.6	0.20	137.1	32 18.0	0.20	136.9	6
7	29 36.9	0.20	136.7	30 05.3	0.20	136.5	30 33.6	0.20	136.3	31 01.9	0.20	136.2	31 30.3	0.20	136.0	31 58.6	0.20	135.8	7
8	29 17.4	0.20	135.7	29 45.7	0.20	135.5	30 14.0	0.20	135.3	30 42.2	0.20	135.1	31 10.5	0.20	134.9	31 38.7	0.20	134.7	8
9	28 57.5	0.20	134.6	29 25.8	0.20	134.4	29 54.0	0.20	134.2	30 22.2	0.20	134.0	30 50.3	0.20	133.8	31 06.4	0.20	133.6	9
40	28 37.3	0.20	133.5	29 05.4	0.20	133.3	29 33.6	0.20	133.1	30 01.7	0.20	132.9	30 29.8	0.20	132.7	30 57.9	0.20	132.5	40
1	28 16.7	0.20	132.5	28 44.8	0.20	132.3	29 12.9	0.20	132.1	29 40.9	0.20	131.9	30 09.0	0.20	131.7	30 37.0	0.20	131.4	1
2	27 55.7	0.20	131.4	28 23.8	0.20	131.2	28 51.8	0.20	131.0	29 19.8	0.20	130.8	29 47.7	0.20	130.6	30 15.0	0.20	130.4	2
3	27 34.4	0.20	130.4	28 02.4	0.20	130.2	28 30.3	0.20	130.0	28 58.3	0.20	129.7	29 26.2	0.20	129.5	29 54.1	0.20	129.3	3
4	27 12.8	0.20	129.3	27 40.7	0.20	129.1	28 06.6	0.20	128.9	28 34.4	0.20	128.7	29 04.3	0.20	128.5	29 32.1	0.20	128.3	4
45	26 50.9	0.20	128.3	27 18.7	0.20	128.1	27 46.5	0.20	127.9	28 14.3	0.20	127.7	28 42.1	0.20	127.4	29 09.8	0.20	127.2	45
6	26 28.6	0.20	127.3	26 56.4	0.20	127.1	27 24.1	0.20	126.8	27 51.9	0.20	126.6	28 19.6	0.20	126.4	28 47.3	0.20	126.2	6
7	26 06.0	0.20	126.2	26 33.7	0.20	126.0	27 01.4	0.20	125.8	27 29.1	0.20	125.6	27 56.8	0.20	125.4	28 24.4	0.20	125.2	7
8	25 43.2	0.20	125.2	26 10.8	0.20	125.0	26 38.4	0.20	124.8	27 06.0	0.20	124.6	27 33.6	0.20	124.4	28 01.2	0.20	124.2	8
9	25 20.0	0.20	124.0	25 47.6	0.20	123.8	26 15.2	0.20	123.6	26 42.7	0.20	123.4	27 10.2	0.20	123.2	27 37.8	0.20	123.0	9
50	24 56.6	0.20	123.2	25 24.1	0.20	123.0	25 51.6	0.20	122.8	26 19.1	0.20	122.6	26 46.6	0.20	122.3	27 14.0	0.20	122.1	50
1	24 32.9	0.20	122.2	25 00.4	0.20	122.0	25 27.7	0.20	121.8	25 55.2	0.20	121.5	26 22.6	0.20	121.3	26 50.0	0.20	121.1	1
2	24 06.9	0.20	121.2	24 36.3	0.20	121.0	25 03.7	0.20	120.8	25 31.1	0.20	120.5	25 58.5	0.20	120.3	26 25.8	0.20	120.1	2
3	23 44.7	0.20	120.2	24 12.1															

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Az.															
00	20 00.0	1.00 180.0	19 30.0	1.00 180.0	19 00.0	1.00 180.0	18 30.0	1.00 180.0	18 00.0	1.00 180.0	17 30.0	1.00 180.0	17 00.0	1.00 180.0	16 30.0	1.00 180.0	00
1	19 59.7	1.00 178.9	19 29.7	1.00 179.0	18 59.7	1.00 179.0	18 29.7	1.00 179.0	17 59.7	1.00 179.0	17 29.7	1.00 179.0	16 59.7	1.00 179.0	16 29.7	1.00 179.0	1
2	19 59.0	1.00 177.9	19 29.0	1.00 177.9	18 59.0	1.00 177.9	18 29.0	1.00 177.9	17 59.0	1.00 177.9	17 29.0	1.00 177.9	16 59.0	1.00 177.9	16 29.0	1.00 178.0	2
3	19 57.7	1.00 176.8	19 27.7	1.00 176.9	18 57.7	1.00 176.9	18 27.7	1.00 176.9	17 57.7	1.00 176.9	17 27.7	1.00 176.9	16 57.7	1.00 176.9	16 27.7	1.00 176.9	3
4	19 55.9	1.00 175.8	19 25.9	1.00 175.8	18 55.9	1.00 175.8	18 25.9	1.00 175.8	17 55.9	1.00 175.9	17 25.9	1.00 175.9	16 55.9	1.00 175.9	16 25.9	1.00 175.9	4
05	19 53.5	1.00 174.7	19 23.6	1.00 174.8	18 53.6	1.00 174.8	18 23.6	1.00 174.8	17 53.6	1.00 174.8	17 23.7	1.00 174.8	16 53.7	1.00 174.9	16 23.7	1.00 174.9	05
6	19 50.7	1.00 173.7	19 20.7	1.00 173.7	18 50.8	1.00 173.7	18 20.8	1.00 173.8	17 50.8	1.00 173.8	17 20.9	1.00 173.8	16 50.9	1.00 173.8	16 21.0	1.00 173.9	6
7	19 47.3	1.00 172.6	19 17.4	1.00 172.7	18 47.4	1.00 172.7	18 17.5	1.00 172.7	17 47.6	1.00 172.8	17 17.6	1.00 172.8	16 47.7	1.00 172.8	16 17.7	1.00 172.9	7
8	19 43.5	1.00 171.6	19 13.5	1.00 171.6	18 43.6	1.00 171.7	18 13.7	1.00 171.7	17 43.7	1.00 171.7	17 13.8	1.00 171.8	16 43.9	1.00 171.8	16 14.0	1.00 171.8	8
9	19 39.1	1.00 170.5	19 09.2	1.00 170.6	18 39.3	1.00 170.6	18 09.4	1.00 170.7	17 39.4	1.00 170.7	17 09.5	1.00 170.7	16 39.6	1.00 170.8	16 09.7	1.00 170.8	9
10	19 34.2	1.00 169.5	19 04.3	1.00 169.5	18 34.4	1.00 169.6	18 04.5	1.00 169.6	17 34.6	1.00 169.7	17 04.8	1.00 169.7	16 34.9	1.00 169.8	16 05.0	1.00 169.8	10
11	19 28.8	1.00 168.4	18 58.9	1.00 168.5	18 29.1	1.00 168.5	17 59.2	1.00 168.6	17 29.3	1.00 168.6	16 59.5	1.00 168.7	16 29.6	1.00 168.7	15 59.7	1.00 168.8	11
12	19 22.9	1.00 167.4	18 53.1	1.00 167.4	18 23.2	1.00 167.5	17 53.3	1.00 167.6	17 23.5	1.00 167.6	16 53.7	1.00 167.7	16 23.9	1.00 167.7	15 54.0	1.00 167.8	12
13	19 16.5	1.00 166.3	18 46.7	1.00 166.4	18 16.9	1.00 166.5	17 47.1	1.00 166.5	17 17.3	1.00 166.6	16 47.4	1.00 166.6	16 17.6	1.00 166.7	15 47.8	1.00 166.8	13
14	19 09.6	1.00 165.3	18 39.8	1.00 165.4	18 10.0	1.00 165.4	17 40.3	1.00 165.5	17 10.5	1.00 165.6	16 40.7	1.00 165.6	16 10.9	1.00 165.7	15 41.1	1.00 165.7	14
15	19 02.2	1.00 164.3	18 32.5	1.00 164.3	18 02.7	1.00 164.4	17 33.0	1.00 164.5	17 03.2	1.00 164.5	16 33.4	1.00 164.6	16 03.7	1.00 164.7	15 33.9	1.00 164.7	15
16	18 54.3	1.00 163.2	18 24.6	1.00 163.3	17 54.9	1.00 163.4	17 25.2	1.00 163.4	16 55.5	1.00 163.5	16 25.7	1.00 163.5	15 56.0	1.00 163.6	15 26.3	1.00 163.7	16
17	18 46.0	1.00 162.2	18 16.3	1.00 162.3	17 46.6	1.00 162.3	17 16.9	1.00 162.4	16 47.2	1.00 162.5	16 17.5	1.00 162.6	15 47.8	1.00 162.6	15 18.1	1.00 162.7	17
18	18 37.1	1.00 161.2	18 07.5	1.00 161.2	17 37.8	1.00 161.3	17 08.2	1.00 161.4	16 38.5	1.00 161.5	16 08.9	1.00 161.6	15 39.2	1.00 161.6	15 09.5	1.00 161.7	18
19	18 27.8	1.00 160.1	17 58.2	1.00 160.2	17 28.6	1.00 160.3	16 58.9	1.00 160.4	16 29.3	1.00 160.5	15 59.7	1.00 160.5	15 30.1	1.00 160.6	15 00.5	1.00 160.7	19
20	18 18.0	1.00 159.1	17 48.4	1.00 159.2	17 18.8	1.00 159.3	16 49.3	1.00 159.4	16 19.7	1.00 159.5	15 50.1	1.00 159.5	15 20.5	1.00 159.6	14 50.9	1.00 159.7	20
1	18 07.7	1.00 158.1	17 38.2	1.00 158.2	17 08.6	1.00 158.3	16 39.1	1.00 158.4	16 09.6	1.00 158.4	15 40.0	1.00 158.5	15 10.5	1.00 158.6	14 40.9	1.00 158.7	1
2	17 56.9	1.00 157.0	17 27.4	1.00 157.1	16 58.0	1.00 157.2	16 28.5	1.00 157.3	15 59.0	1.00 157.4	15 29.5	1.00 157.5	15 00.0	1.00 157.6	14 30.5	1.00 157.7	2
3	17 45.7	1.00 156.0	17 16.3	1.00 156.1	16 46.8	1.00 156.2	16 17.4	1.00 156.3	15 47.9	1.00 156.4	15 18.5	1.00 156.5	14 49.0	1.00 156.6	14 19.6	1.00 156.7	3
4	17 34.0	1.00 155.0	17 04.6	1.00 155.1	16 35.3	1.00 155.2	16 05.9	1.00 155.3	15 36.4	1.00 155.4	15 07.0	1.00 155.5	14 37.6	1.00 155.6	14 08.2	1.00 155.7	4
5	17 21.9	1.00 154.0	16 52.6	1.00 154.1	16 23.2	1.00 154.2	15 53.9	1.00 154.3	15 24.5	1.00 154.4	14 55.2	1.00 154.5	14 25.8	1.00 154.6	13 56.4	1.00 154.7	5
6	17 09.3	1.00 153.0	16 40.0	1.00 153.1	16 10.7	1.00 153.2	15 41.4	1.00 153.3	15 12.1	1.00 153.4	14 42.8	1.00 153.5	14 13.5	1.00 153.6	13 44.2	1.00 153.8	6
7	16 56.3	1.00 152.0	16 27.1	1.00 152.1	15 57.8	1.00 152.2	15 28.6	1.00 152.3	14 59.3	1.00 152.4	14 30.0	1.00 152.5	14 00.8	1.00 152.6	13 31.5	1.00 152.8	7
8	16 42.9	1.00 151.0	16 13.7	1.00 151.1	15 44.5	1.00 151.2	15 15.3	1.00 151.3	14 46.1	1.00 151.4	14 16.8	1.00 151.6	13 47.6	1.00 151.7	13 18.4	1.00 151.8	8
9	16 29.0	1.00 150.0	15 59.8	1.00 150.1	15 30.7	1.00 150.2	15 01.5	1.00 150.3	14 32.4	1.00 150.4	14 03.2	1.00 150.6	13 34.0	1.00 150.7	13 04.9	1.00 150.8	9
30	16 14.7	1.00 149.0	15 45.6	1.00 149.1	15 16.5	1.00 149.2	14 47.4	1.00 149.3	14 18.3	1.00 149.5	13 49.2	1.00 149.6	13 20.1	1.00 149.7	12 50.9	1.00 149.8	30
1	15 59.9	1.00 148.0	15 30.9	1.00 148.1	15 01.8	1.00 148.2	14 32.8	1.00 148.3	14 03.7	1.00 148.5	13 34.7	1.00 148.6	13 05.6	1.00 148.7	12 36.6	1.00 148.9	1
2	15 44.8	1.00 147.0	15 15.8	1.00 147.1	14 46.8	1.00 147.2	14 17.8	1.00 147.4	13 48.8	1.00 147.5	13 19.8	1.00 147.6	12 50.8	1.00 147.8	12 18.1	1.00 147.9	2
3	15 29.2	1.00 146.0	15 00.3	1.00 146.1	14 31.4	1.00 146.2	14 02.4	1.00 146.4	13 33.5	1.00 146.5	13 04.5	1.00 146.6	12 35.6	1.00 146.8	12 06.6	1.00 146.9	3
4	15 13.2	1.00 145.0	14 44.4	1.00 145.1	14 15.5	1.00 145.3	13 46.6	1.00 145.4	13 17.7	1.00 145.5	12 48.8	1.00 145.7	12 19.9	1.00 145.8	11 51.1	1.00 146.0	4
35	14 56.9	1.00 144.0	14 28.1	1.00 144.1	13 59.3	1.00 144.3	13 30.4	1.00 144.4	13 01.6	1.00 144.6	12 32.8	1.00 144.7	12 03.9	1.00 144.8	11 35.1	1.00 145.0	35
6	14 40.1	1.00 143.0	14 11.4	1.00 143.2	13 42.6	1.00 143.3	13 13.8	1.00 143.4	12 45.1	1.00 143.6	12 16.3	1.00 143.7	11 47.5	1.00 143.9	11 18.7	1.00 144.0	6
7	14 23.0	1.00 142.0	13 54.3	1.00 142.2	13 25.6	1.00 142.3	12 56.9	1.00 142.5	12 28.2	1.00 142.6	11 59.4	1.00 142.8	11 30.7	1.00 142.9	11 02.0	1.00 143.1	7
8	14 05.5	1.00 141.1	13 36.8	1.00 141.2	13 08.2	1.00 141.4	12 39.5	1.00 141.5	12 10.9	1.00 141.7	11 42.2	1.00 141.8	11 13.6	1.00 142.0	10 44.9	1.00 142.1	8
9	13 47.6	1.00 140.1	13 19.0	1.00 140.2	12 50.4	1.00 140.4	12 21.8	1.00 140.5	11 53.2	1.00 140.7	11 24.6	1.00 140.9	10 56.0	1.00 141.0	10 27.4	1.00 141.2	9
40	13 29.3	1.00 139.1	13 00.8	1.00 139.3	12 32.3	1.00 139.4	12 03.7	1.00 139.6	11 35.2	1.00 139.7	11 06.7	1.00 139.9	10 38.1	1.00 140.1	10 09.6	1.00 140.2	40
1	13 10.7	1.00 138.1	12 42.2	1.00 138.3	12 13.8	1.00 138.5	11 45.3	1.00 138.6	11 16.8	1.00 138.8	10 48.3	1.00 138.9	10 19.8	1.00 139.1	9 51.4	1.00 139.3	1
2	12 51.7	1.00 137.2	12 23.3	1.00 137.3	11 54.9	1.00 137.5	11 26.5	1.00 137.7	10 58.1	1.00 137.8	10 29.7	1.00 138.0	10 01.2	1.00 138.2	9 32.8	1.00 138.3	2
3	12 32.4	1.00 136.2	12 04.1	1.00 136.4	11 35.7	1.00 136.6	11 07.4	1.00 136.7	10 39.0	1.00 136.9	10 10.6	1.00 137.1	9 42.3	1.00 137.2	9 13.9	1.00 137.4	3
4	12 12.8	1.00 135.3	11 44.1	1.00 135.4	11 16.2	1.00 135.6	10 47.9	1.00 135.8	10 19.6	1.00 136.0	9 51.3	1.00 136.1	9 23.0	1.00 136.3	8 54.7	1.00 136.4	4
45	11 52.8	1.00 134.3	11 24.5	1.00 134.5	10 56.3	1.00 134.7	10 28.1	1.00 134.8	9 59.8	1.00 135.0	9 31.6	1.00 135.2	9 03.3	1.00 135.3	8 35.1	1.00 135.5	45
6	11 32.4	1.00 133.4	11 04.3	1.00 133.5	10 36.1	1.00 133.7	10 07.9	1.00 133.9	9 39.8	1.00 134.1	9 11.6	1.00 134.2	8 43.4	1.00 134.4	8 15.2	1.00 134.6	6
7	11 11.8	1.00 132.4	10 43.7	1.00 132.6	10 15.6												

H.A.	12° 00'			12° 30'			13° 00'			13° 30'			14° 00'			14° 30'			15° 00'			15° 30'			H.A.
	Alt.	Ad At.	Az.																						
00	40 00.0	1.001	180.0	40 30.0	1.001	180.0	41 00.0	1.001	180.0	41 30.0	1.001	180.0	42 00.0	1.001	180.0	42 30.0	1.001	180.0	43 00.0	1.001	180.0	43 30.0	1.001	180.0	00
1	39 59.7	1.002	178.7	40 29.7	1.002	178.7	40 59.7	1.002	178.7	41 29.7	1.002	178.7	41 59.7	1.002	178.7	42 29.7	1.002	178.7	42 59.7	1.002	178.7	43 29.7	1.002	178.7	1
2	39 58.7	1.003	177.4	40 28.7	1.003	177.4	40 58.7	1.003	177.4	41 28.7	1.003	177.4	41 58.7	1.003	177.4	42 28.7	1.003	177.4	42 58.7	1.003	177.4	43 28.7	1.003	177.4	2
3	39 57.2	1.004	176.2	40 27.2	1.004	176.2	40 57.2	1.004	176.2	41 27.2	1.004	176.2	41 57.2	1.004	176.2	42 27.2	1.004	176.2	42 57.2	1.004	176.2	43 27.2	1.004	176.2	3
4	39 55.0	1.005	174.9	40 25.0	1.005	174.9	40 54.9	1.005	174.8	41 24.9	1.005	174.8	41 54.9	1.005	174.8	42 24.8	1.005	174.8	42 54.8	1.005	174.7	43 24.8	1.005	174.7	4
05	39 52.2	1.006	173.6	40 22.1	1.006	173.6	40 52.1	1.006	173.6	41 22.0	1.006	173.5	41 52.0	1.006	173.5	42 21.9	1.006	173.4	42 51.9	1.006	173.4	43 21.8	1.006	173.4	05
6	39 48.7	1.007	172.4	40 18.7	1.007	172.3	40 48.6	1.007	172.3	41 18.5	1.007	172.2	41 48.5	1.007	172.2	42 18.4	1.007	172.1	42 48.3	1.007	172.1	43 18.3	1.007	172.0	6
7	39 44.7	1.008	171.1	40 14.6	1.008	171.0	40 44.5	1.008	171.0	41 14.4	1.008	170.9	41 44.3	1.008	170.9	42 14.2	1.008	170.8	42 44.1	1.008	170.8	43 14.1	1.008	170.7	7
8	39 40.0	1.009	169.8	40 09.9	1.009	169.8	40 39.8	1.009	169.7	41 09.7	1.009	169.6	41 39.5	1.009	169.6	42 09.4	1.009	169.5	42 39.3	1.009	169.5	43 09.2	1.009	169.4	8
9	39 34.7	1.010	168.5	40 04.6	1.010	168.4	40 34.4	1.010	168.4	41 04.3	1.010	168.4	41 34.1	1.010	168.3	42 04.0	1.010	168.2	42 33.8	1.010	168.2	43 03.7	1.010	168.1	9
10	39 28.8	09 11	167.3	39 58.6	09 11	167.2	40 28.5	09 11	167.1	40 58.3	09 11	167.1	41 28.1	09 11	167.0	41 57.9	09 11	166.9	42 27.8	09 11	166.9	42 57.6	09 11	166.8	10
1	39 22.3	09 12	166.0	39 52.1	09 12	166.0	40 21.9	09 12	165.9	40 51.7	09 12	165.8	41 21.5	09 12	165.7	41 51.3	09 12	165.6	42 21.0	09 12	165.6	42 50.8	09 12	165.5	1
2	39 15.2	09 13	164.8	39 45.0	09 13	164.7	40 14.7	09 13	164.6	40 44.5	09 13	164.5	41 14.2	09 13	164.4	41 44.0	09 13	164.3	42 13.7	09 13	164.3	42 43.4	09 13	164.2	2
3	39 07.5	09 14	163.5	39 37.2	09 14	163.4	40 06.9	09 14	163.3	40 36.7	09 14	163.3	41 06.4	09 14	163.2	41 36.1	09 14	163.1	42 05.8	09 14	163.0	42 35.5	09 14	162.9	3
4	38 59.2	09 15	162.3	39 28.9	09 15	162.2	39 58.6	09 15	162.1	40 28.2	09 15	162.0	40 57.9	09 15	161.9	41 27.6	09 15	161.8	41 57.2	09 15	161.7	42 26.9	09 15	161.6	4
15	38 50.4	09 16	161.0	39 20.0	09 16	160.9	39 49.6	09 16	160.8	40 19.2	09 16	160.7	40 48.9	09 16	160.6	41 18.5	09 16	160.5	41 48.1	09 16	160.4	42 17.7	09 16	160.3	15
6	38 40.9	09 17	159.8	39 10.5	09 17	159.7	39 40.1	09 17	159.6	40 09.7	09 17	159.5	40 39.2	09 17	159.4	41 08.8	09 17	159.2	41 38.3	09 17	159.1	42 07.9	09 17	159.0	6
7	38 30.9	09 18	158.6	39 00.4	09 18	158.4	39 30.0	09 18	158.3	39 59.5	09 18	158.2	40 29.0	09 18	158.1	40 58.5	09 18	158.0	41 28.0	09 18	157.9	41 57.5	09 18	157.7	7
8	38 20.3	09 19	157.3	38 49.8	09 19	157.2	39 19.3	09 19	157.1	39 48.8	09 19	157.0	40 18.2	09 19	156.8	40 47.7	09 19	156.7	41 17.1	09 19	156.6	41 46.5	09 19	156.5	8
9	38 09.2	09 19	156.1	38 38.6	09 20	156.0	39 08.0	09 20	155.9	39 37.5	09 20	155.7	40 06.9	09 20	155.6	40 36.2	09 20	155.5	41 05.6	09 20	155.3	41 35.0	09 20	155.2	9
20	37 57.5	09 20	154.9	38 26.9	09 20	154.8	38 56.2	09 21	154.6	39 25.6	09 21	154.5	39 54.9	09 21	154.4	40 24.3	09 21	154.2	40 53.6	09 21	154.1	41 22.9	09 21	153.9	20
1	37 45.3	09 21	153.7	38 14.6	09 21	153.5	38 43.9	09 21	153.4	39 13.2	09 21	153.3	39 42.5	09 21	153.1	40 11.7	09 21	153.0	40 41.0	09 21	152.8	41 10.3	09 21	152.7	1
2	37 32.5	09 22	152.5	38 01.8	09 22	152.2	38 31.0	09 22	152.0	39 03.3	09 22	151.9	39 32.5	09 22	151.7	40 01.1	09 22	151.5	39 58.7	09 22	151.4	40 77.3	09 22	151.4	2
3	37 19.3	09 23	151.3	37 48.5	09 23	151.1	38 17.6	09 23	150.8	38 46.8	09 23	150.8	39 15.9	09 23	150.7	39 45.1	09 23	150.5	40 14.2	09 23	150.4	40 43.3	09 23	150.2	3
4	37 05.5	09 24	150.1	37 34.6	09 24	149.9	38 03.7	09 24	149.8	38 32.8	09 24	149.6	39 01.9	09 24	149.5	39 31.0	09 24	149.3	40 00.0	09 24	149.1	40 29.1	09 24	149.0	4
25	36 51.2	09 25	148.9	37 20.2	09 25	148.7	37 49.3	09 25	148.6	38 18.3	09 25	148.4	38 47.3	09 25	148.3	39 16.3	09 25	148.1	39 45.3	09 25	147.9	40 14.3	09 25	147.8	25
6	36 36.4	09 26	147.7	37 05.4	09 26	147.6	37 34.3	09 26	147.4	38 03.3	09 26	147.2	38 32.3	09 26	147.1	39 01.2	09 26	146.9	39 30.1	09 26	146.7	39 59.0	09 26	146.6	6
7	36 21.1	09 26	146.5	36 50.0	09 26	146.4	37 18.9	09 26	146.2	37 47.8	09 26	146.0	38 16.7	09 26	145.9	38 45.6	09 26	145.7	39 14.4	09 26	145.5	39 43.2	09 26	145.3	7
8	36 05.3	09 27	145.4	36 34.2	09 27	145.2	37 03.0	09 27	145.0	37 31.8	09 27	144.9	38 00.6	09 27	144.7	38 29.4	09 27	144.5	38 58.2	09 27	144.3	39 27.0	09 27	144.1	8
9	35 49.1	09 28	144.2	36 17.9	09 28	144.0	36 46.6	09 28	143.9	37 15.4	09 28	143.7	37 44.1	09 28	143.5	38 12.8	09 28	143.3	38 41.6	09 28	143.1	39 10.2	09 28	142.9	9
30	35 32.4	09 29	143.1	36 01.1	09 29	142.9	36 29.8	09 29	142.7	36 58.5	09 29	142.5	37 27.1	09 29	142.3	37 55.8	09 29	142.1	38 24.4	09 29	142.0	38 53.0	09 29	141.8	30
1	35 15.2	09 30	141.9	35 43.9	09 30	141.7	36 12.5	09 30	141.5	36 41.1	09 30	141.4	37 09.7	09 30	141.2	37 38.3	09 30	141.0	38 06.8	09 30	140.8	38 35.4	09 30	140.6	1
2	34 57.6	09 30	140.8	35 26.2	09 30	140.6	35 54.8	09 30	140.4	36 23.3	09 30	140.2	36 51.8	09 30	140.0	37 20.3	09 30	139.8	37 48.8	09 30	139.6	38 17.3	09 30	139.4	2
3	34 39.6	09 31	139.6	35 08.1	09 31	139.4	35 36.6	09 31	139.3	36 05.0	09 31	139.1	36 33.5	09 31	138.9	37 01.9	09 31	138.7	37 30.3	09 31	138.5	37 58.7	09 31	138.3	3
4	34 21.1	09 31	138.5	34 49.6	09 32	138.3	35 18.0	09 32	138.1	35 46.4	09 32	137.9	36 14.8	09 32	137.7	36 43.1	09 32	137.5	37 11.4	09 32	137.3	37 39.8	09 32	137.1	4
35	34 02.3	09 32	137.4	34 30.6	09 32	137.2	34 59.0	09 32	137.0	35 27.3	09 32	136.8	35 55.6	09 32	136.6	36 23.9	09 32	136.4	36 52.1	09 32	136.2	37 20.4	09 32	136.0	35
6	33 43.0	09 33	136.3	34 11.3	09 33	136.1	34 39.6	09 33	135.9	35 07.8	09 33	135.7	35 36.0	09 33	135.5	36 04.2	09 33	135.2	36 32.4	09 33	135.0	37 00.6	09 33	134.8	6
7	33 23.3	09 33	135.2	33 51.6	09 34	135.0	34 19.8	09 34	134.8	34 77.9	09 34	134.5	35 16.1	09 34	134.3	35 44.2	09 34	134.1	36 12.3	09 34	133.9	36 40.4	09 34	133.7	7
8	33 03.3	09 34	134.1	33 31.4	09 34	133.9	33 59.6	09 34	133.7	34 27.7	09 34	133.4	34 55.8	09 34	133.2	35 23.8	09 34	133.0	35 51.9	09 34	132.8	36 19.9	09 34	132.6	8
9	32 42.9	09 34	133.0	33 10.9	09 34	132.8	33 39.0	09 35	132.6	34 07.0	09 35	132.3	34 35.0	09 35	1										

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.																	
	Alt.	Ad At.																																
00	1600.0	1.000	180.0	1530.0	1.000	180.0	1509.0	1.000	180.0	1439.0	1.000	180.0	1400.0	1.000	180.0	1330.0	1.000	180.0	1260.0	1.000	180.0	1200.0	1.000	180.0	1130.0	1.000	180.0	1060.0	1.000	180.0	00			
1	1559.7	1.001	179.0	1529.8	1.001	179.0	1459.8	1.001	179.0	1429.8	1.001	179.0	1359.8	1.001	179.0	1329.8	1.001	179.0	1259.8	1.001	179.0	1229.8	1.001	179.0	1159.8	1.001	179.0	1089.8	1.001	179.0	1019.8	1.001	179.0	1
2	1559.0	1.002	178.0	1529.0	1.002	178.0	1459.0	1.002	178.0	1429.0	1.002	178.0	1359.0	1.002	178.0	1329.0	1.002	178.0	1259.0	1.002	178.0	1229.0	1.002	178.0	1159.0	1.002	178.0	1089.0	1.002	178.0	1019.0	1.002	178.0	2
3	1557.7	1.003	176.9	1527.8	1.003	177.0	1457.8	1.003	177.0	1427.8	1.003	177.0	1357.8	1.003	177.0	1327.8	1.003	177.0	1257.8	1.003	177.0	1227.8	1.003	177.0	1157.8	1.003	177.0	1087.8	1.003	177.0	1017.8	1.003	177.0	3
4	1556.0	1.004	175.9	1526.0	1.004	175.9	1456.0	1.004	176.0	1426.1	1.004	176.0	1356.1	1.004	176.0	1326.1	1.004	176.0	1256.1	1.004	176.0	1226.1	1.004	176.0	1156.1	1.004	176.0	1086.1	1.004	176.0	1016.1	1.004	176.0	4
5	1553.8	1.006	174.9	1523.8	1.006	174.9	1453.8	1.006	175.0	1423.8	1.006	175.0	1353.9	1.006	175.0	1323.9	1.006	175.0	1253.9	1.006	175.0	1223.9	1.006	175.0	1153.9	1.006	175.0	1083.9	1.006	175.0	1013.9	1.006	175.0	05
6	1551.0	1.005	173.9	1521.0	1.005	173.9	1451.1	1.005	174.0	1421.1	1.005	174.0	1351.2	1.005	174.0	1321.2	1.005	174.0	1251.2	1.005	174.0	1221.2	1.005	174.0	1151.2	1.005	174.0	1081.2	1.005	174.0	1011.2	1.005	174.0	6
7	1547.8	1.006	172.9	1517.8	1.006	172.9	1447.9	1.006	172.9	1417.9	1.006	173.0	1348.0	1.006	173.0	1318.0	1.006	173.0	1248.1	1.006	173.0	1218.1	1.006	173.0	1148.1	1.006	173.0	1078.1	1.006	173.0	1008.1	1.006	173.0	7
8	1544.0	1.007	171.9	1514.1	1.007	171.9	1444.2	1.007	171.9	1414.2	1.007	172.0	1344.3	1.007	172.0	1314.4	1.007	172.0	1244.4	1.007	172.0	1214.5	1.007	172.0	1144.5	1.007	172.0	1074.5	1.007	172.0	1004.5	1.007	172.0	8
9	1539.8	1.008	170.9	1509.9	1.008	170.9	1440.0	1.008	170.9	1410.1	1.008	171.0	1340.1	1.008	171.0	1310.2	1.008	171.0	1240.3	1.008	171.0	1210.4	1.008	171.0	1140.4	1.008	171.0	1070.4	1.008	171.0	1000.4	1.008	171.0	9
10	1535.1	1.009	169.8	1505.2	1.009	169.9	1435.3	1.009	169.9	1405.4	1.009	170.0	1335.5	1.009	170.0	1305.6	1.009	170.0	1235.7	1.009	170.0	1205.8	1.009	170.0	1135.8	1.009	170.0	1065.8	1.009	170.0	995.8	1.009	170.0	10
1	1529.9	1.010	168.8	1500.0	1.010	168.9	1430.3	1.010	168.9	1400.3	1.010	169.0	1330.4	1.010	169.0	1300.5	1.010	169.0	1230.6	1.010	169.0	1200.7	1.010	169.0	1130.7	1.010	169.0	1060.7	1.010	169.0	990.7	1.010	169.0	1
2	1524.2	09 10	167.8	1494.3	09 10	167.9	1424.5	09 10	167.9	1354.6	09 10	168.0	1324.8	09 10	168.0	1254.9	09 10	168.0	1225.1	09 10	168.0	1155.2	09 10	168.0	1085.2	09 10	168.0	1015.2	09 10	168.0	945.2	09 10	168.0	2
3	1518.0	09 11	166.8	1488.2	09 11	166.9	1418.3	09 11	166.9	1348.5	09 11	167.0	1318.7	09 11	167.0	1248.9	09 11	167.0	1219.0	09 11	167.0	1149.2	09 11	167.0	1079.2	09 11	167.0	1009.2	09 11	167.0	939.2	09 11	167.0	3
4	1511.3	09 12	165.8	1481.5	09 12	165.9	1411.7	09 12	165.9	1341.9	09 12	166.0	1312.1	09 12	166.0	1242.3	09 12	166.0	1212.5	09 12	166.0	1142.8	09 12	166.0	1072.8	09 12	166.0	1002.8	09 12	166.0	932.8	09 12	166.0	4
15	1504.2	09 13	164.8	1474.4	09 13	164.9	1404.6	09 13	164.9	1334.9	09 13	165.0	1305.1	09 13	165.0	1235.3	09 13	165.0	1205.6	09 13	165.0	1135.8	09 13	165.0	1065.8	09 13	165.0	995.8	09 13	165.0	925.8	09 13	165.0	15
6	1456.5	09 14	163.8	1468.6	09 14	163.9	1357.1	09 14	163.9	1274.9	09 14	164.0	1257.6	09 14	164.0	1227.9	09 14	164.0	1158.1	09 14	164.0	1088.1	09 14	164.0	1018.1	09 14	164.0	948.1	09 14	164.0	878.1	09 14	164.0	6
7	1448.4	09 14	162.8	1462.8	09 14	162.9	1349.1	09 14	162.9	1319.4	09 14	163.0	1249.7	09 14	163.0	1220.0	09 14	163.0	1150.2	09 14	163.0	1080.2	09 14	163.0	1010.2	09 14	163.0	940.2	09 14	163.0	870.2	09 14	163.0	7
8	1439.9	09 15	161.8	1456.9	09 15	161.9	1340.6	09 15	161.9	1310.9	09 15	162.0	1241.2	09 15	162.0	1211.6	09 15	162.0	1141.9	09 15	162.0	1071.9	09 15	162.0	1001.9	09 15	162.0	931.9	09 15	162.0	861.9	09 15	162.0	8
9	1430.8	09 16	160.8	1451.2	09 16	160.9	1331.6	09 16	161.0	1302.0	09 16	161.0	1232.3	09 16	161.0	1202.7	09 16	161.0	1133.1	09 16	161.0	1063.1	09 16	161.0	993.1	09 16	161.0	923.1	09 16	161.0	853.1	09 16	161.0	9
20	1421.4	09 17	159.8	1351.8	09 17	159.9	1322.2	09 17	159.9	1252.6	09 17	160.0	1223.0	09 17	160.0	1153.4	09 17	160.0	1123.8	09 17	160.0	1054.2	09 17	160.0	984.2	09 17	160.0	914.2	09 17	160.0	844.2	09 17	160.0	20
1	1411.4	09 17	158.8	1341.8	09 17	158.9	1312.3	09 17	158.9	1242.8	09 17	159.0	1213.2	09 17	159.0	1143.6	09 17	159.0	1114.1	09 17	159.0	1044.5	09 17	159.0	974.5	09 17	159.0	904.5	09 17	159.0	834.5	09 17	159.0	1
2	1401.0	09 18	157.8	1331.5	09 18	157.9	1302.0	09 18	158.0	1232.5	09 18	158.0	1203.0	09 18	158.0	1133.4	09 18	158.0	1103.9	09 18	158.0	1034.8	09 18	158.0	964.8	09 18	158.0	894.8	09 18	158.0	824.8	09 18	158.0	2
3	1350.1	09 19	156.8	1320.7	09 19	156.9	1251.2	09 19	157.0	1221.7	09 19	157.0	1152.3	09 19	157.0	1122.8	09 19	157.0	1053.3	09 19	157.0	983.3	09 19	157.0	913.3	09 19	157.0	843.3	09 19	157.0	773.3	09 19	157.0	3
4	1338.8	09 20	155.8	1309.4	09 20	155.9	1240.0	09 20	156.0	1210.6	09 20	156.0	1141.1	09 20	156.0	1111.7	09 20	156.0	1042.3	09 20	156.0	972.3	09 20	156.0	902.3	09 20	156.0	832.3	09 20	156.0	762.3	09 20	156.0	4
25	1327.1	09 20	154.8	1257.6	09 20	155.0	1228.3	09 20	155.1	1158.9	09 20	155.2	1129.6	09 20	155.3	1100.2	09 20	155.4	1030.8	09 20	155.5	961.4	09 20	155.6	891.4	09 20	155.6	821.4	09 20	155.6	751.4	09 20	155.6	25
6	1314.9	09 21	153.9	1245.5	09 21	154.0	1216.2	09 21	154.1	1146.9	09 21	154.2	1117.6	09 21	154.3	1048.2	09 21	154.4	978.9	09 21	154.5	909.6	09 21	154.6	840.2	09 21	154.6	770.2	09 21	154.6	700.2	09 21	154.6	6
7	1302.2	09 22	152.9	1233.0	09 22	153.0	1203.7	09 22	153.1	1134.4	09 22	153.2	1105.1	09 22	153.3	1035.8	09 22	153.4	966.6	09 22	153.5	897.3	09 22	153.6	827.9	09 22	153.6	758.9	09 22	153.6	689.9	09 22	153.6	7
8	1249.2	09 22	151.9	1220.0	09 22	152.0	1150.7	09 22	152.1	1121.5	09 22	152.2	1052.3	09 22	152.4	1023.0	09 22	152.5	953.8	09 22	152.6	884.6	09 22	152.7	815.4	09 22	152.7	746.0	09 22	152.7	676.0	09 22	152.7	8
9	1235.7	09 23	150.9	1206.5	09 23	151.0	1137.4	09 23	151.2	1108.2	09 23	151.3	1039.0	09 23	151.4	1009.8	09 23	151.5	940.6	09 23	151.6	871.4	09 23	151.8	802.0	09 23	151.8	732.6	09 23	151.8	663.2	09 23	151.8	9
30	1221.8	09 24	150.0	1152.7	09 24	150.1	1123.6	09 24	150.2	1054.4	09 24	150.3	1025.3	09 24	150.4	956.2	09 24	150.																

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
00	44 00.0	1.0 01 180.0	44 30.0	1.0 01 180.0	45 00.0	1.0 01 180.0	45 30.0	1.0 01 180.0	46 00.0	1.0 01 180.0	46 30.0	1.0 01 180.0	47 00.0	1.0 01 180.0	47 30.0	1.0 01 180.0	00
1	43 59.7	1.0 02 178.7	44 29.7	1.0 02 178.7	44 59.7	1.0 02 178.6	45 29.7	1.0 02 178.6	45 59.7	1.0 02 178.6	46 29.7	1.0 02 178.6	46 59.7	1.0 02 178.6	47 29.7	1.0 02 178.6	1
2	43 58.7	1.0 03 177.3	44 28.7	1.0 03 177.3	44 58.7	1.0 03 177.3	45 28.7	1.0 03 177.3	45 58.7	1.0 03 177.3	46 28.6	1.0 03 177.2	46 58.6	1.0 03 177.2	47 28.6	1.0 03 177.2	2
3	43 57.0	1.0 04 176.0	44 27.0	1.0 04 176.0	44 57.0	1.0 04 175.9	45 27.0	1.0 04 175.9	45 57.0	1.0 04 175.9	46 27.0	1.0 04 175.9	46 56.9	1.0 04 175.9	47 26.9	1.0 04 175.8	3
4	43 54.7	1.0 05 174.7	44 24.7	1.0 05 174.6	44 54.7	1.0 05 174.6	45 24.7	1.0 05 174.6	45 54.6	1.0 05 174.5	46 24.6	1.0 05 174.5	46 54.6	1.0 05 174.5	47 24.5	1.0 05 174.4	4
05	43 51.8	1.0 06 173.3	44 21.8	1.0 06 173.3	44 51.7	1.0 06 173.2	45 21.7	1.0 06 173.2	45 51.6	1.0 06 173.2	46 21.6	1.0 06 173.1	46 51.5	1.0 06 173.1	47 21.4	1.0 06 173.0	05
6	43 48.1	1.0 07 172.0	44 18.1	1.0 07 171.9	44 48.1	1.0 07 171.9	45 18.0	1.0 07 171.9	45 47.9	1.0 07 171.8	46 17.8	1.0 07 171.8	46 47.8	1.0 07 171.8	47 17.7	1.0 07 171.6	6
7	43 44.0	1.0 08 170.7	44 13.9	1.0 08 170.6	44 43.8	1.0 08 170.6	45 13.7	1.0 08 170.5	45 43.6	1.0 08 170.4	46 13.5	1.0 08 170.4	46 43.4	1.0 08 170.3	47 13.3	1.0 08 170.3	7
8	43 39.1	1.0 09 169.3	44 08.9	1.0 09 169.3	44 38.8	1.0 09 169.2	45 08.7	1.0 09 169.2	45 38.6	1.0 09 169.1	46 08.4	1.0 10 169.0	46 38.3	1.0 10 169.0	47 08.2	1.0 10 168.9	8
9	43 33.5	99 10 168.0	44 03.4	99 10 168.0	44 33.2	99 10 167.9	45 03.1	99 10 167.8	45 32.9	99 10 167.7	46 02.7	99 11 167.7	46 32.6	99 11 167.6	47 02.4	99 11 167.5	9
10	43 27.4	99 11 166.7	43 57.2	99 11 166.6	44 27.0	99 11 166.5	44 56.8	99 12 166.5	45 26.6	99 12 166.4	45 56.4	99 12 166.3	46 26.2	99 12 166.2	46 56.0	99 12 166.1	10
1	43 20.6	99 12 165.4	43 50.4	99 12 165.3	44 20.1	99 12 165.2	44 49.9	99 12 165.1	45 19.6	99 12 165.0	45 49.4	99 12 164.9	46 19.1	99 12 164.9	46 48.9	99 12 164.8	1
2	43 13.2	99 13 164.1	43 42.9	99 13 164.0	44 12.6	99 13 163.9	44 42.3	99 13 163.8	45 12.1	99 13 163.7	45 41.8	99 13 163.6	46 11.5	99 13 163.5	46 41.2	99 13 163.4	2
3	43 05.1	99 14 162.8	43 34.8	99 14 162.7	44 04.5	99 14 162.6	44 34.2	99 14 162.5	45 03.8	99 14 162.4	45 33.5	99 14 162.3	46 03.2	99 14 162.2	46 32.8	99 14 162.0	3
4	42 56.5	99 15 161.5	43 26.1	99 15 161.4	43 55.8	99 15 161.3	44 25.4	99 15 161.2	44 55.0	99 15 161.0	45 24.6	99 15 160.9	45 54.2	99 15 160.8	46 23.8	99 15 160.7	4
15	42 47.4	99 16 160.2	43 16.9	99 16 160.1	43 46.4	99 17 160.0	44 16.0	99 17 159.8	44 45.5	99 17 159.7	45 15.1	99 17 159.6	45 44.6	99 17 159.5	46 14.2	99 17 159.3	15
6	42 37.4	99 17 158.9	43 06.9	99 17 158.8	43 36.5	99 18 158.7	44 06.0	99 18 158.5	44 35.5	99 18 158.4	45 05.0	99 18 158.3	45 34.5	99 18 158.1	46 03.9	99 18 158.0	6
7	42 27.0	99 18 157.6	42 56.4	99 18 157.5	43 25.9	99 19 157.4	43 55.4	99 19 157.2	44 24.8	99 19 157.1	44 54.2	99 19 157.0	45 23.7	99 19 156.8	45 53.1	99 19 156.7	7
8	42 15.9	99 19 156.3	42 45.4	99 19 156.2	43 14.8	99 20 156.1	43 44.2	99 20 155.9	44 13.5	99 20 155.8	44 42.9	99 20 155.6	45 12.3	99 20 155.5	45 41.6	99 20 155.4	8
9	42 04.4	99 20 155.1	42 33.7	99 20 154.9	43 03.0	99 20 154.8	43 32.4	99 21 154.6	44 01.7	99 21 154.5	44 31.0	99 21 154.3	45 00.3	99 21 154.2	45 29.6	99 21 154.0	9
20	41 52.2	99 21 153.8	42 21.5	99 21 153.7	42 50.8	99 21 153.5	43 20.0	99 22 153.4	43 49.3	99 22 153.2	44 18.5	99 22 153.0	44 47.8	99 22 152.9	45 17.0	99 22 152.7	20
1	41 39.5	99 22 152.5	42 08.7	99 22 152.4	42 37.9	99 22 152.1	43 07.1	99 22 152.1	43 36.3	99 22 151.9	44 05.5	99 22 151.8	44 34.6	99 22 151.6	45 03.8	99 22 151.4	1
2	41 26.2	99 23 151.3	41 55.4	99 23 151.1	42 24.5	99 23 151.0	42 53.7	99 23 150.8	43 22.8	99 23 150.6	43 51.9	99 23 150.5	44 21.0	99 23 150.3	44 50.0	99 23 150.1	2
3	41 12.4	99 24 150.1	41 41.5	99 24 149.9	42 10.6	99 24 149.7	42 39.6	99 24 149.6	43 08.7	99 24 149.4	43 37.7	99 24 149.2	44 06.7	99 24 149.0	44 35.7	99 24 148.9	3
4	40 58.1	99 25 148.8	41 27.1	99 25 148.6	41 56.1	99 25 148.5	42 25.1	99 25 148.3	42 54.1	99 25 148.1	43 23.0	99 25 147.9	43 52.0	99 25 147.8	44 20.9	99 25 147.6	4
25	40 43.3	99 26 147.6	41 12.2	99 26 147.4	41 41.1	99 26 147.2	42 10.0	99 26 147.1	42 38.9	99 26 146.9	43 07.8	99 26 146.7	43 36.7	99 26 146.5	44 05.5	99 26 146.3	25
6	40 27.9	99 26 146.4	40 56.8	99 27 146.2	41 25.6	99 27 146.0	41 54.5	99 27 145.8	42 23.3	99 27 145.6	42 52.1	99 27 145.4	43 20.9	99 27 145.3	43 49.6	99 27 145.1	6
7	40 12.1	99 27 145.2	40 40.9	99 27 145.0	41 09.6	99 28 144.8	41 38.4	99 28 144.6	42 07.2	99 28 144.4	42 35.9	99 28 144.2	43 04.6	99 28 144.0	43 33.3	99 28 143.8	7
8	39 55.7	99 28 143.9	40 24.9	99 28 143.8	40 53.2	99 28 143.6	41 21.8	99 28 143.4	41 50.5	99 28 143.2	42 19.2	99 28 143.0	42 47.8	99 28 142.8	43 16.4	99 28 142.6	8
9	39 38.9	99 29 142.8	40 07.6	99 29 142.6	40 36.2	99 29 142.4	41 04.8	99 29 142.2	41 33.4	99 29 142.0	42 02.0	99 29 141.8	42 30.5	99 29 141.6	42 59.0	99 29 141.3	9
30	39 21.6	99 30 141.6	39 50.2	99 30 141.4	40 18.8	99 30 141.2	40 47.3	99 30 141.0	41 15.8	99 30 140.8	41 44.3	99 30 140.5	42 12.8	99 30 140.3	42 41.2	99 30 140.1	30
1	39 03.9	99 30 140.4	39 32.4	99 30 140.2	40 00.9	99 31 140.0	40 29.3	99 31 139.8	40 57.8	99 31 139.6	41 26.2	99 31 139.3	41 54.5	99 31 139.1	42 22.9	99 31 138.9	1
2	38 45.7	99 31 139.2	39 14.1	99 31 139.0	39 42.5	99 31 138.8	40 10.9	99 31 138.6	40 39.3	99 31 138.4	41 07.6	99 31 138.2	41 35.9	99 31 138.0	42 04.2	99 31 137.7	2
3	38 27.1	99 32 138.0	38 55.4	99 32 137.8	39 23.8	99 32 137.6	39 52.1	99 32 137.4	40 20.3	99 32 137.2	40 48.6	99 32 137.0	41 16.8	99 32 136.7	41 45.0	99 32 136.5	3
4	38 08.4	99 32 136.9	38 36.3	99 32 136.7	39 04.6	99 32 136.5	39 32.8	99 32 136.2	40 01.0	99 32 136.0	40 29.3	99 32 135.8	40 57.3	99 32 135.6	41 25.4	99 32 135.3	4
35	37 48.6	99 33 135.7	38 16.8	99 33 135.5	38 45.0	99 33 135.3	39 13.1	99 33 135.1	39 41.2	99 33 134.9	40 09.3	99 33 134.6	40 37.4	99 33 134.4	41 05.4	99 33 134.2	35
6	37 28.7	99 34 134.6	37 56.9	99 34 134.4	38 24.9	99 34 134.2	38 53.0	99 34 133.9	39 21.0	99 34 133.7	39 49.1	99 34 133.5	40 17.0	99 34 133.2	40 45.0	99 34 133.0	6
7	37 08.5	99 34 133.5	37 36.5	99 34 133.2	38 04.5	99 34 133.0	38 32.5	99 34 132.8	39 00.5	99 34 132.6	39 28.4	99 34 132.3	39 56.3	99 34 132.1	40 24.2	99 34 131.8	7
8	36 47.9	99 35 132.3	37 15.8	99 35 132.1	37 43.8	99 35 131.9	38 11.7	99 35 131.7	38 39.6	99 35 131.4	39 07.4	99 35 131.2	39 35.2	99 35 130.9	40 03.0	99 35 130.7	8
9	36 26.9	99 36 131.2	36 54.7	99 36 131.0	37 22.6	99 36 130.8	37 50.4	99 36 130.5	38 18.3	99 36 130.3	38 46.0	99 36 130.1	39 13.8	99 36 129.8	39 41.5	99 36 129.6	9
40	36 05.5	99 36 130.1	36 33.3	99 36 129.9	37 01.1	99 36 129.7	37 28.9	99 37 129.4	37 56.6	99 37 129.2	38 24.3	99 37 128.9	38 52.0	99 37 128.7	39 19.6	99 37 128.4	40
1	35 43.3	99 37 129.0	36 11.5	99 37 128.8	36 39.2	99 37 128.6	37 06.9	99 37 128.3	37 34.6	99 37 128.1	38 02.2	99 37 127.8	38 29.9	99 37 127.6	38 57.4	99 37 127.3	1
2	35 21.7	99 37 127.9	35 49.5	99 37 127.7	36 17.0	99 38 127.5	36 44.7	99 38 127.2	37 12.2	99 38 127.0	37 39.8	99 38 126.7	38 07.3	99 38 126.5	38 34.8	99 38 126.2	2
3	34 59.4	99 38 126.9	35 27.0	99 38 126.6	35 54.5	99 38 126.4	36 22.1	99 38 126.1	36 49.6	99 38 125.9	37 17.1	99 38 125.6	37 44.5	99 38 125.4	38 11.9	99 38 125.1	3
4	34 36.7	99 38 125.8	35 04.2	99 38 125.5	35 31.7	99 39 125.3	35 59.2	99 39 125.0	36 26.6	99 39 124.8	36 54.0	99 39 124.5	37 21.4	99 39 124.3	37 48.7	99 39 124.0	4
45	34 13.6	99 39 124.7	34 41.1	99 39 124.5	35 08.5	99 39 124.2	35 35.9	99 39 124.0	36 03.3	99 39 123.7							

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
00	1200.0	180.0	1130.0	180.0	1060.0	180.0	1030.0	180.0	1000.0	180.0	930.0	180.0	900.0	180.0	830.0	180.0	00
1	1159.8	179.0	1129.8	179.0	1059.8	179.0	1029.8	179.0	959.8	179.0	929.8	179.0	859.8	179.0	829.8	179.0	1
2	1119.6	178.0	1089.6	178.0	1019.6	178.0	989.6	178.0	919.6	178.0	889.6	178.0	819.6	178.0	789.6	178.0	2
3	1079.4	177.1	1049.4	177.1	979.4	177.1	949.4	177.1	879.4	177.1	849.4	177.1	779.4	177.1	749.4	177.1	3
4	1039.2	176.1	1009.2	176.1	939.2	176.1	909.2	176.1	839.2	176.1	809.2	176.1	739.2	176.1	709.2	176.1	4
05	1154.0	175.1	1124.0	175.1	1054.0	175.1	1024.0	175.1	954.0	175.1	924.0	175.1	854.0	175.1	824.0	175.1	05
6	1113.8	174.1	1083.8	174.1	1013.8	174.1	983.8	174.1	913.8	174.1	883.8	174.1	813.8	174.1	783.8	174.1	6
7	1073.6	173.2	1043.6	173.2	973.6	173.2	943.6	173.2	873.6	173.2	843.6	173.2	773.6	173.2	743.6	173.2	7
8	1033.4	172.1	1003.4	172.1	933.4	172.1	903.4	172.1	833.4	172.1	803.4	172.1	733.4	172.1	703.4	172.1	8
9	1014.5	171.2	984.5	171.2	914.5	171.2	884.5	171.2	814.5	171.2	784.5	171.2	714.5	171.2	684.5	171.2	9
10	1135.9	170.2	1105.9	170.2	1035.9	170.2	1005.9	170.2	935.9	170.2	905.9	170.2	835.9	170.2	805.9	170.2	10
1	1095.7	169.3	1065.7	169.3	995.7	169.3	965.7	169.3	895.7	169.3	865.7	169.3	795.7	169.3	765.7	169.3	1
2	1055.5	168.2	1025.5	168.2	955.5	168.2	925.5	168.2	855.5	168.2	825.5	168.2	755.5	168.2	725.5	168.2	2
3	1015.3	167.3	985.3	167.3	915.3	167.3	885.3	167.3	815.3	167.3	785.3	167.3	715.3	167.3	685.3	167.3	3
4	1013.0	166.3	983.0	166.3	913.0	166.3	883.0	166.3	813.0	166.3	783.0	166.3	713.0	166.3	683.0	166.3	4
15	1106.0	165.3	1076.0	165.3	1006.0	165.3	976.0	165.3	906.0	165.3	876.0	165.3	806.0	165.3	776.0	165.3	15
6	1065.8	164.3	1035.8	164.3	965.8	164.3	935.8	164.3	865.8	164.3	835.8	164.3	765.8	164.3	735.8	164.3	6
7	1025.6	163.4	995.6	163.4	925.6	163.4	895.6	163.4	825.6	163.4	795.6	163.4	725.6	163.4	695.6	163.4	7
8	1012.3	162.4	982.3	162.4	912.3	162.4	882.3	162.4	812.3	162.4	782.3	162.4	712.3	162.4	682.3	162.4	8
9	1033.8	161.4	1003.8	161.4	933.8	161.4	903.8	161.4	833.8	161.4	803.8	161.4	733.8	161.4	703.8	161.4	9
20	1024.6	160.5	994.6	160.5	924.6	160.5	894.6	160.5	824.6	160.5	794.6	160.5	724.6	160.5	694.6	160.5	20
1	1015.0	159.5	985.0	159.5	915.0	159.5	885.0	159.5	815.0	159.5	785.0	159.5	715.0	159.5	685.0	159.5	1
2	1004.9	158.5	974.9	158.5	904.9	158.5	874.9	158.5	804.9	158.5	774.9	158.5	704.9	158.5	674.9	158.5	2
3	994.8	157.6	964.8	157.6	894.8	157.6	864.8	157.6	794.8	157.6	764.8	157.6	694.8	157.6	664.8	157.6	3
4	943.4	156.6	913.4	156.6	843.4	156.6	813.4	156.6	743.4	156.6	713.4	156.6	643.4	156.6	613.4	156.6	4
25	932.0	155.7	902.0	155.7	832.0	155.7	802.0	155.7	732.0	155.7	702.0	155.7	632.0	155.7	602.0	155.7	25
6	920.2	154.7	890.2	154.7	820.2	154.7	790.2	154.7	720.2	154.7	690.2	154.7	620.2	154.7	590.2	154.7	6
7	908.0	153.8	878.0	153.8	808.0	153.8	778.0	153.8	708.0	153.8	678.0	153.8	608.0	153.8	578.0	153.8	7
8	895.3	152.8	865.3	152.8	795.3	152.8	765.3	152.8	695.3	152.8	665.3	152.8	595.3	152.8	565.3	152.8	8
9	842.2	151.9	812.2	151.9	742.2	151.9	712.2	151.9	642.2	151.9	612.2	151.9	542.2	151.9	512.2	151.9	9
30	828.8	150.9	798.8	150.9	728.8	150.9	698.8	150.9	628.8	150.9	598.8	150.9	528.8	150.9	498.8	150.9	30
1	814.9	150.0	784.9	150.0	714.9	150.0	684.9	150.0	614.9	150.0	584.9	150.0	514.9	150.0	484.9	150.0	1
2	800.6	149.0	770.6	149.0	700.6	149.0	670.6	149.0	600.6	149.0	570.6	149.0	500.6	149.0	470.6	149.0	2
3	745.9	148.1	715.9	148.1	645.9	148.1	615.9	148.1	545.9	148.1	515.9	148.1	445.9	148.1	415.9	148.1	3
4	730.8	147.2	700.8	147.2	630.8	147.2	600.8	147.2	530.8	147.2	500.8	147.2	430.8	147.2	400.8	147.2	4
35	715.3	146.2	685.3	146.2	615.3	146.2	585.3	146.2	515.3	146.2	485.3	146.2	415.3	146.2	385.3	146.2	35
6	659.5	145.3	629.5	145.3	559.5	145.3	529.5	145.3	459.5	145.3	429.5	145.3	359.5	145.3	329.5	145.3	6
7	643.3	144.4	613.3	144.4	543.3	144.4	513.3	144.4	443.3	144.4	413.3	144.4	343.3	144.4	313.3	144.4	7
8	626.7	143.4	596.7	143.4	526.7	143.4	496.7	143.4	426.7	143.4	396.7	143.4	326.7	143.4	296.7	143.4	8
9	609.7	142.5	579.7	142.5	509.7	142.5	479.7	142.5	409.7	142.5	379.7	142.5	309.7	142.5	279.7	142.5	9
40	552.4	141.6	522.4	141.6	452.4	141.6	422.4	141.6	352.4	141.6	322.4	141.6	252.4	141.6	222.4	141.6	40
1	534.7	140.7	504.7	140.7	434.7	140.7	404.7	140.7	334.7	140.7	304.7	140.7	234.7	140.7	204.7	140.7	1
2	516.7	139.8	486.7	139.8	416.7	139.8	386.7	139.8	316.7	139.8	286.7	139.8	216.7	139.8	186.7	139.8	2

Lat. 62°

Lat. 63°

Lat. 64°

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
91	1337.3	88.6	1403.5	88.6	1429.8	88.6	1456.0	88.6	1522.2	88.6	1548.4	88.6	1614.6	88.6	1640.7	88.6	91
2	1309.4	88.6	1375.6	88.6	1401.9	88.6	1428.1	88.6	1494.3	88.6	1520.5	88.6	1586.7	88.6	1612.8	88.6	2
3	1241.7	88.6	1307.9	88.6	1334.1	88.6	1360.3	88.6	1426.5	88.6	1452.7	88.6	1519.1	88.6	1545.3	88.6	3
4	1214.0	88.6	1280.2	88.6	1306.4	88.6	1332.6	88.6	1398.8	88.6	1425.0	88.6	1491.4	88.6	1517.0	88.6	4
95	1146.4	88.6	1212.6	88.6	1238.8	88.6	1265.0	88.6	1331.2	88.6	1357.4	88.6	1423.8	88.6	1450.0	88.6	95
6	1118.9	88.6	1185.1	88.6	1211.3	88.6	1237.5	88.6	1303.7	88.6	1330.0	88.6	1396.4	88.6	1422.6	88.6	6
7	1051.5	88.6	1117.7	88.6	1143.9	88.6	1170.1	88.6	1236.3	88.6	1262.5	88.6	1328.9	88.6	1355.1	88.6	7
8	1024.2	88.6	1090.4	88.6	1116.6	88.6	1142.8	88.6	1208.0	88.6	1234.2	88.6	1300.6	88.6	1326.8	88.6	8
9	957.0	88.6	1023.2	88.6	1049.4	88.6	1075.6	88.6	1141.8	88.6	1168.0	88.6	1234.4	88.6	1260.6	88.6	9
100	929.9	88.6	996.1	88.6	1022.3	88.6	1048.5	88.6	1114.7	88.6	1140.9	88.6	1207.3	88.6	1233.5	88.6	100
1	902.9	88.6	969.1	88.6	995.3	88.6	1021.5	88.6	1087.7	88.6	1113.9	88.6	1180.3	88.6	1206.5	88.6	1
2	836.0	88.6	902.2	88.6	928.4	88.6	954.6	88.6	1021.0	88.6	1047.2	88.6	1113.6	88.6	1140.0	88.6	2
3	809.3	88.6	875.5	88.6	901.7	88.6	928.1	88.6	994.5	88.6	1020.9	88.6	1087.3	88.6	1113.7	88.6	3
4	742.7	88.6	808.9	88.6	835.3	88.6	861.7	88.6	928.1	88.6	954.5	88.6	1020.9	88.6	1047.3	88.6	4
105	716.3	88.6	782.5	88.6	808.9	88.6	835.3	88.6	901.7	88.6	928.1	88.6	994.5	88.6	1020.9	88.6	105
6	65																

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.								
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.									
00	48 00.0	1.001	180.0	48 30.0	1.001	180.0	49 00.0	1.001	180.0	49 30.0	1.001	180.0	50 00.0	1.001	180.0	50 30.0	1.001	180.0	51 00.0	1.001	180.0	51 30.0	1.001	180.0	00
1	47 59.7	1.002	178.6	48 29.7	1.002	178.6	48 59.6	1.002	178.6	49 29.6	1.002	178.6	49 59.6	1.002	178.6	50 29.6	1.002	178.6	50 59.6	1.002	178.6	51 29.6	1.002	178.6	1
2	47 58.6	1.003	177.2	48 28.6	1.003	177.2	48 58.6	1.003	177.2	49 28.6	1.003	177.2	49 58.6	1.003	177.2	50 28.6	1.003	177.2	50 58.6	1.003	177.2	51 28.6	1.003	177.2	2
3	47 56.9	1.004	175.8	48 26.9	1.004	175.8	48 56.9	1.004	175.7	49 26.8	1.004	175.7	49 56.8	1.004	175.7	50 26.8	1.004	175.6	50 56.8	1.004	175.6	51 26.7	1.004	175.6	3
4	47 54.5	1.005	174.4	48 24.4	1.005	174.4	48 54.4	1.005	174.3	49 24.4	1.005	174.3	49 54.3	1.005	174.2	50 24.3	1.005	174.2	50 54.3	1.005	174.2	51 24.2	1.005	174.1	4
05	47 51.4	1.006	173.0	48 21.3	1.006	172.9	48 51.3	1.006	172.9	49 21.3	1.006	172.8	49 51.2	1.006	172.8	50 21.1	1.007	172.8	50 51.0	1.006	172.7	51 21.0	1.007	172.6	05
6	47 47.6	1.007	171.6	48 17.5	1.006	171.5	48 47.4	1.006	171.5	49 17.4	1.006	171.4	49 47.3	1.006	171.4	50 17.2	1.007	171.3	50 47.1	1.006	171.3	51 17.0	1.006	171.2	6
7	47 43.2	1.009	170.2	48 13.0	1.009	170.1	48 42.9	1.009	170.1	49 12.8	1.009	170.0	49 42.7	1.009	169.9	50 12.6	1.009	169.9	50 42.5	1.009	169.8	51 12.3	1.009	169.7	7
8	47 38.0	1.010	168.8	48 07.9	1.010	168.7	48 37.7	1.010	168.7	49 07.6	1.010	168.6	49 37.4	1.010	168.5	50 07.3	1.010	168.4	50 37.1	1.010	168.4	51 07.0	1.010	168.3	8
9	47 32.2	1.011	167.4	48 02.0	1.011	167.3	48 31.9	1.011	167.3	49 01.7	1.011	167.2	49 31.5	1.011	167.1	50 01.5	1.011	167.0	50 31.3	1.011	166.9	51 00.9	1.011	166.8	9
10	47 25.8	1.012	166.0	47 55.5	1.012	166.0	48 25.3	1.012	165.9	48 55.1	1.012	165.8	49 24.8	1.012	165.7	49 54.6	1.012	165.6	50 24.4	1.012	165.5	50 54.1	1.012	165.4	10
1	47 18.6	1.013	164.7	47 48.4	1.013	164.6	48 18.1	1.013	164.5	48 47.8	1.013	164.4	49 17.5	1.013	164.3	49 47.3	1.013	164.2	50 17.0	1.013	164.1	50 46.7	1.013	164.0	1
2	47 10.9	1.014	163.3	47 40.5	1.014	163.2	48 10.2	1.014	163.1	48 39.9	1.014	163.0	49 09.6	1.014	162.9	49 39.2	1.014	162.7	50 09.9	1.014	162.6	50 38.5	1.014	162.5	2
3	47 02.4	1.015	161.9	47 32.1	1.015	161.8	48 01.7	1.015	161.7	48 31.3	1.015	161.6	49 00.9	1.015	161.5	49 30.5	1.015	161.3	50 00.1	1.015	161.2	50 29.7	1.015	161.1	3
4	46 53.4	1.016	160.6	47 23.0	1.016	160.4	47 52.5	1.016	160.3	48 22.1	1.016	160.2	48 51.7	1.016	160.1	49 21.2	1.016	159.9	49 50.7	1.016	159.8	50 20.3	1.016	159.7	4
15	46 43.7	1.017	159.2	47 13.2	1.017	159.1	47 42.7	1.017	159.0	48 12.2	1.017	158.8	48 41.7	1.017	158.7	49 11.2	1.017	158.5	49 40.7	1.017	158.4	49 50.0	1.017	158.3	15
6	46 33.4	1.018	157.9	47 02.9	1.018	157.7	47 32.3	1.018	157.6	48 01.7	1.018	157.5	48 31.2	1.018	157.3	49 00.6	1.018	157.2	49 30.0	1.018	157.0	49 59.4	1.018	156.8	6
7	46 22.5	1.019	156.5	46 51.9	1.019	156.4	47 21.3	1.019	156.2	47 50.6	1.019	156.1	48 20.0	1.019	155.9	48 49.3	1.019	155.8	49 18.7	1.019	155.6	49 48.0	1.019	155.5	7
8	46 11.0	1.020	155.2	46 40.3	1.020	155.1	47 09.6	1.020	154.9	47 38.9	1.020	154.7	48 08.2	1.020	154.6	48 37.5	1.020	154.4	49 06.7	1.020	154.2	49 36.0	1.020	154.1	8
9	45 58.9	1.021	153.9	46 28.1	1.021	153.7	46 57.4	1.021	153.6	47 26.9	1.021	153.4	47 55.8	1.021	153.2	48 25.0	1.021	153.1	48 54.2	1.021	152.9	49 23.4	1.021	152.7	9
20	45 46.2	1.022	152.6	46 15.4	1.022	152.4	46 44.5	1.022	152.2	47 13.7	1.022	152.1	47 42.8	1.022	151.9	48 12.0	1.022	151.7	48 41.1	1.022	151.5	49 10.2	1.022	151.3	20
1	45 32.9	1.023	151.3	46 02.0	1.023	151.1	46 31.1	1.023	150.9	47 00.2	1.023	150.7	47 29.3	1.023	150.5	47 58.3	1.023	150.4	48 27.3	1.023	150.2	48 56.3	1.023	150.0	1
2	45 19.1	1.024	150.0	45 48.1	1.024	149.8	46 17.1	1.024	149.6	46 47.1	1.024	149.4	47 15.1	1.024	149.2	47 44.1	1.024	149.0	48 13.0	1.024	148.8	48 42.0	1.024	148.6	2
3	45 04.7	1.025	148.7	45 33.7	1.025	148.5	46 02.6	1.025	148.3	46 31.5	1.025	148.1	47 00.4	1.025	147.9	47 29.3	1.025	147.7	47 58.2	1.025	147.5	48 27.0	1.025	147.3	3
4	44 49.8	1.026	147.4	45 18.7	1.026	147.2	45 47.5	1.026	147.0	46 16.4	1.026	146.8	46 45.2	1.026	146.6	47 14.0	1.026	146.4	47 42.8	1.026	146.2	48 11.5	1.026	146.0	4
25	44 34.4	1.027	146.1	45 03.7	1.027	145.9	45 31.9	1.027	145.7	46 00.7	1.027	145.5	46 29.4	1.027	145.3	46 58.2	1.027	145.1	47 26.8	1.027	144.9	47 55.5	1.027	144.7	25
6	44 18.4	1.028	144.9	44 47.1	1.028	144.7	45 15.8	1.028	144.4	45 44.5	1.028	144.2	46 13.1	1.028	144.0	46 41.8	1.028	143.8	47 10.4	1.028	143.6	47 39.0	1.028	143.4	6
7	44 01.9	1.029	143.6	44 30.6	1.029	143.4	44 59.2	1.029	143.2	45 27.8	1.029	143.0	45 56.3	1.029	142.8	46 24.9	1.029	142.5	46 53.4	1.029	142.3	47 21.9	1.029	142.1	7
8	43 45.0	1.030	142.4	44 13.5	1.030	142.1	44 42.1	1.030	141.9	45 10.6	1.030	141.7	45 39.1	1.030	141.5	46 07.5	1.030	141.3	46 30.5	1.030	141.0	47 04.3	1.030	140.8	8
9	43 27.5	1.031	141.1	43 56.0	1.031	140.9	44 24.5	1.031	140.7	44 52.9	1.031	140.5	45 21.3	1.031	140.2	45 49.6	1.031	140.0	46 18.0	1.031	139.8	46 46.3	1.031	139.5	9
30	43 09.6	1.032	139.9	43 38.0	1.032	139.7	44 06.4	1.032	139.5	44 34.7	1.032	139.2	45 03.0	1.032	139.0	45 31.3	1.032	138.8	45 59.6	1.032	138.5	46 27.8	1.032	138.3	30
1	42 51.2	1.033	138.7	43 19.5	1.033	138.5	43 47.8	1.033	138.2	44 16.1	1.033	138.0	44 44.3	1.033	137.8	45 12.5	1.033	137.5	45 40.7	1.033	137.3	46 08.8	1.033	137.0	1
2	42 32.4	1.034	137.5	43 00.6	1.034	137.2	43 28.8	1.034	137.0	43 57.0	1.034	136.8	44 25.1	1.034	136.6	44 53.3	1.034	136.3	45 21.3	1.034	136.0	45 49.4	1.034	135.8	2
3	42 13.2	1.035	136.3	42 41.3	1.035	136.1	43 09.4	1.035	135.8	43 37.5	1.035	135.6	44 05.6	1.035	135.3	44 33.6	1.035	135.1	45 01.6	1.035	134.8	45 29.5	1.035	134.6	3
4	41 53.4	1.036	135.1	42 21.6	1.036	134.9	42 49.6	1.036	134.6	43 17.8	1.036	134.4	43 45.8	1.036	134.1	44 13.5	1.036	133.8	44 41.4	1.036	133.6	45 09.2	1.036	133.3	4
35	41 33.4	1.037	133.9	42 01.4	1.037	133.7	42 29.3	1.037	133.4	42 57.2	1.037	133.2	43 25.1	1.037	132.9	43 53.0	1.037	132.7	44 20.8	1.037	132.4	44 48.5	1.037	132.1	35
6	41 12.9	1.038	132.8	41 40.8	1.038	132.5	42 08.7	1.038	132.3	42 36.5	1.038	132.0	43 04.3	1.038	131.8	43 32.1	1.038	131.5	43 59.8	1.038	131.2	44 27.5	1.038	131.0	6
7	40 52.0	1.039	131.6	41 19.5	1.039	131.3	41 47.6	1.039	131.1	42 15.4	1.039	130.8	42 43.1	1.039	130.6	43 10.8	1.039	130.3	43 38.4	1.039	130.0	44 06.0	1.039	129.8	7
8	40 30.8	1.040	130.5	40 58.9	1.040	130.2	41 26.2	1.040	130.0	41 53.9	1.040	129.7	42 21.5	1.040	129.4	42 49.1	1.040	129.2	43 16.7	1.040	128.9	43 44.2	1.040	128.6	8
9	40 09.2	1.041	129.3	40 36.8	1.041	129.1	41 04.4	1.041	128.8	41 32.0	1.041	128.5	41 59.6	1.041	128.3	42 27.1	1.041	128.0	42 54.6						

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.											
00	800.0	1.00 180.0	730.0	1.00 180.0	700.0	1.00 180.0	630.0	1.00 180.0	600.0	1.00 180.0	530.0	1.00 180.0	500.0	1.00 180.0			00
1	759.8	1.001 179.1	729.8	1.001 179.1	659.8	1.001 179.1	629.8	1.001 179.1	559.8	1.001 179.1	529.8	1.001 179.1					1
2	759.1	1.002 178.1	729.1	1.002 178.1	659.1	1.002 178.1	629.1	1.002 178.1	559.1	1.002 178.1	529.1	1.002 178.1					2
3	757.9	1.003 177.2	727.9	1.003 177.2	657.9	1.003 177.2	627.9	1.003 177.2	557.9	1.003 177.2	527.9	1.003 177.2					3
4	756.3	1.004 176.2	726.3	1.004 176.2	656.3	1.004 176.2	626.3	1.004 176.2	556.3	1.004 176.2	526.3	1.004 176.2					4
05	754.2	1.004 175.3	724.2	1.004 175.3	654.2	1.004 175.3	624.2	1.004 175.3	554.2	1.004 175.3	524.2	1.004 175.3					05
6	751.6	1.005 174.3	721.6	1.005 174.3	651.6	1.005 174.3	621.6	1.005 174.3	551.6	1.005 174.3	521.6	1.005 174.3					6
7	748.6	1.006 173.4	718.6	1.006 173.4	648.6	1.006 173.4	618.6	1.006 173.4	548.6	1.006 173.4	518.6	1.006 173.4					7
8	745.1	1.007 172.4	715.1	1.007 172.4	645.1	1.007 172.4	615.1	1.007 172.4	545.1	1.007 172.4	515.1	1.007 172.4					8
9	741.2	1.007 171.5	711.2	1.007 171.5	641.2	1.007 171.5	611.2	1.007 171.5	541.2	1.007 171.5	511.2	1.007 171.5					9
10	736.7	1.008 170.5	706.7	1.008 170.5	636.7	1.008 170.5	607.0	1.008 170.5	537.1	1.008 170.7	507.2	1.008 170.7					10
1	731.9	1.009 169.6	702.0	1.009 169.6	632.1	1.009 169.7	602.2	1.009 169.8	532.4	1.009 169.8	502.5	1.009 169.8					1
2	726.6	1.010 168.6	696.7	1.010 168.7	626.8	1.010 168.7	597.0	1.010 168.8	527.1	1.009 168.8							2
3	720.8	99 10 167.7	690.9	99 10 167.7	621.1	99 10 167.8	591.3	99 10 167.9	521.5	99 10 167.9							3
4	714.5	99 11 166.8	684.7	99 11 166.8	614.9	99 11 166.9	585.1	99 11 167.0	515.3	99 11 167.0							4
15	707.9	99 12 165.8	678.1	99 12 165.9	608.3	99 12 165.9	578.5	99 12 166.0	508.8	99 12 166.1							15
6	700.7	99 13 164.9	671.0	99 13 164.9	601.3	99 13 165.0	571.5	99 12 165.1	501.8	99 12 165.1							6
7	693.2	99 13 163.9	663.5	99 13 164.0	593.7	99 13 164.1	563.9	99 13 164.1	494.2	99 13 164.1							7
8	685.2	99 14 163.0	655.5	99 14 163.1	585.8	99 14 163.1	556.0	99 14 163.2	486.2	99 14 163.2							8
9	676.7	99 15 162.1	647.1	99 15 162.1	577.4	99 15 162.2	547.6	99 15 162.3	477.4	99 15 162.3							9
20	627.8	99 16 161.1	598.2	99 16 161.2	528.6	99 16 161.3											20
1	618.5	99 16 160.2	589.9	99 16 160.3	519.3	99 16 160.4											1
2	608.7	98 17 159.3	579.2	98 17 159.4	509.7	98 17 159.4											2
3	598.5	98 18 158.3	568.0	98 18 158.4													3
4	587.9	98 18 157.4	556.5	98 18 157.5													4
25	536.9	98 19 156.5	507.5	98 19 156.6													25
6	525.4	98 20 155.6															6
7	513.6	98 20 154.6															7
8	501.3	98 21 153.7															8

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.
	Alt.	Az.															
91	1706.9	87 46 79.4	1733.0	87 46 79.2	1759.1	87 46 78.9	1825.2	87 46 78.7	1851.3	87 46 78.4	1917.3	87 46 78.1	1943.3	87 46 77.9	2009.3	87 46 77.6	91
2	1639.2	87 46 78.6	1705.4	87 46 78.3	1731.5	87 46 78.1	1757.6	87 46 77.8	1823.7	87 46 77.6	1849.8	87 46 77.3	1915.8	87 46 77.0	1941.8	87 46 76.8	2
3	1611.7	87 46 77.7	1637.8	87 46 77.5	1704.0	87 46 77.2	1730.1	87 46 77.0	1756.2	87 46 76.7	1822.3	87 46 76.4	1848.4	87 46 76.2	1914.5	87 46 75.9	3
4	1544.2	87 46 76.9	1610.4	87 46 76.6	1636.6	87 46 76.4	1702.7	87 46 76.1	1728.9	87 46 75.9	1755.0	87 46 75.6	1821.1	87 46 75.3	1847.2	87 46 75.1	4
95	1516.8	87 46 76.0	1543.0	87 46 75.8	1609.2	87 46 75.5	1635.4	87 46 75.3	1701.6	87 46 75.0	1727.8	87 46 74.8	1753.9	87 46 74.5	1820.0	87 46 74.2	95
6	1449.5	88 45 75.2	1515.8	88 45 74.9	1542.0	88 45 74.7	1608.2	88 45 74.4	1634.5	88 45 74.2	1700.6	88 45 73.9	1726.8	88 45 73.7	1753.0	88 45 73.4	6
7	1422.3	88 45 74.3	1448.6	88 45 74.1	1514.9	88 45 73.8	1541.2	88 45 73.6	1607.4	88 45 73.3	1633.6	88 45 73.1	1659.8	88 45 72.8	1726.0	88 45 72.6	7
8	1355.3	88 45 73.5	1421.6	88 45 73.2	1447.9	88 45 73.0	1514.2	88 45 72.7	1540.5	88 45 72.5	1606.8	88 45 72.2	1633.0	88 45 72.0	1659.2	88 45 71.7	8
9	1328.3	88 45 72.6	1354.7	88 45 72.4	1421.0	88 45 72.1	1447.4	88 45 71.9	1513.7	88 45 71.6	1540.0	88 45 71.4	1606.3	88 45 71.1	1632.5	88 45 70.9	9
100	1301.5	88 44 71.8	1327.9	88 44 71.5	1354.3	88 44 71.3	1420.7	88 44 71.0	1447.0	88 44 70.8	1513.4	88 44 70.5	1539.7	88 44 70.3	1606.0	88 44 70.1	100
1	1234.8	88 44 70.9	1301.3	88 44 70.7	1327.7	88 44 70.4	1354.1	88 44 70.2	1420.5	88 44 70.0	1446.9	88 44 69.7	1513.2	88 44 69.5	1539.6	88 44 69.2	1
2	1208.3	88 44 70.1	1234.7	88 44 69.8	1301.2	88 44 69.6	1327.7	88 44 69.4	1354.1	88 44 69.1	1420.5	88 44 68.9	1446.9	88 44 68.6	1513.3	88 44 68.4	2
3	1141.9	88 44 69.2	1208.4	88 44 69.0	1234.9	88 44 68.8	1301.4	88 44 68.5	1327.9	88 44 68.3	1354.3	88 44 68.0	1420.8	88 44 67.8	1447.2	88 44 67.5	3
4	1115.6	88 44 68.4	1142.2	88 44 68.1	1208.7	88 44 67.9	1235.2	88 44 67.7	1301.8	88 44 67.4	1328.3	88 44 67.2	1354.8	88 44 66.9	1421.3	88 44 66.7	4
105	1049.5	88 43 67.5	1116.1	88 43 67.3	1142.7	88 43 67.1	1209.3	88 43 66.8	1235.8	88 43 66.6	1302.4	88 43 66.4	1328.9	88 43 66.1	1355.5	88 43 65.9	105
6	1023.5	88 43 66.7	1050.2	88 43 66.5	1116.8	88 43 66.2	1143.5	88 43 66.0	1210.1	88 43 65.7	1236.7	88 43 65.5	1303.3	88 43 65.3	1329.9	88 43 65.0	6
7	957.8	88 43 65.8	1024.4	88 43 65.6	1051.1	88 43 65.4	1117.8	88 43 65.1	1144.5	88 43 64.9	1211.1	88 43 64.7	1237.8	88 43 64.4	1304.4	88 43 64.2	7
8	932.1	88 42 65.0	958.9	88 42 64.8	1025.6	88 42 64.5	1052.3	88 42 64.3	1119.1	88 42 64.1	1145.8	88 42 63.8	1212.5	88 42 63.6	1239.1	88 42 63.4	8
9	906.7	88 42 64.1	933.5	88 42 63.9	1000.3	88 42 63.7	1027.1	88 42 63.5	1053.8	88 42 63.2	1120.6	88 42 63.0	1147.3	88 42 62.8	1214.0	88 42 62.5	9
110	841.4	88 42 63.3	908.3	88 42 63.1	935.1	88 42 62.8	1001.9	88 42 62.6	1028.8	88 42 62.4	1055.6	88 42 62.2	1122.4	88 42 61.9	1149.1	88 42 61.7	110
1	816.4	90 41 62.4	883.3	90 41 62.2	910.2	90 41 62.0	937.0	90 41 61.8	1003.9	90 41 61.5	1030.8	90 41 61.3	1057.6	90 41 61.1	1124.4	90 41 60.9	1
2	751.5	90 41 61.6	818.4	90 41 61.4	845.4	90 41 61.1	912.3	90 41 60.9	939.2	90 41 60.7	1006.1	90 41 60.5	1033.0	90 41 60.2	1059.9	90 41 60.0	2
3	726.8	90 41 60.7	793.8	90 41 60.5	820.8	90 40 60.3	847.8	90 40 60.1	914.8	90 40 59.8	941.7	90 40 59.6	1008.7	90 40 59.4	1035.7	90 40 59.2	3
4	702.4	90 40 59.9	769.4	90 40 59.7	796.5	90 40 59.4	823.5	90 40 59.2	850.5	90 40 59.0	917.5	90 40 58.8	944.6	90 40 58.6	1011.6	90 40 58.3	4
115	638.1	90 40 59.0	705.2	90 40 58.8	732.3	90 40 58.6	759.4	90 40 58.4	826.5	90 40 58.2	853.6	90 40 57.9	920.6	90 40 57.7	947.7	90 39 57.5	115
6	614.1	91 40 58.2	681.2	91 40 58.0	708.4	91 40 57.7	735.5	90 39 57.5	802.7	90 39 57.3	829.8	90 39 57.1	856.9	90 39 56.9	924.1	90 39 56	

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.
	Alt.	Ad. Az.															
00	52 00.0	1.001 180.0	52 30.0	1.001 180.0	53 00.0	1.001 180.0	53 30.0	1.001 180.0	54 00.0	1.001 180.0	54 30.0	1.001 180.0	55 00.0	1.001 180.0	55 30.0	1.001 180.0	00
1	51 59.6	1.002 178.5	52 29.6	1.002 178.5	52 59.6	1.002 178.5	53 29.6	1.002 178.5	53 59.6	1.002 178.5	54 29.6	1.002 178.5	54 59.6	1.002 178.5	55 29.6	1.002 178.5	1
2	51 58.5	1.003 177.0	52 28.5	1.003 177.0	52 58.5	1.003 177.0	53 28.5	1.003 177.0	53 58.5	1.003 177.0	54 28.5	1.003 177.0	54 58.5	1.003 177.0	55 28.5	1.003 177.0	2
3	51 57.1	1.004 175.6	52 27.1	1.004 175.6	52 57.1	1.004 175.6	53 27.1	1.004 175.6	53 57.1	1.004 175.6	54 27.1	1.004 175.6	54 57.1	1.004 175.6	55 27.1	1.004 175.6	3
4	51 54.2	1.006 174.1	52 24.1	1.006 174.0	52 54.1	1.006 174.0	53 24.0	1.006 173.9	53 54.0	1.006 173.9	54 23.9	1.006 173.8	54 53.9	1.006 173.8	55 23.9	1.006 173.7	4
05	51 50.9	1.007 172.6	52 20.8	1.007 172.5	52 50.8	1.007 172.5	53 20.7	1.007 172.4	53 50.6	1.007 172.4	54 20.6	1.007 172.3	54 50.5	1.007 172.2	55 20.4	1.007 172.2	05
6	51 46.9	1.008 171.1	52 16.8	1.008 171.1	52 46.7	1.008 171.0	53 16.6	1.008 170.9	53 46.5	1.008 170.9	54 16.4	1.008 170.8	54 46.3	1.008 170.7	55 16.2	1.008 170.6	6
7	51 42.2	1.009 169.7	52 12.1	1.009 169.6	52 41.9	1.009 169.5	53 11.8	1.009 169.4	53 41.7	1.009 169.3	54 11.5	1.009 169.2	54 41.4	1.009 169.1	55 11.2	1.009 169.1	7
8	51 36.8	1.010 168.2	52 06.6	1.010 168.1	52 36.5	1.010 168.0	53 06.3	1.010 167.9	53 36.1	1.010 167.8	54 05.9	1.010 167.7	54 35.7	1.010 167.6	55 05.5	1.010 167.5	8
9	51 30.7	1.011 166.7	52 00.5	1.011 166.6	52 30.2	1.011 166.5	53 00.0	1.011 166.4	53 29.8	1.011 166.3	53 59.6	1.011 166.2	54 29.3	1.011 166.1	54 59.1	1.011 166.0	9
10	51 23.9	1.012 165.3	51 53.6	1.012 165.2	52 23.3	1.012 165.1	52 53.1	1.012 164.9	53 22.8	1.012 164.8	53 52.5	1.012 164.7	54 22.2	1.012 164.6	54 51.9	1.012 164.5	10
1	51 16.4	1.013 163.8	51 46.0	1.013 163.7	52 15.7	1.013 163.6	52 45.4	1.013 163.5	53 15.1	1.013 163.4	53 44.7	1.013 163.3	54 14.4	1.013 163.2	54 44.0	1.013 163.1	1
2	51 08.2	1.014 162.4	51 37.8	1.014 162.3	52 07.4	1.014 162.2	52 37.0	1.014 162.0	53 06.6	1.014 161.9	53 36.2	1.014 161.7	54 05.8	1.014 161.6	54 35.4	1.014 161.4	2
3	50 59.3	1.015 160.9	51 28.9	1.015 160.8	51 58.4	1.015 160.7	52 28.0	1.015 160.5	52 57.5	1.015 160.4	53 27.1	1.015 160.2	53 56.6	1.015 160.1	54 26.1	1.015 159.9	3
4	50 49.8	1.016 159.5	51 19.3	1.016 159.4	51 48.8	1.016 159.2	52 18.3	1.016 159.1	52 47.7	1.016 158.9	53 17.2	1.016 158.8	53 46.6	1.016 158.6	54 16.1	1.016 158.4	4
15	50 39.6	1.017 158.1	51 09.9	1.017 158.0	51 38.5	1.017 157.8	52 07.9	1.017 157.6	52 37.3	1.017 157.5	53 06.7	1.017 157.3	53 36.0	1.017 157.1	54 05.0	1.017 156.9	15
6	50 28.8	1.018 156.7	50 58.1	1.018 156.6	51 27.5	1.018 156.4	51 56.8	1.018 156.2	52 26.2	1.018 156.0	52 55.5	1.018 155.8	53 24.7	1.018 155.7	53 54.0	1.018 155.5	6
7	50 17.3	1.019 155.3	50 46.6	1.019 155.1	51 15.9	1.019 154.9	51 45.1	1.019 154.8	52 14.4	1.019 154.6	52 43.6	1.019 154.4	53 12.8	1.019 154.2	53 42.0	1.019 154.0	7
8	50 05.2	1.020 153.9	50 34.4	1.020 153.7	51 03.6	1.020 153.5	51 32.8	1.020 153.4	52 02.0	1.020 153.2	52 31.1	1.020 153.0	53 00.2	1.020 152.8	53 29.4	1.020 152.6	8
9	49 52.5	1.021 152.5	50 21.7	1.021 152.3	50 50.8	1.021 152.1	51 19.9	1.021 151.9	51 49.0	1.021 151.7	52 18.0	1.021 151.5	52 47.0	1.021 151.3	53 16.1	1.021 151.1	9
20	49 39.2	1.022 151.1	50 08.3	1.022 150.9	50 37.3	1.022 150.8	51 06.3	1.022 150.6	51 35.3	1.022 150.3	52 04.3	1.022 150.1	52 33.2	1.022 149.9	53 02.2	1.022 149.7	20
1	49 25.3	1.023 149.8	49 54.3	1.023 149.6	50 23.3	1.023 149.4	50 52.2	1.023 149.2	51 21.1	1.023 149.0	51 50.0	1.023 148.7	52 18.8	1.023 148.5	52 47.6	1.023 148.3	1
2	49 10.9	1.024 148.4	49 39.8	1.024 148.2	50 08.6	1.024 148.0	50 37.5	1.024 147.8	51 06.3	1.024 147.6	51 35.1	1.024 147.3	52 03.8	1.024 147.1	52 32.5	1.024 146.9	2
3	48 55.8	1.025 147.1	49 24.6	1.025 146.9	49 53.4	1.025 146.7	50 22.2	1.025 146.4	50 50.9	1.025 146.2	51 19.6	1.025 146.0	51 48.2	1.025 145.7	52 16.9	1.025 145.5	3
4	48 40.3	1.026 145.8	49 09.0	1.026 145.5	49 37.7	1.026 145.3	50 06.3	1.026 145.1	50 34.9	1.026 144.8	51 03.5	1.026 144.6	51 32.1	1.026 144.4	52 00.6	1.026 144.1	4
25	48 24.2	1.027 144.4	48 52.8	1.027 144.2	49 21.4	1.027 144.0	49 49.9	1.027 143.7	50 18.4	1.027 143.5	50 46.9	1.027 143.3	51 15.4	1.027 143.0	51 43.9	1.027 142.8	25
6	48 07.5	1.028 143.1	48 36.0	1.028 142.9	49 04.5	1.028 142.7	49 33.0	1.028 142.4	50 01.4	1.028 142.2	50 29.8	1.028 141.9	50 58.2	1.028 141.7	51 26.5	1.028 141.4	6
7	47 50.4	1.029 141.8	48 18.8	1.029 141.6	48 47.2	1.029 141.4	49 15.6	1.029 141.1	49 43.9	1.029 140.9	50 12.2	1.029 140.6	50 40.5	1.029 140.3	51 08.7	1.029 140.1	7
8	47 32.5	1.030 140.6	48 01.0	1.030 140.3	48 29.4	1.030 140.1	48 57.6	1.030 139.8	49 25.9	1.030 139.5	49 54.1	1.030 139.3	50 22.3	1.030 139.0	50 50.4	1.030 138.7	8
9	47 14.5	1.031 139.3	47 42.8	1.031 139.0	48 11.0	1.031 138.8	48 39.2	1.031 138.5	49 07.4	1.031 138.3	49 35.5	1.031 138.0	50 03.5	1.031 137.7	50 31.6	1.031 137.4	9
30	46 56.0	1.032 138.0	47 24.1	1.032 137.8	47 52.2	1.032 137.5	48 20.3	1.032 137.2	48 48.4	1.032 137.0	49 16.4	1.032 136.7	49 44.3	1.032 136.4	50 12.3	1.032 136.1	30
1	46 36.9	1.033 136.8	47 05.0	1.033 136.5	47 33.0	1.033 136.2	48 01.1	1.033 135.9	48 28.9	1.033 135.7	48 56.8	1.033 135.4	49 24.7	1.033 135.1	49 52.5	1.033 134.9	1
2	46 17.4	1.034 135.5	46 45.3	1.034 135.3	47 13.3	1.034 135.0	47 41.2	1.034 134.7	48 09.0	1.034 134.4	48 36.8	1.034 134.2	49 04.6	1.034 133.9	49 32.3	1.034 133.6	2
3	45 57.4	1.035 134.3	46 25.3	1.035 134.0	46 53.1	1.035 133.8	47 20.9	1.035 133.5	47 48.7	1.035 133.2	48 16.4	1.035 132.9	48 44.1	1.035 132.6	49 11.7	1.035 132.3	3
4	45 37.1	1.036 133.1	46 04.8	1.036 132.8	46 32.6	1.036 132.5	47 00.3	1.036 132.2	47 28.0	1.036 132.0	47 55.6	1.036 131.7	48 23.2	1.036 131.4	48 50.7	1.036 131.1	4
35	45 16.3	1.037 131.9	45 44.4	1.037 131.6	46 11.6	1.037 131.3	46 39.3	1.037 131.0	47 06.8	1.037 130.8	47 34.4	1.037 130.5	48 01.8	1.037 130.2	48 29.3	1.037 129.9	35
6	44 55.1	1.038 130.7	45 22.7	1.038 130.4	45 50.3	1.038 130.1	46 17.8	1.038 129.8	46 45.3	1.038 129.5	47 12.7	1.038 129.3	47 49.1	1.038 129.0	48 07.5	1.038 128.6	6
7	44 33.6	1.039 129.5	45 01.1	1.039 129.2	45 28.6	1.039 128.9	45 56.0	1.039 128.6	46 23.4	1.039 128.3	46 50.7	1.039 128.0	47 18.0	1.039 127.7	47 45.3	1.039 127.4	7
8	44 11.6	1.040 128.3	44 39.1	1.040 128.0	45 06.5	1.040 127.7	45 33.8	1.040 127.4	46 01.1	1.040 127.2	46 28.4	1.040 126.9	46 55.6	1.040 126.6	47 22.7	1.040 126.2	8
9	43 49.4	1.041 127.2	44 16.7	1.041 126.9	44 44.0	1.041 126.6	45 11.3	1.041 126.3	45 38.5	1.041 126.0	46 05.7	1.041 125.7	46 32.8	1.041 125.4	47 09.8	1.041 125.1	9
40	43 26.8	1.042 126.0	43 54.0	1.042 125.7	44 21.2	1.042 125.4	44 48.4	1.042 125.1	45 15.5	1.042 124.8	45 42.6	1.042 124.5	46 09.7	1.042 124.2	46 36.6	1.042 123.9	40
1	43 03.8	1.043 124.8	43 31.0	1.043 124.5	43 58.1	1.043 124.2	44 25.2	1.043 123.9	44 52.3	1.043 123.7	45 19.3	1.043 123.4	45 46.2	1.043 123.1	46 13.9	1.043 122.8	1
2	42 40.5	1.044 123.5	43 07.9	1.044 123.2	43 34.7	1.044 122.9	44 01.7	1.044 122.6	44 28.7	1.044 122.3	44 55.6	1.044 122.0	45 22.4	1.044 121.7	45 49.3	1.044 121.4	2
3	42 17.0	1.045 122.6	42 44.0	1.045 122.3	43 11.0	1.045 122.0	43 37.9	1.045 121.7	44 04.8	1.045 121.4	44 31.6	1.045 121.1	44 58.4	1.045 120.8	45 25.1	1.045 120.5	3
4	41 53.1	1.046 121.5	42 20.1	1.046 121.2	42 47.0	1.046 120.9	43 13.8	1.046 120.6	43 40.6	1.046 120.3	44 07.4	1.046 120.0	44 34.1	1.046 119.7	45 00.7	1.046 119.4	4
45	41 28.9	1.047 120.4	41 55.8	1.047 120.1	42 22.7	1.047 119.8	42 49.4	1.047 119.5	43 16.2	1.047 119.2	43 42.8	1.047 118.9	44 09.5	1.047 118.6			

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00'			24° 30'			25° 00'			25° 30'			26° 00'			26° 30'			27° 00'			27° 30'			H.A.
	Alt.	Δd	Az.																						
91	20 35.3	87 46	77.3	21 01.2	86 46	77.1	21 27.1	86 46	76.8	21 53.0	86 46	76.5	22 18.9	86 46	76.3	22 44.7	86 45	76.0	23 10.5	86 45	75.7	23 36.3	86 45	75.4	91
2	20 07.8	87 46	76.5	20 33.8	87 46	76.2	20 59.8	86 46	76.0	21 25.7	86 46	75.7	21 51.6	86 45	75.4	22 17.4	86 45	75.2	22 43.3	86 45	74.9	23 09.1	86 45	74.6	2
3	19 40.5	87 46	75.7	20 06.5	87 45	75.4	20 32.5	87 45	75.1	20 58.4	86 45	74.9	21 24.4	86 45	74.6	21 50.3	86 45	74.3	22 16.1	86 45	74.0	22 42.0	86 45	73.8	3
4	19 13.2	87 45	74.8	19 39.3	87 45	74.6	20 05.3	87 45	74.3	20 31.3	87 45	74.0	20 57.3	87 45	73.8	21 23.2	86 45	73.5	21 49.1	86 45	73.2	22 15.0	86 45	72.9	4
95	18 46.1	87 45	74.0	19 12.2	87 45	73.7	19 38.2	87 45	73.5	20 04.3	87 45	73.2	20 30.3	87 45	72.9	20 56.3	87 45	72.7	21 22.2	86 45	72.4	21 48.1	86 45	72.1	95
6	18 19.1	87 45	73.1	18 45.2	87 45	72.9	19 11.3	87 45	72.6	19 37.4	87 45	72.4	20 03.4	87 44	72.1	20 29.4	87 44	71.8	20 55.4	87 44	71.6	21 21.4	87 44	71.3	6
7	17 52.2	87 45	72.3	18 18.4	87 45	72.0	18 44.5	87 44	71.8	19 10.6	87 44	71.5	19 36.7	87 44	71.3	20 02.7	87 44	71.0	20 28.8	87 44	70.7	20 54.8	87 44	70.5	7
8	17 25.4	87 44	71.5	17 51.6	87 44	71.2	18 17.8	87 44	71.0	18 43.9	87 44	70.7	19 10.1	87 44	70.4	19 36.2	87 44	70.2	20 02.2	87 44	69.9	20 28.3	87 44	69.7	8
9	16 58.8	87 44	70.6	17 25.0	87 44	70.4	17 51.2	87 44	70.1	18 17.4	87 44	69.9	18 43.6	87 44	69.6	19 09.7	87 44	69.4	19 35.9	87 44	69.1	20 02.0	87 44	68.8	9
100	16 32.3	88 44	69.8	16 58.6	88 44	69.5	17 24.8	87 44	69.3	17 51.0	87 44	69.0	18 17.3	87 44	68.8	18 43.4	87 44	68.5	19 09.6	87 44	68.3	19 35.8	87 43	68.0	100
1	16 05.9	88 44	69.0	16 32.2	88 44	68.7	16 58.5	88 44	68.5	17 24.8	88 43	68.2	17 51.1	87 44	68.0	18 17.3	87 43	67.7	18 43.5	87 43	67.4	19 09.7	87 43	67.2	1
2	15 39.7	88 44	68.1	16 06.1	88 43	67.9	16 32.4	88 43	67.6	16 58.7	88 43	67.4	17 25.0	88 43	67.1	17 51.3	88 43	66.9	18 17.6	88 43	66.6	18 43.8	87 43	66.4	2
3	15 13.6	88 43	67.3	15 40.0	88 43	67.1	16 06.4	88 43	66.8	16 32.8	88 43	66.6	16 59.2	88 43	66.3	17 25.5	88 43	66.1	17 51.8	88 43	65.8	18 18.1	88 43	65.6	3
4	14 47.7	88 43	66.5	15 14.2	88 43	66.2	15 40.6	88 43	66.0	16 07.0	88 43	65.7	16 33.5	88 43	65.5	16 39.8	88 42	65.2	17 26.2	88 42	65.0	17 52.6	88 42	64.7	4
105	14 22.0	88 43	65.6	14 48.5	88 43	65.4	15 15.0	88 42	65.1	15 41.5	88 42	64.9	16 07.9	88 42	64.7	16 34.3	88 42	64.4	17 00.8	88 42	64.2	17 27.2	88 42	63.9	105
6	13 56.4	89 42	64.8	14 23.0	88 42	64.6	14 49.5	88 42	64.3	15 16.0	88 42	64.1	15 42.5	88 42	63.8	16 09.0	88 42	63.6	16 35.5	88 42	63.3	17 02.0	88 42	63.1	6
7	13 31.0	89 42	64.0	13 57.6	89 42	63.7	14 24.2	89 42	63.5	14 50.8	89 42	63.2	15 17.3	89 42	63.0	15 43.9	88 42	62.8	16 10.4	88 42	62.5	16 36.9	88 41	62.3	7
8	13 05.8	89 42	63.1	13 32.5	89 42	62.9	13 59.1	89 42	62.7	14 25.7	89 41	62.4	14 52.3	89 41	62.2	15 18.9	89 41	61.9	15 45.5	89 41	61.7	16 12.1	89 41	61.5	8
9	12 40.8	89 42	62.3	13 07.5	89 41	62.1	13 34.2	89 41	61.8	14 00.9	89 41	61.6	14 27.5	89 41	61.4	14 54.2	89 41	61.1	15 20.8	89 41	60.9	15 47.4	89 41	60.6	9
110	12 15.9	89 41	61.5	12 42.7	89 41	61.2	13 09.4	89 41	61.0	13 36.2	89 41	60.8	14 02.9	89 41	60.5	14 29.6	89 41	60.3	14 56.3	89 40	60.1	15 23.0	89 40	59.8	110
1	11 51.3	89 41	60.6	12 18.1	89 41	60.4	12 44.9	89 40	60.2	13 11.7	89 40	59.9	13 38.5	89 40	59.7	14 05.2	89 40	59.5	14 32.0	89 40	59.2	14 58.7	89 40	59.0	1
2	11 26.8	90 40	59.8	11 53.7	90 40	59.6	12 20.6	90 40	59.3	12 47.4	90 40	59.1	13 14.3	90 40	58.9	13 41.1	90 40	58.7	14 07.9	90 40	58.4	14 34.7	90 40	58.2	2
3	11 02.6	90 40	59.0	11 29.5	90 40	58.7	11 56.4	90 40	58.5	12 23.4	90 40	58.3	12 50.2	90 40	58.1	13 17.1	90 40	57.8	13 44.0	90 40	57.6	14 10.9	90 39	57.4	3
4	10 38.6	90 40	58.1	11 05.6	90 40	57.9	11 32.5	90 40	57.7	11 59.5	90 39	57.5	12 26.5	90 39	57.2	12 53.4	90 39	57.0	13 20.3	90 39	56.8	13 47.3	90 39	56.6	4
115	10 14.8	90 39	57.3	10 41.8	90 39	57.1	11 08.8	90 39	56.8	11 35.9	90 39	56.6	12 02.9	90 39	56.4	12 29.9	90 39	56.2	12 56.9	90 39	56.0	13 23.9	90 39	55.7	115
6	9 51.2	90 39	56.4	10 18.3	90 39	56.2	10 45.4	90 39	56.0	11 12.5	90 39	55.8	11 39.5	90 38	55.6	12 06.6	90 38	55.4	12 33.7	90 38	55.1	13 00.7	90 38	54.9	6
7	9 27.8	91 38	55.6	9 55.0	91 38	55.4	10 22.1	91 38	55.2	10 49.3	90 38	55.0	11 16.4	90 38	54.7	11 43.5	90 38	54.5	12 10.7	90 38	54.3	12 37.8	90 38	54.1	7
8	9 04.7	91 38	54.8	9 31.9	91 38	54.6	9 59.1	91 38	54.3	10 26.3	91 38	54.1	10 53.5	91 38	53.9	11 20.7	91 38	53.7	11 47.9	91 38	53.5	12 15.1	91 37	53.3	8
9	8 41.8	91 38	53.9	9 09.1	91 38	53.7	9 36.4	91 38	53.5	10 03.6	91 37	53.3	10 30.9	91 37	53.1	10 58.1	91 37	52.9	11 25.4	91 37	52.7	11 52.6	91 37	52.4	9
120	8 19.1	91 37	53.1	8 46.5	91 37	52.9	9 13.8	91 37	52.7	9 41.2	91 37	52.5	10 08.5	91 37	52.3	10 35.8	91 37	52.0	11 03.1	91 37	51.8	11 30.4	91 37	51.6	120
1	7 56.7	91 37	52.2	8 24.2	91 37	52.0	8 51.6	91 37	51.8	9 19.0	91 37	51.6	9 46.3	91 36	51.4	10 13.7	91 36	51.2	10 41.1	91 36	51.0	11 08.5	91 36	50.8	1
2	7 34.6	92 36	51.4	8 02.1	92 36	51.2	8 29.5	92 36	51.0	8 57.0	92 36	50.8	9 24.4	91 36	50.6	9 51.9	91 36	50.4	10 19.3	91 36	50.2	10 46.8	91 36	50.0	2
3	7 12.7	92 36	50.6	7 40.3	92 36	50.4	8 07.8	92 36	50.2	8 35.3	92 36	50.0	9 02.8	92 36	49.8	9 30.3	92 36	49.6	9 57.8	92 36	49.4	10 25.3	92 36	49.1	3
4	6 51.1	92 36	49.7	7 18.7	92 36	49.5	7 46.3	92 36	49.3	8 13.9	92 36	49.1	8 41.5	92 36	48.9	9 09.0	92 35	48.7	9 36.6	92 35	48.5	10 04.2	92 35	48.3	4
125	6 29.7	92 35	48.9	6 57.4	92 35	48.7	7 25.1	92 35	48.5	7 52.7	92 35	48.3	8 20.4	92 35	48.1	8 48.0	92 35	47.9	9 15.6	92 34	47.7	9 43.2	92 34	47.5	125
6	6 08.7	92 35	48.0	6 36.4	92 35	47.8	7 04.1	92 34	47.6	7 31.8	92 34	47.4	7 59.5	92 34	47.2	8 27.2	92 34	47.1	8 54.9	92 34	46.9	9 22.6	92 34	46.7	6
7	5 47.9	93 34	47.2	6 15.7	93 34	47.0	6 43.4	93 34	46.8	7 11.2	93 34	46.6	7 39.0	93 34	46.4	8 06.8	93 34	46.2	8 34.5	93 34	46.0	9 02.3	93 33	45.8	7
8	5 27.4	93 34	46.3	5 55.2	93 34	46.1	6 23.1	93 34	45.9	6 50.9	93 33	45.8	7 18.7	93 33	45.6	7 46.6	93 33	45.4	8 14.4	93 33	45.2	8 42.2	93 33	45.0	8
9	5 07.1	93 34	45.5	5 35.0	93 33	45.3	6 03.0	93 33	45.1	6 30.9	93 33	44.9	6 58.8	93 33	44.7	7 26.7	93 33	44.5	7 54.6	93 33	44.4	8 22.4	93 32	44.2	9
130				5 15.2	93 33	44.4	5 43.2	93 33	44.2	6 11.1	93 32	44.1	6 39.1	93 32	43.9	7 07.0	93 32	43.7	7 35.0	93 32	43.5	8 03.0	93 32	43.3	130
1							5 23.6	93 32	43.4	5 51.7	93 32	43.2	6 19.7	93 32	43.0	6 47.7	93 32	42.9	7 15.8	93 32	42.7	7 43.8	93 31	42.5	1
2				</																					

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.					
	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt						
00	56 00.0	1.0 01	180.0	56 30.0	1.0 01	180.0	57 00.0	1.0 01	180.0	58 00.0	1.0 01	180.0	60 00.0	1.0 01	180.0	62 30.0	1.0 01	180.0	63 30.0	1.0 01	180.0	00
1	55 59.6	1.0 02	178.4	56 29.6	1.0 02	178.4	56 59.6	1.0 02	178.4	57 59.6	1.0 02	178.4	59 59.6	1.0 02	178.4	61 59.6	1.0 02	178.2	63 29.6	1.0 02	178.2	1
2	55 58.4	1.0 03	176.8	56 28.4	1.0 03	176.8	56 58.4	1.0 03	176.8	57 58.4	1.0 03	176.8	59 58.3	1.0 03	176.6	61 58.3	1.0 04	176.4	63 28.2	1.0 04	176.4	2
3	55 56.5	1.0 04	175.3	56 26.5	1.0 04	175.2	56 56.5	1.0 05	175.2	57 56.4	1.0 05	175.1	59 56.3	1.0 05	174.9	61 56.1	1.0 05	174.7	63 26.1	1.0 05	174.5	3
4	55 53.8	1.0 06	173.7	56 23.7	1.0 06	173.6	56 53.7	1.0 06	173.6	57 53.6	1.0 06	173.5	59 53.3	1.0 06	173.2	61 53.1	1.0 06	172.9	63 23.0	1.0 07	172.7	4
05	55 50.3	1.0 07	172.1	56 20.2	1.0 07	172.0	56 50.2	1.0 07	172.0	57 50.0	1.0 07	171.8	59 49.6	1.0 08	171.5	61 49.2	1.0 08	171.2	63 19.1	1.0 08	170.9	05
6	55 46.1	1.0 08	170.6	56 16.0	1.0 08	170.5	56 45.8	1.0 08	170.4	57 45.6	1.0 09	170.2	59 45.1	1.0 09	169.9	61 44.5	09 09	169.5	63 14.3	09 09	169.3	6
7	55 41.1	09 10	169.0	56 10.9	09 10	168.9	56 40.8	09 10	168.8	57 40.4	09 10	168.6	59 39.7	09 10	168.2	61 38.9	09 11	167.8	63 08.7	09 11	167.3	7
8	55 35.3	09 11	167.4	56 05.1	09 11	167.3	56 34.9	09 11	167.2	57 34.5	09 11	167.0	59 33.5	09 12	166.5	61 32.5	09 12	166.0	63 01.6	09 12	165.5	8
9	55 28.8	09 12	165.9	55 58.6	09 12	165.8	56 28.3	09 12	165.7	57 27.8	09 12	165.4	59 26.6	09 13	164.9	61 25.2	09 13	164.3	63 54.1	09 14	163.8	9
10	55 21.6	09 13	164.4	55 51.3	09 13	164.2	56 21.0	09 14	164.1	57 20.3	09 14	163.8	59 18.8	09 14	163.2	61 17.2	09 15	162.6	63 46.8	09 15	162.0	10
1	55 13.6	09 14	162.8	55 43.3	09 15	162.7	56 12.9	09 15	162.5	57 12.1	09 15	162.2	59 10.3	09 15	161.6	61 08.3	09 16	160.9	63 37.8	09 16	160.7	1
2	55 05.0	09 16	161.3	55 34.5	09 16	161.1	56 04.1	09 16	161.0	57 03.1	09 16	160.7	59 01.1	09 17	160.0	60 58.7	09 17	159.2	63 28.1	09 17	158.5	2
3	54 55.6	09 17	159.8	55 25.1	09 17	159.6	55 54.5	09 17	159.5	56 53.4	09 17	159.1	58 51.0	09 18	158.4	60 48.4	09 18	157.5	63 17.6	09 18	156.8	3
4	54 45.5	09 18	158.3	55 14.9	09 18	158.1	55 44.3	09 18	157.9	56 43.0	09 18	157.6	58 40.3	09 19	156.8	60 37.2	09 20	155.9	63 06.4	09 20	155.1	4
15	54 34.7	09 19	156.8	55 04.1	09 19	156.6	55 33.4	09 20	156.4	56 31.9	09 20	156.0	58 28.8	09 20	155.2	60 25.3	09 21	154.2	63 54.4	09 21	154.0	15
6	54 23.3	09 20	155.3	54 52.5	09 20	155.1	55 21.7	09 20	154.9	56 20.1	09 21	154.5	58 16.6	09 21	153.6	60 12.7	09 22	152.6	63 41.7	09 22	152.3	6
7	54 11.2	09 21	153.8	54 40.3	09 21	153.6	55 09.5	09 22	153.4	56 07.7	09 22	153.0	58 03.8	09 23	152.0	59 59.4	09 23	151.0	63 28.2	09 24	150.7	7
8	53 58.4	09 22	152.4	54 27.5	09 22	152.1	54 56.5	09 22	151.9	55 54.5	09 22	151.5	57 50.2	09 24	150.5	59 45.4	09 24	149.4	63 14.1	09 25	149.1	8
9	53 45.1	09 23	150.9	54 14.0	09 24	150.7	54 43.0	09 24	150.5	55 40.8	09 24	150.0	57 36.0	09 25	149.0	59 30.8	09 26	147.6	63 59.4	09 26	146.9	9
20	53 31.1	09 24	149.5	53 59.9	09 24	149.2	54 28.8	09 25	149.0	55 26.4	09 26	148.5	57 21.2	09 26	147.5	59 15.5	09 27	146.3	63 43.9	09 27	145.3	20
1	53 16.4	09 26	148.1	53 45.2	09 26	147.8	54 14.0	09 26	147.6	55 11.4	09 26	147.1	57 05.8	09 27	146.0	58 59.5	09 28	144.8	63 29.7	09 28	144.5	1
2	53 01.2	09 28	146.6	53 29.9	09 28	146.4	53 58.6	09 27	146.1	54 55.8	09 27	145.6	56 49.7	09 28	144.5	58 43.0	09 29	143.3	63 11.2	09 29	142.9	2
3	52 45.5	09 27	145.2	53 14.0	09 27	145.0	53 42.6	09 28	144.7	54 39.6	09 28	144.2	56 33.1	09 29	143.0	58 25.8	09 30	141.8	63 58.3	09 30	141.4	3
4	52 29.1	09 28	143.9	52 57.6	09 28	143.6	53 26.0	09 28	143.3	54 22.8	09 29	142.8	56 15.8	09 30	141.6	58 08.1	09 31	140.3	63 36.1	09 31	140.0	4
25	52 12.3	09 29	142.5	52 40.6	09 29	142.2	53 09.0	09 30	142.0	54 05.5	09 30	141.4	55 58.1	09 30	140.2	57 49.9	09 31	138.8	63 17.7	09 32	138.5	25
6	51 54.8	09 30	141.1	52 23.1	09 30	140.9	52 51.3	09 30	140.6	53 47.6	09 31	140.0	55 39.8	09 31	138.8	57 31.1	09 32	137.4	63 57.7	09 32	137.1	6
7	51 36.9	09 31	139.8	52 05.1	09 31	139.5	52 33.2	09 31	139.2	53 29.3	09 31	138.6	55 20.9	09 32	137.4	57 11.7	09 33	136.0	63 39.3	09 33	135.6	7
8	51 18.5	09 32	138.5	51 46.5	09 32	138.2	52 14.5	09 32	137.9	53 10.4	09 32	137.3	55 01.6	09 32	136.0	56 51.9	09 34	134.6	63 19.4	09 34	134.2	8
9	50 59.6	09 32	137.1	51 27.5	09 32	136.9	51 55.4	09 33	136.6	52 51.1	09 33	136.0	54 41.8	09 34	134.6	56 31.6	09 35	133.2	63 58.9	09 35	132.8	9
30	50 40.2	09 33	135.8	51 08.0	09 33	135.6	51 35.8	09 33	135.3	52 31.3	09 34	134.6	54 21.5	09 35	133.3	55 10.9	09 36	131.9	63 36.0	09 36	131.5	30
1	50 20.3	09 34	134.6	50 48.1	09 34	134.3	51 15.8	09 34	134.0	52 11.0	09 35	133.3	54 00.8	09 36	132.0	55 49.7	09 36	130.5	63 16.7	09 36	130.1	1
2	50 00.0	09 34	133.3	50 27.7	09 35	133.0	50 55.3	09 35	132.7	51 50.3	09 35	132.0	53 39.7	09 36	130.7	55 28.1	09 37	129.2	63 55.0	09 37	128.8	2
3	49 39.3	09 35	132.0	50 06.9	09 35	131.7	50 34.3	09 36	131.4	51 29.2	09 36	130.8	53 18.1	09 37	129.4	55 06.0	09 37	127.9	63 32.8	09 38	127.5	3
4	49 18.2	09 36	130.8	49 45.6	09 36	130.5	50 13.0	09 36	130.2	51 07.6	09 37	129.5	52 56.1	09 37	128.1	54 43.6	09 38	126.6	63 10.3	09 38	126.2	4
35	48 56.7	09 36	129.5	49 24.0	09 37	129.2	49 51.3	09 37	128.9	50 45.7	09 37	128.3	52 33.8	09 38	126.9	54 20.8	09 39	125.3	63 47.4	09 39	124.9	35
6	48 34.8	09 37	128.3	49 02.0	09 37	128.0	49 29.2	09 38	127.7	50 23.4	09 38	127.0	52 11.1	09 38	125.6	53 57.7	09 39	124.1	63 24.1	09 39	123.7	6
7	48 12.5	09 38	127.1	48 39.6	09 38	126.8	49 06.7	09 38	126.5	50 00.7	09 38	125.8	51 48.0	09 39	124.4	53 34.2	09 40	122.8	63 04.0	09 40	122.4	7
8	47 49.8	09 38	125.9	48 16.9	09 38	125.6	48 43.9	09 39	125.3	49 37.7	09 39	124.6	51 24.6	09 40	123.2	53 10.3	09 40	121.6	63 36.6	09 40	121.2	8
9	47 26.9	09 39	124.7	47 53.8	09 39	124.4	48 20.7	09 39	124.1	49 14.4	09 39	123.4	51 00.8	09 40	122.0	52 46.2	09 41	120.4	63 12.3	09 41	120.0	9
40	47 03.6	09 40	123.6	47 30.4	09 40	123.3	47 57.2	09 40	122.9	48 50.7	09 40	122.2	50 36.8	09 41	120.8	52 21.8	09 41	119.2	63 52.4	09 41	118.8	40
1	46 39.9	09 40	122.4	47 06.7	09 40	122.1	47 33.4	09 40	121.8	48 26.7	09 40	121.1	50 12.4	09 41	119.6	51 57.0	09 42	118.1	63 23.0	09 42	117.6	1
2	46 16.0	09 40	121.3	46 42.7	09 40	120.9	47 09.3	09 40	120.6	48 02.4	09 41	119.9	49 47.8	09 41	118.5	51 32.0	09 42	116.9	63 57.9	09 42	116.5	2
3	45 51.8	09 41	120.1	46 18.4	09 41	119.8	46 45.0	09 41	119.5	47 37.9	09 41	118.8	49 22.9	09 42	117.3	51 06.8	09 42	115.8	63 32.6	09 43	115.3	3
4	45 27.3	09 41	119.0	45 53.8	09 41	118.7	46 20.3	09 42	118.4	47 13.1	09 42	117.7	48 57.8	09 42	116.2	50 41.3	09					

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.								
	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.									
91	24 02.1	86 45	75.2	24 27.8	86 45	74.9	24 53.5	86 45	74.6	25 44.7	85 45	74.0	27 26.9	85 45	72.8	29 08.4	84 44	71.6	29 33.7	84 44	71.3	30 24.1	84 44	70.7	91
2	23 34.9	86 45	74.3	24 00.6	86 45	74.0	24 26.4	86 45	73.8	25 17.7	85 45	73.2	27 00.0	85 45	72.0	28 41.7	84 44	70.8	29 07.1	84 44	70.5	29 57.6	84 44	69.9	2
3	23 07.8	86 45	73.5	23 33.6	86 45	73.2	23 59.4	86 45	72.9	24 50.8	85 44	72.4	26 33.3	85 44	71.2	28 15.2	85 44	70.0	28 40.6	85 44	69.7	29 31.2	84 44	69.1	3
4	22 40.9	86 45	72.7	23 06.7	86 45	72.4	23 32.5	86 44	72.1	24 24.0	86 44	71.6	26 06.7	85 44	70.4	27 48.8	85 44	69.2	28 14.2	85 44	68.9	29 05.0	84 44	68.3	4
95	22 14.0	86 44	71.8	22 39.9	86 44	71.6	23 05.8	86 44	71.3	23 57.4	86 44	70.7	25 40.2	85 44	69.6	27 22.5	85 44	68.4	27 48.0	85 43	68.1	28 38.8	85 43	67.5	95
6	21 47.3	86 44	71.0	22 13.3	86 44	70.8	22 39.2	86 44	70.5	23 30.8	86 44	69.9	25 13.9	86 44	68.8	26 56.4	85 43	67.6	27 21.9	85 43	67.4	28 12.9	85 43	66.8	6
7	21 20.8	87 44	70.2	21 46.7	86 44	69.9	22 12.7	86 44	69.7	23 04.5	86 44	69.1	24 47.7	86 43	68.0	26 30.4	85 43	66.9	26 56.0	85 43	66.6	27 47.1	85 43	66.0	7
8	20 54.3	87 44	69.4	21 20.3	87 44	69.1	21 46.3	87 44	68.8	22 38.2	86 44	68.3	24 21.6	86 43	67.2	26 04.6	86 43	66.1	26 30.2	85 43	65.8	27 21.4	85 42	65.2	8
9	20 28.0	87 44	68.6	20 54.1	87 44	68.3	21 20.1	87 43	68.0	22 12.1	87 43	67.5	23 55.8	86 43	66.4	25 38.9	86 42	65.3	26 04.6	86 42	65.0	26 56.0	85 42	64.4	9
100	20 01.9	87 43	67.7	20 28.0	87 43	67.5	20 54.1	87 43	67.2	21 46.2	87 43	66.7	23 30.0	86 43	65.6	25 13.4	86 42	64.5	25 39.2	86 42	64.2	26 30.6	86 42	63.6	100
1	19 35.9	87 43	66.9	20 02.1	87 43	66.7	20 28.2	87 43	66.4	21 20.4	87 43	65.9	23 04.5	87 42	64.8	24 48.1	86 42	63.7	25 13.9	86 42	63.4	26 05.8	86 42	62.9	1
2	19 10.1	87 43	66.1	19 36.3	87 43	65.9	20 02.5	87 43	65.6	20 54.8	87 42	65.1	22 39.0	87 42	64.0	24 22.9	86 42	62.9	24 48.8	86 42	62.6	25 40.5	86 41	62.1	2
3	18 44.4	88 42	65.3	19 10.7	87 42	65.0	19 36.9	87 42	64.8	20 29.3	87 42	64.3	22 13.8	87 42	63.2	23 57.9	87 41	62.1	24 23.9	86 41	61.9	25 15.7	86 41	61.3	3
4	18 18.9	88 42	64.5	18 45.2	88 42	64.2	19 11.5	88 42	64.0	20 04.0	87 42	63.5	21 48.8	87 41	62.4	23 33.1	87 41	61.3	23 59.1	87 41	61.1	24 51.1	86 41	60.5	4
105	17 53.6	88 42	63.7	18 19.9	88 42	63.4	18 46.3	88 42	63.2	19 38.9	88 42	62.7	21 23.9	87 41	61.6	23 08.5	87 41	60.6	23 34.6	87 41	60.3	24 26.7	87 40	59.7	105
6	17 28.4	88 42	62.8	17 54.8	88 42	62.6	18 21.2	88 41	62.3	19 14.0	88 41	61.8	20 59.2	88 41	60.8	22 44.1	87 40	59.8	23 10.2	87 40	59.5	24 02.4	87 40	59.0	6
7	17 03.4	88 41	62.0	17 29.9	88 41	61.8	17 56.4	88 41	61.5	18 49.2	88 41	61.0	20 34.7	88 40	60.0	22 19.8	87 40	59.0	22 46.0	87 40	58.7	23 38.4	87 40	58.2	7
8	16 38.6	88 41	61.2	17 05.2	88 41	61.0	17 31.7	88 41	60.7	18 24.7	88 41	60.2	20 10.4	88 40	59.2	21 55.8	88 40	58.2	22 22.1	88 40	57.9	23 14.5	87 39	57.4	8
9	16 14.1	89 41	60.4	16 40.6	89 41	60.2	17 07.2	89 40	59.9	18 00.3	88 40	59.4	19 46.3	88 40	58.4	21 31.9	88 39	57.4	21 58.3	88 39	57.2	22 50.9	88 39	56.6	9
110	15 49.7	89 40	59.6	16 16.3	89 40	59.3	16 42.9	89 40	59.1	17 36.2	89 40	58.6	19 22.4	89 40	57.6	21 08.3	88 39	56.6	21 34.7	88 39	56.4	22 27.5	88 39	55.9	110
1	15 25.5	89 40	58.8	15 52.2	89 40	58.5	16 18.9	89 40	58.3	17 12.2	89 40	57.8	18 58.7	89 39	56.8	20 44.9	88 39	55.9	21 11.4	88 39	55.6	22 04.3	88 38	55.1	1
2	15 01.5	89 40	58.0	15 28.3	89 40	57.7	15 55.0	89 39	57.5	16 48.5	89 39	57.0	18 35.2	89 39	56.1	20 21.7	89 38	55.1	21 48.2	88 38	54.8	21 41.3	88 38	54.3	2
3	14 37.7	89 39	57.1	15 04.6	89 39	56.9	15 31.4	89 39	56.7	16 25.0	89 39	56.2	18 12.0	89 38	55.3	19 58.7	89 38	54.3	20 25.3	89 38	54.0	21 18.5	89 38	53.6	3
4	14 14.2	90 39	56.3	14 41.1	90 39	56.1	15 07.9	90 39	55.9	16 01.7	89 38	55.4	17 48.9	89 38	54.5	19 35.9	89 38	53.5	20 40.6	89 37	53.3	20 56.0	89 37	52.8	4
115	13 50.8	90 38	55.5	14 17.8	90 38	55.3	14 44.7	90 38	55.1	15 38.6	90 38	54.6	17 26.1	90 38	53.7	19 13.4	89 37	52.7	20 02.6	89 37	52.5	20 33.7	89 37	52.0	115
6	13 27.7	90 38	54.7	13 54.8	90 38	54.5	14 21.8	90 38	54.2	15 15.8	90 38	53.8	17 03.6	90 37	52.9	18 51.1	90 37	51.9	19 17.9	89 37	51.7	20 11.6	89 36	51.2	6
7	13 04.9	90 38	53.9	13 32.0	90 38	53.6	13 59.0	90 38	53.4	14 53.1	90 37	53.0	16 41.2	90 37	52.1	18 29.0	90 36	51.2	18 56.0	90 36	50.9	19 49.7	90 36	50.5	7
8	12 42.2	91 37	53.0	13 09.4	90 37	52.8	13 36.5	90 37	52.6	14 30.8	90 37	52.2	16 19.1	90 36	51.3	18 07.2	90 36	50.4	18 34.2	90 36	50.1	19 28.1	90 36	49.7	8
9	12 19.9	91 37	52.2	12 47.1	91 37	52.0	13 14.3	91 37	51.8	14 08.7	91 36	51.4	15 57.3	90 36	50.5	17 45.7	90 36	49.6	18 12.7	90 35	49.4	19 06.8	90 35	48.9	9
120	11 57.7	91 36	51.4	12 25.0	91 36	51.2	12 52.3	91 36	51.0	13 46.8	91 36	50.6	15 35.7	91 36	49.7	17 24.3	90 35	48.8	17 51.5	90 35	48.6	18 45.7	90 35	48.1	120
1	11 35.8	91 36	50.6	12 03.2	91 36	50.4	12 30.5	91 36	50.2	13 25.1	91 36	49.7	15 14.3	91 35	48.9	17 03.3	91 35	48.0	17 30.5	91 35	47.8	18 24.8	91 34	47.3	1
2	11 14.2	91 36	49.8	11 41.6	91 36	49.6	12 09.0	91 35	49.4	13 03.8	91 35	48.9	14 53.2	91 35	48.1	16 42.5	91 34	47.2	17 09.7	91 34	47.0	18 04.3	91 34	46.6	2
3	10 52.8	92 35	48.9	11 20.3	92 35	48.7	11 47.8	92 35	48.5	12 42.7	91 35	48.1	14 32.4	91 34	47.3	16 21.9	91 34	46.4	16 49.3	91 34	46.2	17 43.9	91 33	45.8	3
4	10 31.7	92 35	48.1	10 59.2	92 35	47.9	11 26.8	92 34	47.7	12 21.8	92 34	47.3	14 11.8	92 34	46.5	16 01.6	91 33	45.7	16 29.1	91 33	45.4	17 23.9	91 33	45.0	4
125	10 10.9	92 34	47.3	10 38.5	92 34	47.1	11 06.1	92 34	46.9	12 01.3	92 34	46.5	13 51.5	92 33	45.7	15 41.6	92 33	44.9	16 09.1	92 33	44.7	17 04.1	92 33	44.2	125
6	9 50.3	92 34	46.5	10 18.0	92 34	46.3	10 45.7	92 34	46.1	11 41.0	92 33	45.7	13 31.5	92 33	44.9	15 21.9	92 32	44.1	15 49.5	92 32	43.9	16 44.6	92 32	43.5	6
7	9 30.0	92 33	45.6	9 57.8	92 33	45.4	10 25.5	92 33	45.3	11 21.0	92 33	44.9	13 11.8	92 32	44.1	15 02.4	92 32	43.3	15 30.1	92 32	43.1	16 25.3	92 32	42.7	7
8	9 10.0	93 33	44.8	9 37.8	93 33	44.6	10 05.6	93 32	44.4	11 01.2	93 32	44.0	12 52.3	93 32	43.3	14 43.3	92 31	42.5	15 11.0	92 31	42.3	16 06.4	92 31	41.9	8
9	8 50.3	93 32	44.0	9 18.2	93 32	43.8	9 46.1	93 32	43.6	10 41.8	93 32	43.2	12 33.2	93 31	42.5	14 24.4	93 31	41.7	14 52.2	93 31	41.5	15 47.7	93 31	41.1	9
130	8 30.9	93 32	43.2	8 58.9	93 32	43.0	9 26.8	93 32	42.8	10 22.6	93 31	42.4	12 14.3	93 31	41.7	14 05.8	93 30	40.9	14 33.7	93 30	40.7	15 29.3	93 30	40.3	130
1	8 11.8	93 31	42.3	8 39.8	93 31	42.1	9 07.8	93 31	42.0	10 03.8	93 31	41.6	11 55.7	93 30	40.9	13 47.5	93 30	40.1	14 15.4	93 30	39.9				

Lat. 62°

H.A.	36° 00'		37° 00'		38° 30'		40° 00'		42° 00'		42° 30'		43° 00'		45° 00'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	64 00.0	1.001	180.0	65 00.0	1.001	180.0	66 30.0	1.001	180.0	68 00.0	1.001	180.0	70 00.0	1.001	180.0	73 00.0	1.001	180.0	00
1	63 59.5	1.002	178.2	64 59.5	1.002	178.1	66 29.5	1.002	178.0	67 59.5	1.002	177.8	69 59.5	1.002	177.8	72 59.5	1.002	177.6	1
2	63 58.2	1.004	176.3	64 58.1	1.004	176.2	66 28.1	1.004	176.1	67 58.0	1.004	175.9	69 57.9	1.004	175.7	72 57.8	1.004	175.2	2
3	63 55.9	1.005	174.5	64 55.8	1.005	174.3	66 25.7	1.005	174.1	67 55.5	1.005	173.9	69 55.2	1.005	173.5	72 54.7	1.005	172.8	3
4	63 52.8	1.007	172.6	64 52.6	1.007	172.5	66 22.3	1.007	172.2	67 52.0	1.007	171.9	69 51.5	1.007	171.3	72 51.2	1.007	170.4	4
05	63 48.7	1.008	170.8	64 48.4	1.008	170.6	66 18.0	1.008	170.2	67 47.5	1.008	169.8	69 46.7	1.008	169.2	72 45.2	1.008	168.0	05
6	63 43.8	1.009	169.0	64 43.4	1.009	168.7	66 12.7	1.009	168.3	67 42.0	1.009	167.8	69 40.9	1.009	167.1	72 40.3	1.009	165.7	6
7	63 37.9	1.011	167.2	64 37.4	1.011	166.9	66 06.6	1.011	166.4	67 35.6	1.011	165.8	69 34.1	1.011	165.0	72 33.3	1.011	163.3	7
8	63 31.3	1.013	165.4	64 30.6	1.013	165.0	65 59.5	1.013	164.5	67 28.2	1.013	163.8	69 26.3	1.013	162.9	72 25.2	1.013	161.0	8
9	63 23.7	1.014	163.6	64 22.9	1.014	163.2	65 51.5	1.014	162.6	67 19.9	1.014	161.9	69 17.5	1.014	160.8	72 16.2	1.014	158.8	9
10	63 15.3	1.015	161.8	64 14.3	1.015	161.4	65 42.6	1.015	160.7	67 10.7	1.015	159.9	69 07.8	1.015	158.8	72 06.1	1.015	156.5	10
1	63 06.1	1.017	160.0	64 04.9	1.017	159.6	65 32.9	1.017	158.9	67 00.6	1.017	158.0	68 57.1	1.017	156.7	71 55.2	1.017	154.3	1
2	62 56.1	1.018	158.3	63 54.7	1.018	157.8	65 22.3	1.018	157.0	66 49.7	1.018	156.1	68 45.6	1.018	154.8	71 44.4	1.018	152.4	2
3	62 45.3	1.019	156.6	63 43.6	1.019	156.1	65 10.9	1.019	155.2	66 37.8	1.019	154.3	68 31.1	1.019	152.8	71 30.5	1.019	150.1	3
4	62 33.7	1.021	154.9	63 31.8	1.021	154.3	64 58.7	1.021	153.4	66 25.2	1.021	152.4	68 19.8	1.021	150.9	71 09.8	1.021	148.0	4
15	62 21.4	1.022	153.2	63 19.2	1.022	152.6	64 45.7	1.022	151.6	66 11.7	1.022	150.6	68 05.7	1.022	149.0	70 34.0	1.022	148.5	15
6	62 08.3	1.023	151.5	63 05.9	1.023	150.9	64 31.9	1.023	149.9	65 57.5	1.023	148.8	67 50.8	1.023	147.1	70 18.9	1.023	146.6	6
7	61 54.5	1.024	149.8	62 51.8	1.024	149.2	64 17.4	1.024	148.2	65 42.6	1.024	147.0	67 35.1	1.024	145.3	70 03.7	1.024	144.8	7
8	61 40.0	1.025	148.2	62 37.1	1.025	147.5	64 02.2	1.025	146.5	65 26.9	1.025	145.3	67 18.7	1.025	143.5	69 46.5	1.025	143.0	8
9	61 24.9	1.026	146.6	62 21.6	1.026	145.9	63 46.3	1.026	144.8	65 10.5	1.026	143.6	67 01.6	1.026	141.7	69 27.9	1.026	141.2	9
20	61 09.0	1.027	145.0	62 05.5	1.027	144.3	63 29.8	1.027	143.1	64 53.4	1.027	141.9	66 34.3	1.027	140.7	69 11.1	1.027	139.4	20
1	60 52.6	1.028	143.4	61 48.7	1.028	142.7	63 12.5	1.028	141.5	64 35.7	1.028	140.2	66 25.3	1.028	138.3	68 52.5	1.028	137.2	1
2	60 35.5	1.029	141.9	61 31.4	1.029	141.1	62 54.7	1.029	139.9	64 17.4	1.029	138.6	66 06.3	1.029	136.6	68 33.3	1.029	135.5	2
3	60 17.8	1.030	140.4	61 13.4	1.030	139.6	62 36.3	1.030	138.4	63 58.4	1.030	137.0	65 46.6	1.030	135.0	68 03.1	1.030	133.8	3
4	59 59.5	1.031	138.9	60 54.9	1.031	138.1	62 17.3	1.031	136.8	63 38.9	1.031	135.4	65 26.4	1.031	133.3	67 43.3	1.031	132.2	4
25	59 40.7	1.032	137.4	60 35.8	1.032	136.6	61 57.7	1.032	135.3	63 18.9	1.032	133.9	65 05.7	1.032	131.8	67 22.1	1.032	130.6	25
6	59 21.4	1.033	135.9	60 16.1	1.033	135.1	61 37.6	1.033	133.8	62 58.3	1.033	132.4	64 44.4	1.033	130.2	66 56.7	1.033	129.1	6
7	59 01.5	1.034	134.5	59 56.0	1.034	133.6	61 17.1	1.034	132.3	62 37.3	1.034	130.9	64 22.7	1.034	128.7	66 34.9	1.034	127.5	7
8	58 41.2	1.035	133.0	59 35.4	1.035	132.2	60 56.0	1.035	130.9	62 15.7	1.035	129.4	64 00.5	1.035	127.2	66 12.1	1.035	126.1	8
9	58 20.4	1.036	131.6	59 14.9	1.036	130.8	60 34.5	1.036	129.0	61 53.8	1.036	127.8	63 37.8	1.036	125.8	64 03.5	1.036	124.2	9
30	57 59.1	1.037	130.3	58 52.7	1.037	129.4	60 12.5	1.037	128.0	61 31.3	1.037	126.6	63 14.8	1.037	124.4	63 40.3	1.037	123.8	30
1	57 37.4	1.038	128.9	58 30.8	1.038	128.0	59 50.1	1.038	126.7	61 08.5	1.038	125.2	62 51.3	1.038	123.0	63 16.7	1.038	121.4	1
2	57 15.3	1.039	127.6	58 08.4	1.039	126.7	59 27.3	1.039	125.3	60 45.3	1.039	123.8	62 27.5	1.039	121.6	62 52.7	1.039	120.1	2
3	56 52.7	1.040	126.3	57 45.6	1.040	125.4	59 04.1	1.040	124.0	60 21.7	1.040	122.5	62 03.4	1.040	120.3	62 28.4	1.040	119.7	3
4	56 29.8	1.041	125.0	57 22.4	1.041	124.1	58 40.6	1.041	122.7	59 57.8	1.041	121.2	61 38.9	1.041	118.9	62 03.8	1.041	118.4	4
35	56 06.6	1.042	123.7	56 58.9	1.042	122.8	58 16.7	1.042	121.4	59 33.5	1.042	119.9	61 14.1	1.042	117.7	61 38.9	1.042	116.1	35
6	55 43.0	1.043	122.4	56 35.1	1.043	121.5	57 52.5	1.043	120.1	59 08.9	1.043	118.6	60 49.0	1.043	116.4	61 13.6	1.043	115.8	6
7	55 19.0	1.044	121.2	56 10.9	1.044	120.3	57 28.0	1.044	118.9	58 44.0	1.044	117.3	60 23.6	1.044	115.1	60 48.1	1.044	114.6	7
8	54 54.8	1.045	119.9	55 46.4	1.045	119.1	57 03.2	1.045	117.6	58 18.9	1.045	116.1	59 58.0	1.045	113.9	60 22.4	1.045	113.3	8
9	54 30.2	1.046	118.7	55 21.7	1.046	117.8	56 38.1	1.046	116.4	57 53.5	1.046	114.9	59 32.1	1.046	112.7	59 56.4	1.046	112.1	9
40	54 05.4	1.047	117.5	54 56.6	1.047	116.7	56 12.7	1.047	115.2	57 27.8	1.047	113.7	59 06.0	1.047	111.5	59 30.2	1.047	110.0	40
1	53 40.3	1.048	116.4	54 31.3	1.048	115.5	55 47.1	1.048	114.1	57 01.9	1.048	112.6	58 39.7	1.048	110.4	59 03.8	1.048	109.8	1
2	53 14.9	1.049	115.2	54 05.8	1.049	114.3	55 21.3	1.049	112.9	56 35.8	1.049	111.4	58 13.2	1.049	109.2	58 37.2	1.049	108.7	2
3	52 49.3	1.050	114.1	53 40.0	1.050	113.2	54 55.2	1.050	111.8	56 09.4	1.050	110.3	57 46.5	1.050	108.1	58 10.4	1.050	107.5	3
4	52 23.5	1.051	112.9	53 14.0	1.051	112.1	54 29.0	1.051	110.6	55 42.9	1.051	109.1	57 19.7	1.051	107.0	57 43.5	1.051	106.4	4
45	51 57.4	1.052	111.8	52 47.8	1.052	110.9	54 02.5	1.052	109.5	55 16.2	1.052	108.0	56 52.7	1.052	105.9	57 16.4	1.052	105.4	45
6	51 31.2	1.053	110.7	52 21.8	1.053	109.8	53 35.9	1.053	108.4	54 49.4	1.053	107.0	56 25.7	1.053	104.8	56 49.9	1.053	104.3	6
7	51 04.7	1.054	109.6	51 54.8	1.054	108.8	53 09.1	1.054	107.4	54 22.3	1.054	105.9	55 58.2	1.054	103.8	56 21.8	1.054	103.2	7
8	50 38.1	1.055	108.6	51 28.8	1.055	107.7	52 42.1	1.055	106.3	53 55.2	1.055	104.8	55 30.8	1.055	102.7	55 54.4	1.055	102.2	8
9	50 11.3	1.056	107.5	51 01.1	1.056	106.6	52 15.0	1.056	105.3	53 27.9	1.056	103.8	55 03.3	1.056	101.7	55 26.8	1.056	101.2	9
50	49 44.4	1.057	106.5	50 34.1	1.057	105.6	51 47.8	1.057	104.2	53 00.5	1.057	102.8	54 35.6	1.057	100.7	54 59.1	1.057	100.2	50
1	49 17.3	1.058	105.4	50 06.9	1.058	104.6	51 20.4	1.058	103.2	52 32.9	1.058	101.8	54 07						

Main table with columns for Right Ascension (H.A.), Declination (Lat. 62° to 65°), and various astronomical data points. The table is organized into rows and columns corresponding to declination values.

Lat. 62°

Lat. 63°

Lat. 64°

Lat. 65°

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00'		47° 00'		48° 30'		49° 30'		50° 30'		51° 30'		52° 30'		54° 00'		H.A.					
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.						
00	74 00.0	1.001	180.0	75 00.0	1.001	180.0	76 30.0	1.001	180.0	77 30.0	1.001	180.0	78 30.0	1.001	180.0	80 30.0	1.002	180.0	82 00.0	1.002	180.0	00
1	73 59.4	1.008	177.5	74 59.4	1.008	177.4	76 29.3	1.008	177.0	77 29.3	1.004	177.0	78 29.2	1.004	176.6	80 29.1	1.008	176.3	81 59.9	1.006	175.8	01
2	73 57.5	1.005	175.0	74 57.4	1.005	174.7	76 27.2	1.005	174.3	77 27.1	1.006	174.0	78 26.9	1.006	173.2	80 26.4	1.007	172.7	81 55.9	1.009	171.6	02
3	73 54.4	1.007	172.5	74 54.2	1.008	172.1	76 23.7	0908	171.5	77 23.4	0908	171.0	78 23.0	0909	169.8	80 21.9	0910	169.0	81 50.7	0912	167.5	03
4	73 50.1	0909	170.0	74 49.7	0910	169.5	76 18.9	0910	168.7	77 18.3	0911	168.1	78 17.6	0912	166.5	80 15.7	0913	165.5	81 43.7	0915	163.4	04
05	73 44.6	0911	167.5	74 44.0	0912	167.0	76 12.8	0912	166.0	77 11.8	0913	165.2	78 10.7	0914	164.3	79 09.4	0915	163.2	80 07.8	0916	162.0	05
6	73 38.0	0912	165.1	74 37.0	0914	164.4	76 05.3	0915	163.3	77 03.9	0915	162.3	78 02.3	0916	161.3	79 00.5	0917	160.0	79 58.3	0918	158.6	06
7	73 30.1	0915	162.7	74 28.8	0916	161.9	75 56.5	0917	160.6	76 54.7	0917	159.5	77 52.6	0918	158.3	78 50.2	0920	156.9	79 47.2	0921	155.3	07
8	73 21.2	0917	160.3	74 19.5	0917	159.4	75 46.6	0919	158.0	76 44.2	0920	156.8	77 41.6	0921	155.5	78 38.4	0922	153.9	79 34.7	0923	152.1	08
9	73 11.1	0918	157.9	74 09.0	0919	157.0	75 35.4	0920	155.4	76 32.5	0921	154.1	77 29.2	0923	152.7	78 25.4	0924	151.0	79 20.9	0925	149.0	09
10	73 00.0	0920	155.6	73 57.5	0921	154.6	75 23.1	0922	152.9	76 19.7	0923	151.5	77 15.7	0924	149.9	78 11.1	0926	148.1	79 05.7	0927	146.0	10
1	72 47.9	0922	153.4	73 44.9	0923	152.3	75 09.7	0924	150.4	76 05.7	0925	149.0	77 01.0	0926	147.3	77 55.7	0928	145.4	78 49.4	0929	143.2	1
2	72 34.8	0923	151.2	73 31.3	0924	150.0	74 55.3	0926	148.0	75 50.6	0927	146.5	76 45.3	0928	144.7	77 39.1	0929	142.8	78 32.0	0931	140.5	2
3	72 20.7	0925	149.0	73 16.8	0926	147.8	74 39.9	0927	145.7	75 34.6	0928	144.1	76 28.5	0930	142.3	77 21.6	0931	140.2	78 13.6	0932	137.8	3
4	72 05.8	0926	146.9	73 01.3	0927	145.6	74 23.6	0929	143.4	75 17.6	0930	141.8	76 10.8	0931	139.9	77 03.1	0932	137.8	77 54.2	0934	135.3	4
15	71 50.0	0928	144.8	72 45.0	0929	143.5	74 06.4	0930	141.2	74 59.8	0931	139.5	75 52.3	0932	137.6	76 43.8	0934	135.4	77 34.0	0935	133.0	15
6	71 33.3	0929	142.8	72 27.8	0930	141.4	73 48.3	0931	139.1	74 41.1	0932	137.3	75 32.9	0934	135.4	76 23.6	0935	133.2	77 13.0	0936	130.7	6
7	71 15.9	0930	140.8	72 09.8	0931	139.4	73 29.5	0932	137.0	74 21.6	0934	135.2	75 12.7	0935	133.2	76 02.7	0936	131.0	76 51.3	0937	128.5	7
8	70 57.7	0931	138.8	71 51.1	0932	137.4	73 09.9	0934	135.0	74 01.4	0935	133.2	74 51.3	0936	131.2	75 41.1	0937	128.9	76 28.9	0938	126.4	8
9	70 38.8	0933	137.0	71 31.7	0933	135.5	72 49.7	0935	133.1	73 40.5	0936	131.2	74 30.3	0937	129.2	75 18.9	0938	126.9	76 06.0	0939	124.4	9
20	70 19.3	0934	135.1	71 11.7	0934	133.6	72 27.8	0936	131.2	73 19.0	0937	129.3	74 08.2	0938	127.3	74 56.1	0939	125.0	75 42.5	0940	123.2	20
1	69 59.1	0935	133.1	70 51.0	0935	131.8	72 07.3	0937	129.3	72 57.0	0938	127.5	73 45.5	0939	125.4	74 32.7	0940	123.2	75 18.5	0941	120.5	1
2	69 38.3	0936	131.6	70 29.7	0936	130.1	71 45.2	0938	127.6	72 34.3	0939	125.7	73 22.3	0940	123.6	74 08.9	0941	121.4	74 54.0	0942	118.9	2
3	69 17.0	0936	129.9	70 07.9	0937	128.4	71 22.6	0938	125.8	72 11.2	0939	124.0	72 58.6	0940	121.9	73 44.7	0941	119.0	74 29.2	0943	117.2	3
4	68 55.1	0937	128.2	69 45.5	0938	126.7	70 55.1	0939	124.2	71 47.6	0940	122.3	72 34.5	0941	120.2	73 20.0	0942	118.0	74 03.9	0943	115.6	4
25	68 32.7	0938	126.6	69 22.7	0939	125.1	70 36.0	0940	122.5	71 23.6	0941	120.7	72 09.9	0942	118.6	72 54.9	0943	116.4	73 38.4	0944	114.0	25
6	68 09.9	0939	125.0	68 59.4	0940	123.5	70 12.1	0941	121.0	70 59.2	0942	119.1	71 45.0	0943	117.1	72 29.5	0944	114.9	73 12.5	0944	112.5	6
7	67 46.6	0940	123.5	68 35.7	0941	122.0	69 47.7	0942	119.4	70 34.4	0943	117.6	71 19.8	0944	115.6	72 03.8	0945	113.4	72 46.3	0946	111.1	7
8	67 22.9	0941	122.0	68 11.6	0941	120.5	69 23.0	0942	117.9	70 09.2	0943	116.1	70 54.2	0944	114.1	71 37.9	0945	112.0	72 19.9	0946	109.7	8
9	66 58.8	0941	120.5	67 47.2	0942	119.0	68 57.9	0943	116.5	69 43.8	0944	114.7	70 28.4	0945	112.7	71 11.6	0946	110.6	71 53.3	0947	108.3	9
30	66 34.4	0942	119.1	67 22.4	0943	117.6	68 32.6	0944	115.1	69 18.0	0945	113.3	70 02.3	0946	111.3	70 45.1	0947	109.2	71 26.5	0948	107.0	30
1	66 09.6	0943	117.7	66 57.3	0943	116.2	68 06.9	0944	113.7	68 52.0	0945	111.9	69 35.9	0946	110.0	70 18.4	0947	107.9	70 59.4	0948	105.7	1
2	65 44.5	0944	116.4	66 31.8	0944	114.8	67 41.0	0945	112.4	68 25.8	0946	110.6	69 09.3	0947	108.7	69 51.5	0948	106.7	70 32.2	0949	104.5	2
3	65 19.2	0945	115.0	66 06.2	0945	113.5	67 14.8	0946	111.1	67 59.3	0947	109.3	68 42.5	0948	107.4	69 24.5	0949	105.4	70 04.9	0950	103.3	3
4	64 53.5	0945	113.7	65 40.2	0946	112.2	66 48.4	0947	109.8	67 32.6	0948	108.1	68 15.6	0949	106.2	68 57.2	0950	104.2	69 37.4	0951	102.1	4
35	64 27.6	0946	112.5	65 14.0	0947	111.0	66 21.8	0948	108.6	67 05.7	0949	106.8	67 48.4	0950	105.0	68 29.9	0951	103.1	69 09.8	0952	101.0	35
6	64 01.4	0947	111.2	64 47.6	0948	109.7	65 55.0	0949	107.4	66 38.7	0950	105.6	67 21.2	0951	103.8	68 02.3	0952	101.9	68 42.1	0953	99.9	6
7	63 35.1	0948	110.0	64 21.0	0949	108.5	65 28.1	0950	106.2	66 11.5	0951	104.5	66 53.8	0952	102.7	67 34.7	0953	100.8	68 14.3	0954	98.8	7
8	63 08.5	0949	108.8	63 54.2	0950	107.3	65 00.9	0951	105.0	65 44.2	0952	103.3	66 26.2	0953	101.6	67 07.0	0954	99.7	67 46.5	0955	97.8	8
9	62 41.8	0950	107.6	63 27.2	0951	106.2	64 33.7	0952	103.9	65 16.7	0953	102.2	65 58.6	0954	100.5	66 39.2	0955	98.7	67 18.5	0956	96.7	9
40	62 14.8	0951	106.5	63 00.1	0952	105.1	64 06.3	0953	102.8	64 49.1	0954	101.2	65 30.8	0955	99.4	66 11.3	0956	97.6	66 50.5	0957	95.7	40
1	61 47.7	0952	105.4	62 32.8	0953	103.9	63 38.7	0954	101.7	64 21.4	0955	100.1	65 03.0	0956	98.4	65 43.0	0957	96.6	65 22.5	0958	94.8	1
2	61 20.5	0953	104.3	62 05.4	0954	102.9	63 11.1	0955	100.6	63 53.6	0956	99.0	64 35.1	0957	97.4	65 15.4	0958	95.6	65 04.3	0959	93.8	2
3	60 53.1	0954	103.2	61 37.9	0955	101.8	62 43.4	0956	99.6	63 25.8	0957	98.0	64 07.1	0958	96.4	64 47.3	0959	94.7	64 47.3	0960	92.8	3
4	60 25.7	0955	102.1	61 10.3	0956	100.7	62 15.5	0957	98.6	62 57.9	0958	97.0	63 39.1	0959	95.4	64 19.2	0960	93.7	64 58.1	0961	91.9	4
45	59 58.1	0956	101.1	60 42.6	0957	99.7	61 47.6	0958	97.5	62 29.9	0959	96.0	63 11.0	0960	94.4	63 51.1	0961	92.8	64 29.9	0962	91.0	45
6	59 30.4	0957	100.0	60 14.7	0958																	

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 60° to 180°.

Lat. 62°

Lat. 63°

Lat. 64°

Lat. 65°

Lat. 66°

Lat. 67°

Lat. 68°

Lat. 69°

Lat. 70°

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30'		55° 00'		56° 00'		56° 30'		57° 00'		57° 30'		59° 00'		59° 30'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
00	82 30.0	1.002	180.0	83 00.0	1.002	180.0	84 00.0	1.002	180.0	84 30.0	1.002	180.0	85 00.0	1.002	180.0	85 30.0	1.002	180.0	87 00.0	1.004	180.0	87 30.0	1.005	180.0	00
1	82 28.9	1.005	175.6	82 58.8	1.006	175.3	83 58.7	1.006	174.3	84 28.6	1.007	174.3	84 58.5	1.008	173.8	85 28.3	1.008	173.2	86 57.5	1.010	170.2	87 27.2	1.011	168.5	1
2	82 25.6	09 09	175.6	82 55.4	09 09	170.6	83 54.8	09 11	169.4	84 24.4	09 11	168.6	84 53.9	09 12	167.7	85 23.4	09 13	166.5	86 50.6	09 15	161.0	87 19.0	09 21	157.8	2
3	82 20.3	08 12	166.8	82 49.7	08 13	166.1	83 48.4	07 15	164.3	84 17.5	07 16	163.1	84 46.5	06 17	161.8	85 15.3	06 18	160.1	86 39.4	01 24	152.5	87 06.2	07 27	148.3	3
4	82 12.8	07 16	162.6	82 41.9	07 16	161.7	83 39.5	06 18	159.3	84 08.1	06 20	157.9	84 36.4	04 21	156.2	85 04.3	02 23	154.1	86 24.8	03 29	145.0	86 49.7	01 32	140.2	4
05	82 03.4	06 19	158.5	82 32.0	05 20	157.4	83 28.5	04 22	154.6	83 56.3	03 25	152.9	84 23.8	01 26	150.9	84 50.8	00 26	148.6	86 07.3	00 33	138.4	86 30.4	00 36	133.5	05
6	81 52.2	04 22	154.6	82 20.3	03 23	153.3	83 15.4	01 26	151.6	83 42.5	00 26	148.2	84 09.1	00 28	146.0	84 35.0	00 29	143.5	85 47.6	00 36	132.8	86 09.0	00 38	127.8	6
7	81 39.3	02 24	150.8	82 06.7	01 25	149.4	83 00.5	00 28	146.0	83 26.8	00 29	143.9	83 52.4	00 31	141.5	84 17.4	00 32	138.8	85 26.1	00 38	127.9	85 46.0	00 40	123.1	7
8	81 24.8	00 27	147.2	81 51.6	00 28	145.7	82 44.0	00 30	142.0	83 09.4	00 31	139.9	83 34.1	00 33	137.4	83 58.0	00 34	134.6	85 03.2	00 40	123.8	85 21.9	00 42	119.1	8
9	81 08.9	00 29	143.8	81 35.0	00 30	142.2	82 25.9	00 32	138.4	82 50.5	00 34	136.1	83 14.4	00 35	133.6	83 37.4	00 36	130.8	84 39.3	00 41	120.1	84 56.9	00 43	115.6	9
10	80 51.6	00 31	140.6	81 17.1	00 32	138.9	81 06.6	00 34	135.0	82 30.4	00 35	132.7	82 53.4	00 37	130.2	83 15.5	00 38	127.4	84 14.6	00 42	116.9	84 31.2	00 44	112.7	10
1	80 33.1	00 33	137.5	80 58.0	00 34	135.8	80 46.1	00 36	131.8	82 09.2	00 37	129.5	82 31.4	00 38	127.0	82 52.6	00 39	124.2	83 49.2	00 43	114.1	84 04.9	00 45	110.1	1
2	80 13.6	00 34	134.7	80 37.9	00 35	132.9	80 24.7	00 37	128.9	81 47.0	00 38	126.6	82 08.4	00 40	124.1	82 29.0	00 41	121.4	83 23.2	00 44	111.6	83 38.3	00 46	107.8	2
3	79 53.1	00 36	131.9	80 16.8	00 37	130.2	80 02.3	00 39	126.1	81 24.0	00 40	123.9	81 44.8	00 41	121.4	82 04.6	00 42	118.7	82 56.8	00 45	109.3	83 11.3	00 46	105.7	3
4	79 31.7	00 37	129.4	79 54.9	00 38	127.6	80 39.2	00 40	123.6	81 00.2	00 41	121.4	81 20.4	00 42	118.9	81 39.6	00 42	116.3	82 30.1	00 45	107.3	82 44.1	00 46	103.9	4
15	79 09.6	00 38	127.0	79 32.2	00 39	125.2	80 15.4	00 41	121.2	80 35.9	00 42	119.0	80 55.4	00 42	116.7	81 14.1	00 43	114.1	82 03.0	00 45	105.4	82 16.6	00 46	102.2	15
6	78 46.7	00 39	124.7	79 08.8	00 40	122.9	79 51.0	00 41	119.0	80 11.0	00 42	116.8	80 30.1	00 43	114.5	80 48.2	00 44	112.1	81 35.8	00 46	103.7	81 49.0	00 46	100.6	6
7	78 23.3	00 40	122.5	78 44.9	00 41	120.7	79 26.2	00 42	116.9	79 45.6	00 43	114.8	80 04.3	00 44	112.6	80 21.9	00 44	110.2	81 08.3	00 46	102.2	81 21.3	00 46	99.7	7
8	77 59.2	00 41	120.4	78 20.4	00 42	118.7	79 00.8	00 43	114.9	79 19.9	00 44	112.9	79 38.1	00 44	110.7	79 55.3	00 45	108.4	80 40.7	00 46	100.7	80 53.4	00 47	97.9	8
9	77 34.7	00 42	118.5	77 55.5	00 42	116.8	78 35.1	00 43	113.1	78 53.8	00 44	111.1	79 11.6	00 45	109.0	79 28.5	00 45	106.7	80 13.0	00 46	99.3	80 25.5	00 47	96.6	9
20	77 09.7	00 42	116.6	77 30.2	00 43	115.0	77 09.0	00 44	111.3	77 27.3	00 44	109.4	77 44.8	00 45	107.3	78 01.4	00 45	105.2	79 45.1	00 47	98.0	79 57.4	00 47	95.5	20
1	76 44.4	00 43	114.9	77 04.5	00 43	113.2	77 22.6	00 44	109.7	77 40.6	00 45	107.8	78 00.6	00 45	105.8	78 17.8	00 46	103.8	79 34.1	00 47	96.8	79 47.2	00 47	94.4	1
2	76 18.6	00 43	113.2	76 38.4	00 44	111.6	77 16.0	00 45	108.1	77 33.7	00 45	106.3	77 50.6	00 46	104.3	78 06.7	00 46	102.3	78 49.2	00 47	95.7	79 01.3	00 47	93.3	2
3	75 52.6	00 44	111.6	76 12.1	00 44	110.0	76 49.1	00 45	106.6	77 06.6	00 46	104.8	77 23.2	00 46	102.9	77 39.1	00 46	101.0	78 21.1	00 47	94.6	78 33.1	00 47	92.3	3
4	75 26.3	00 44	110.1	75 45.5	00 45	108.5	75 22.0	00 45	105.2	76 39.2	00 46	103.5	76 55.7	00 46	101.6	77 11.4	00 46	99.7	77 53.0	00 47	93.6	78 05.0	00 47	91.4	4
25	74 59.7	00 45	108.6	75 18.7	00 45	107.1	75 54.8	00 46	103.9	76 11.8	00 46	102.1	76 28.1	00 46	100.4	76 43.6	00 46	98.5	77 24.9	00 47	92.6	77 36.8	00 47	90.4	25
6	74 32.9	00 45	107.2	74 51.6	00 45	105.7	75 27.3	00 46	102.5	75 44.2	00 46	100.9	76 00.3	00 46	99.2	76 15.7	00 47	97.4	76 56.8	00 47	91.6	77 08.7	00 47	89.6	6
7	74 05.9	00 45	105.8	74 24.4	00 46	104.4	74 59.8	00 46	101.5	75 16.5	00 46	99.7	75 32.5	00 47	98.0	75 47.7	00 47	96.3	75 28.6	00 47	90.7	76 40.5	00 47	88.6	7
8	73 38.7	00 46	104.5	73 57.1	00 46	103.1	74 32.1	00 46	100.1	74 48.6	00 46	98.5	75 04.5	00 47	96.9	75 19.7	00 47	95.2	76 00.4	00 47	89.8	76 12.3	00 47	87.9	8
9	73 11.3	00 46	103.2	73 29.6	00 46	101.9	74 04.3	00 46	98.9	74 20.7	00 47	97.4	74 36.5	00 47	95.8	74 51.6	00 47	94.2	75 32.3	00 47	88.9	75 44.2	00 47	87.1	9
30	72 43.8	00 46	102.0	73 01.9	00 46	100.7	73 36.4	00 47	97.8	73 52.8	00 47	96.3	74 08.5	00 47	94.8	74 23.5	00 47	93.2	75 04.1	00 47	88.1	75 16.1	00 47	86.3	30
1	72 16.2	00 46	100.8	72 34.2	00 46	99.5	73 08.5	00 47	96.7	73 24.8	00 47	95.3	73 40.4	00 47	93.8	73 55.4	00 47	92.2	74 36.0	00 47	87.3	74 48.0	00 47	85.5	1
2	71 48.5	00 46	99.7	72 06.4	00 46	98.4	72 40.5	00 47	95.7	72 56.7	00 47	94.3	73 12.3	00 47	92.8	73 27.2	00 47	91.3	74 07.8	00 47	86.5	74 19.9	00 47	84.8	2
3	71 20.7	00 46	98.6	71 38.5	00 47	97.3	72 12.4	00 47	94.7	72 28.6	00 47	93.3	72 44.1	00 47	91.8	72 59.0	00 47	90.4	73 39.7	00 47	85.7	73 51.9	00 47	84.1	3
4	70 52.8	00 47	97.5	71 10.5	00 47	96.3	71 44.4	00 47	93.7	72 00.4	00 47	92.3	72 16.0	00 47	90.9	72 30.9	00 47	89.5	73 11.7	00 47	85.0	73 23.9	00 47	83.4	4
35	70 24.9	00 47	96.5	70 42.5	00 47	95.3	71 16.2	00 47	92.7	71 32.3	00 47	91.4	71 47.8	00 47	90.0	72 02.7	00 47	88.6	72 43.6	00 47	84.2	72 55.9	00 47	82.7	35
6	69 56.8	00 47	95.5	70 14.4	00 47	94.3	70 48.1	00 47	91.8	71 04.1	00 47	90.5	71 19.6	00 47	89.2	71 34.5	00 47	87.8	72 15.6	00 47	83.5	72 28.0	00 47	82.0	6
7	69 28.8	00 47	94.5	69 46.3	00 47	93.3	70 19.9	00 47	90.9	70 36.0	00 47	89.6	70 51.5	00 47	88.3	71 06.4	00 47	87.0	71 47.7	00 47	82.8	72 00.1	00 47	81.3	7
8	69 00.7	00 47	93.5	69 18.2	00 47	92.4	69 51.8	00 47	90.0	70 07.8	00 47	88.7	70 23.3	00 47	87.5	70 38.3	00 47	86.2	71 19.7	00 47	82.1	71 32.5	00 47	80.7	8
9	68 32.6	00 47	92.5	68 50.0	00 47	91.4	69 23.6	00 47	89.1	69 39.6	00 47	87.9	69 55.2	00 47	86.7	70 10.2	00 47	85.4	70 51.9	00 47	81.4	71 04.5	00 47	80.0	8
40	68 04.4	00 47	91.6	68 21.9</																					

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 54° 30' to 62°.

Lat. 62°

Lat. 63°

Lat. 64°

Lat. 65°

Lat. 66°

DECLINATION SAME NAME AS LATITUDE

H.A.	60° 00'		60° 30'		62° 00'		62° 30'		63° 00'		69° 00'		69° 30'		74° 30'		H.A.							
	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.								
00	88 00.0	1.0 06	180.0	88 30.0	1.0 08	180.0	90 00.0	... 47	...	89 30.0	1.0 18	00.0	89 00.0	1.0 01	00.0	82 30.0	1.0 01	00.0	77 30.0	1.0 02	00.0	00		
1	87 56.6	07 16	165.9	88 25.5	08 21	161.8	89 31.8	01 47	89.6	89 19.0	07 37	42.5	88 53.9	00 28	24.3	82 59.3	1.0 04	02.9	82 29.3	1.0 08	02.7	77 29.7	1.0 02	01.2
2	87 46.6	01 26	153.3	88 13.1	05 30	146.4	89 03.7	02 47	89.1	88 56.6	06 43	60.9	88 38.3	07 25	41.8	82 57.1	09 06	05.9	82 27.4	09 06	05.3	77 28.8	1.0 02	02.5
3	87 31.7	02 31	142.7	87 55.1	04 36	134.8	88 35.5	02 47	88.7	88 31.0	02 44	69.0	88 17.5	07 30	52.9	82 53.5	08 08	08.7	82 24.1	08 08	08.0	77 27.3	09 04	03.7
4	87 12.9	07 36	134.1	87 33.7	07 40	126.2	88 07.4	03 47	88.2	88 04.3	03 44	73.2	87 54.0	05 42	59.8	82 48.6	07 10	11.5	82 19.6	07 10	10.5	77 25.2	09 06	04.9
05	86 51.5	07 39	127.3	87 10.0	06 42	119.7	87 39.2	04 47	87.8	87 37.2	04 46	75.7	87 29.1	06 43	64.4	82 42.3	06 12	14.2	82 13.8	06 12	13.0	77 22.4	08 05	06.1
6	86 28.3	00 41	121.9	86 45.0	05 43	114.8	87 11.0	05 47	87.4	87 09.8	05 46	77.2	87 03.4	00 44	67.5	82 34.8	03 15	16.9	82 06.9	03 15	15.5	77 19.2	07 06	07.3
7	86 03.8	05 42	117.4	86 19.0	05 44	110.9	86 42.9	05 47	86.9	86 42.2	05 46	78.2	86 37.1	04 44	69.7	82 26.0	00 16	19.4	81 58.8	01 15	17.8	77 15.3	07 07	08.5
8	85 38.4	01 43	113.7	85 52.4	02 45	107.8	86 14.8	06 47	86.5	86 14.6	07 46	78.8	86 10.6	02 45	71.3	82 16.1	07 18	21.8	81 49.7	09 17	20.1	77 10.8	06 08	09.6
9	85 12.3	08 44	110.6	85 25.4	09 46	105.1	85 46.7	07 47	86.0	85 47.0	06 46	79.2	85 43.8	07 45	72.5	82 05.1	08 20	24.0	81 39.5	08 18	22.2	77 05.8	04 09	10.8
10	84 45.7	05 45	110.0	84 58.0	07 46	102.9	85 18.6	08 47	85.6	85 19.8	08 46	79.5	85 16.8	03 45	73.4	81 53.2	03 21	26.2	81 28.4	04 20	24.2	77 00.3	03 10	11.9
1	84 18.8	03 45	105.7	84 30.5	03 46	101.0	84 50.5	08 47	85.1	84 51.6	01 46	79.6	84 49.8	11 45	74.0	81 40.3	07 23	28.2	81 16.4	01 21	26.1	76 54.2	02 11	13.0
2	83 51.5	01 46	103.7	84 02.8	03 46	99.3	84 22.5	09 47	84.7	84 23.9	00 46	79.6	84 22.7	08 45	74.5	81 26.6	05 24	30.1	81 03.6	07 23	27.9	76 47.6	00 12	14.1
3	83 24.0	09 46	101.8	83 34.9	03 47	97.7	83 54.4	10 47	84.3	83 55.6	02 46	79.5	83 55.6	06 45	74.8	81 12.1	02 25	31.8	80 50.0	05 24	29.6	76 40.5	00 13	15.1
4	82 56.4	08 46	100.2	83 07.0	02 47	96.4	83 26.4	11 47	83.8	83 28.5	03 46	79.4	83 28.3	04 45	75.0	80 56.9	00 26	33.4	80 35.8	02 25	31.2	76 32.9	07 13	16.1
15	82 28.6	07 46	98.7	82 38.9	01 47	95.1	82 58.4	12 47	83.4	83 00.8	04 46	79.3	83 01.1	03 45	75.2	80 41.1	06 27	35.0	80 20.8	00 26	32.7	76 24.9	06 14	17.1
6	82 00.7	06 47	97.4	82 10.8	01 47	93.9	82 30.5	12 47	82.9	82 33.2	06 46	79.1	82 33.9	01 45	75.2	80 24.7	03 28	36.4	80 05.3	06 27	34.1	76 16.4	04 15	18.1
7	81 32.8	05 47	96.1	81 42.7	01 47	92.9	82 02.5	13 47	82.5	82 06.6	07 46	78.9	82 06.6	01 45	75.2	80 07.7	00 29	37.7	79 49.3	03 28	35.4	76 07.4	02 16	19.0
8	81 04.7	04 47	94.9	81 14.6	00 47	91.8	81 34.6	14 46	82.0	81 37.9	08 46	78.6	81 39.4	02 45	75.2	79 50.3	07 30	38.9	79 32.7	00 28	36.6	75 58.0	00 16	19.9
9	80 36.6	03 47	93.8	80 46.4	00 47	90.9	81 06.7	15 46	81.6	81 10.3	09 46	78.4	81 12.2	03 45	75.1	79 32.4	04 30	40.0	79 15.7	07 29	37.7	75 48.2	07 17	20.8
20	80 08.5	02 47	92.8	80 18.2	00 47	90.0	80 38.9	15 46	81.2	80 42.7	10 46	78.1	80 45.0	05 45	75.0	79 14.1	01 31	41.0	78 58.2	04 30	38.8	75 38.0	06 18	21.6
1	79 40.4	01 47	91.8	79 50.1	00 47	89.1	80 11.0	16 46	80.7	80 15.2	11 46	77.8	80 17.8	06 45	74.8	78 55.4	03 32	41.9	78 40.4	03 30	39.7	75 27.5	04 18	22.4
2	79 12.2	00 47	90.8	79 21.9	00 47	88.3	79 43.3	17 46	80.3	79 47.6	12 46	77.5	79 50.6	07 45	74.7	78 36.4	02 32	42.8	78 22.2	02 31	40.6	75 16.5	02 19	23.2
3	78 44.0	00 47	89.9	78 53.8	00 47	87.5	79 15.5	18 46	79.8	79 20.2	13 46	77.2	79 23.4	08 45	74.5	78 17.1	01 33	43.6	78 03.8	01 31	41.4	75 05.3	01 19	23.9
4	78 15.9	00 47	89.1	78 25.6	01 47	86.7	78 47.8	18 46	79.4	78 52.7	14 46	76.8	78 56.3	10 45	74.2	77 57.6	00 33	44.3	77 45.0	00 32	42.2	74 53.7	00 20	24.7
25	77 47.7	00 47	88.2	77 57.5	01 47	86.0	78 20.2	19 46	78.9	78 25.3	15 46	76.5	78 29.2	11 45	74.0	77 37.8	00 33	45.0	77 26.0	01 32	42.9	74 41.8	00 20	25.3
6	77 19.6	00 47	87.4	77 29.4	01 47	85.3	77 52.5	20 46	78.5	77 57.9	16 46	76.1	78 02.1	12 45	73.7	77 17.8	00 34	45.6	77 06.7	00 32	43.5	74 29.6	00 21	26.0
7	76 51.4	00 47	86.7	77 01.4	01 47	84.6	77 25.0	21 46	78.0	77 30.6	17 46	75.8	77 35.1	13 45	73.5	76 57.5	00 34	46.1	76 47.2	00 33	44.1	74 17.1	00 21	26.6
8	76 23.3	00 47	85.9	76 33.4	02 47	83.9	76 57.4	22 46	77.6	77 03.3	18 45	75.4	77 08.1	14 45	73.2	76 37.1	00 34	46.6	76 27.5	00 33	44.6	74 04.4	00 22	27.2
9	75 55.2	00 47	85.2	76 05.4	02 47	83.2	76 29.9	23 46	77.1	76 36.1	19 45	75.0	76 41.2	15 45	72.9	76 16.6	00 34	47.1	76 07.6	01 33	45.1	73 51.4	00 22	27.8
30	75 27.2	00 47	84.5	75 37.4	03 47	82.6	76 02.5	23 46	76.7	76 08.9	20 45	74.7	76 14.3	16 45	72.6	75 55.9	00 35	47.5	75 47.6	00 34	45.5	73 38.1	00 22	28.3
1	74 59.2	00 47	83.8	75 09.5	03 46	81.9	75 35.1	24 46	76.2	75 41.8	21 45	74.3	75 47.4	17 45	72.3	75 35.1	00 35	47.9	75 27.4	00 34	45.9	73 24.6	00 23	28.8
2	74 31.2	00 47	83.1	74 41.6	03 46	81.3	75 07.8	25 46	75.8	75 14.7	21 45	73.9	75 20.6	18 45	72.0	75 14.1	00 35	48.2	75 07.2	00 34	46.3	73 11.0	00 23	29.3
3	74 03.2	00 47	82.4	74 13.8	03 46	80.7	74 40.5	25 46	75.3	74 47.6	22 45	73.5	74 53.9	19 44	71.6	74 53.0	00 35	48.5	74 46.7	00 34	46.6	72 57.1	00 23	29.8
4	73 35.3	00 47	81.7	73 46.9	03 46	80.1	74 13.3	26 45	74.9	74 20.7	23 45	73.1	74 27.2	20 44	71.3	74 32.0	00 35	48.7	74 26.2	00 34	46.9	72 43.0	00 24	30.2
35	73 07.3	00 47	81.1	73 18.3	03 46	79.5	73 46.1	27 45	74.4	73 53.7	24 45	72.7	74 00.5	21 44	70.9	74 10.8	00 35	48.9	74 05.6	00 34	47.1	72 28.7	00 24	30.6
6	72 39.7	00 46	80.5	72 50.7	03 46	78.9	73 19.0	28 45	74.0	73 26.9	25 45	72.3	73 33.9	22 44	70.6	73 49.5	00 36	49.1	73 44.9	00 35	47.4	72 14.3	00 24	31.0
7	72 11.9	00 46	79.8	72 23.0	03 46	78.3	72 52.0	28 45	73.5	73 07.1	26 45	71.9	73 07.4	23 44	70.2	73 28.2	00 36	49.3	73 24.2	00 35	47.5	71 59.7	00 25	31.4
8	71 44.2	00 46	79.2	71 55.5	03 46	77.7	72 25.0	29 45	73.1	72 33.3	27 44	71.5	72 40.9	24 44	69.9	73 06.8	00 36	49.4	73 03.4	00 35	47.7	71 45.0	00 25	31.7
9	71 16.6	00 46	78.6	71 28.0	03 46	77.1	71 58.1	30 45	72.6	72 06.6	27 44	71.1	72 14.5	25 44	69.5	72 45.4	00 36	49.5	72 42.5	00 35	47.9	71 30.1	00 25	32.0
40	70 49.0	00 46	78.0	71 00.6	03 46	76.6	71 31.2	31 45	72.2	71 40.0	28 44	70.7	71 48.1	26 44	69.1	72 23.9	00 36	49.6	72 21.6	00 35	48.0	71 15.1	00 25	32.3
1	70 21.5	00 46	77.4	70 33.2	03 46	76.0	71 04.4	31 45	71.7	71 13.5	29 44	70.3	71 21.8	27 44	68.8	72 02.5	00 36	49.7	72 00.7	00 35	48.1	71 00		

Main table with columns for H.A., Alt., Az., and various declination values (60° 00', 60° 30', 62° 00', 62° 30', 63° 00', 69° 00', 69° 30', 74° 30').

Lat. 62°

Lat. 63°

Lat. 64°

Lat. 65°

Lat. 66°

Lat. 62°

H.A.	60° 00'		60° 30'		62° 00'		62° 30'		63° 00'		69° 00'		69° 30'		74° 30'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
00	88 00.0	1.0 06	180.0	88 30.0	1.0 08	180.0	90 00.0	.. 47	...	89 30.0	1.0 18	00.0	89 00.0	1.0 10	00.0	82 30.0	1.0 01	00.0	77 30.0	1.0 00	00.0	00			
1	87 56.6	97 16	165.9	88 25.5	96 21	161.8	89 31.8	01 47	89.6	89 19.0	78 37	42.5	88 53.9	90 26	24.3	82 59.3	1.0 04	02.9	82 29.3	1.0 03	02.7	77 29.7	1.0 02	01.2	1
2	87 46.6	91 26	153.3	88 13.1	85 30	146.4	89 03.7	02 47	89.1	88 56.6	46 43	60.9	88 38.3	72 35	41.8	82 57.1	90 06	05.9	82 27.4	90 05	05.3	77 28.8	1.0 02	02.5	2
3	87 31.7	82 31	142.7	87 55.1	74 36	134.8	88 35.5	02 47	88.7	88 31.0	32 44	69.0	88 17.5	57 39	52.9	82 53.5	90 08	08.7	82 24.1	90 08	08.0	77 27.3	90 04	03.7	3
4	87 12.9	74 36	134.1	87 33.7	64 40	126.2	88 07.4	03 47	88.2	88 04.3	23 45	73.2	87 54.0	45 42	59.8	82 48.6	97 10	11.5	82 19.6	97 10	10.5	77 25.2	90 05	04.9	4
05	86 51.5	67 39	127.3	87 10.0	56 42	119.7	87 39.2	04 47	87.8	87 37.2	17 46	75.7	87 29.1	36 43	64.4	82 42.3	96 13	14.2	82 13.8	96 13	13.0	77 22.4	90 05	06.1	05
6	86 28.3	60 41	121.9	86 45.0	50 43	114.8	87 11.0	05 47	87.4	87 09.8	13 46	77.2	87 03.4	30 44	67.5	82 34.8	93 15	16.9	82 06.9	93 15	15.5	77 19.2	97 06	07.3	6
7	86 03.8	55 42	117.4	86 19.0	45 44	110.9	86 42.9	05 47	86.9	86 42.2	10 46	78.2	86 37.1	24 44	69.7	82 26.0	90 16	19.4	81 58.9	91 15	17.8	77 15.3	97 07	08.5	7
8	85 38.4	51 43	113.7	85 52.4	42 45	107.8	86 14.8	06 47	86.5	86 14.6	07 46	78.8	86 10.6	20 45	71.3	82 16.1	87 18	21.8	81 49.7	89 17	20.1	77 10.8	96 08	09.6	8
9	85 12.3	48 44	110.6	85 25.4	39 46	105.1	85 46.7	07 47	86.0	85 47.0	05 46	79.2	85 43.8	17 45	72.5	82 05.1	85 20	24.0	81 39.5	86 18	22.2	77 05.8	94 09	10.8	9
10	84 45.7	45 45	108.0	84 58.0	37 46	102.9	85 18.6	08 47	85.6	85 19.3	03 46	79.5	85 16.8	13 45	73.4	81 53.2	82 21	26.2	81 28.4	84 20	24.2	77 00.3	93 10	11.9	10
1	84 18.3	43 45	105.7	84 30.5	35 46	101.0	84 50.5	08 47	85.1	84 51.6	01 46	79.6	84 49.8	11 45	74.0	81 40.3	79 23	28.2	81 16.4	81 21	26.1	76 54.2	92 11	13.0	1
2	83 51.5	41 46	103.7	84 02.8	34 46	99.3	84 22.5	09 47	84.7	84 23.9	00 46	79.6	84 22.7	08 45	74.5	81 26.6	75 24	30.1	81 03.6	78 23	27.9	76 47.6	90 12	14.1	2
3	83 24.0	39 46	101.8	83 34.9	32 47	97.7	83 54.4	10 47	84.3	83 56.2	02 46	79.5	83 55.5	06 45	74.8	81 12.1	72 25	31.8	80 50.0	75 24	29.6	76 40.5	89 13	15.1	3
4	82 56.4	38 46	100.2	83 07.3	30 47	96.4	83 26.4	11 47	83.8	83 28.5	04 46	79.4	83 28.3	04 45	75.0	80 56.9	69 26	33.4	80 35.8	72 25	31.2	76 32.9	87 13	16.1	4
15	82 28.6	37 46	98.7	82 38.9	31 47	95.1	82 58.4	12 47	83.4	83 00.8	08 46	79.3	83 01.1	08 45	75.2	80 41.1	66 27	35.0	80 20.8	69 26	32.7	76 24.9	86 14	17.1	15
6	82 00.7	36 47	97.4	82 10.3	31 47	93.9	82 30.5	12 47	82.9	82 32.3	06 46	79.1	82 33.9	01 45	75.2	80 24.7	63 28	36.4	80 05.3	66 27	34.1	76 16.4	84 15	18.1	6
7	81 32.8	35 47	96.1	81 42.7	31 47	92.9	82 02.5	13 47	82.5	82 05.5	07 46	78.9	82 06.6	01 45	75.2	80 07.7	60 29	37.7	79 49.3	63 28	35.4	76 07.4	82 16	19.0	7
8	81 04.7	35 47	94.9	81 14.6	30 47	91.8	81 34.6	14 46	82.0	81 37.9	08 46	78.6	81 39.4	02 45	75.2	79 50.3	57 30	38.9	79 32.7	60 28	36.6	75 58.0	80 16	19.9	8
9	80 36.6	35 47	93.8	80 46.4	30 47	90.9	81 06.7	15 46	81.6	81 10.3	09 46	78.4	81 12.2	03 45	75.1	79 32.4	54 30	40.0	79 15.7	57 29	37.7	75 48.2	78 17	20.8	9
20	80 08.5	35 47	92.8	80 18.2	30 47	90.0	80 38.9	16 46	81.2	80 42.7	10 46	78.1	80 45.0	05 45	75.0	79 14.1	51 31	41.0	78 58.2	54 30	38.8	75 38.0	78 18	21.6	20
1	79 40.4	35 47	91.8	79 50.1	30 47	89.1	80 11.0	16 46	80.7	80 15.2	11 46	77.8	80 17.8	06 45	74.8	78 55.4	48 32	41.9	78 40.4	52 30	39.7	75 27.5	74 18	22.4	1
2	79 12.2	34 47	90.8	79 21.9	30 47	88.3	79 43.3	17 46	80.3	79 47.6	12 46	77.5	79 50.6	07 45	74.7	78 36.4	46 32	42.8	78 22.2	49 31	40.6	75 16.5	72 19	23.2	2
3	78 44.0	34 47	89.9	78 53.8	30 47	87.5	79 15.5	18 46	79.8	79 20.2	13 46	77.2	79 23.4	09 45	74.5	78 17.1	43 33	43.6	78 03.8	46 31	41.4	75 05.3	70 19	23.9	3
4	78 15.9	34 47	89.1	78 25.6	31 47	86.7	78 47.8	18 46	79.4	78 52.7	14 46	76.8	78 56.3	10 45	74.2	77 57.6	40 33	44.3	77 45.9	44 32	42.2	74 53.7	68 20	24.7	4
25	77 47.7	35 47	88.2	77 57.5	31 47	86.0	78 20.2	19 46	78.9	78 25.3	15 46	76.5	78 29.2	11 45	74.0	77 37.8	38 33	45.0	77 26.0	41 32	42.9	74 41.8	66 20	25.3	25
6	77 19.6	35 47	87.4	77 29.4	31 47	85.3	77 52.5	20 46	78.5	77 57.9	16 46	76.1	78 02.1	12 45	73.7	77 17.8	35 34	45.6	77 06.7	39 32	43.5	74 29.6	64 21	26.0	6
7	76 51.4	35 47	86.7	77 01.4	31 47	84.6	77 25.0	21 46	78.0	77 30.6	17 45	75.8	77 35.1	13 45	73.5	76 57.5	33 34	46.1	76 47.2	36 33	44.1	74 17.1	62 21	26.6	7
8	76 23.3	35 47	85.9	76 33.4	32 47	83.9	76 57.4	21 46	77.6	77 03.3	18 45	75.4	77 08.1	14 45	73.2	76 37.1	30 34	46.6	76 27.5	34 33	44.6	74 04.4	60 22	27.2	8
9	75 55.2	35 47	85.2	76 05.4	32 47	83.2	76 29.9	22 46	77.1	76 36.1	19 45	75.0	76 41.2	15 45	72.9	76 16.6	28 34	47.1	76 07.6	31 33	45.1	73 51.4	57 22	27.8	9
30	75 27.2	36 47	84.5	75 37.4	33 47	82.6	76 02.5	23 46	77.7	76 08.9	20 45	74.7	76 14.3	16 45	72.6	75 59.9	26 35	47.5	75 47.6	29 34	45.5	73 38.1	55 22	28.3	30
1	74 59.2	36 47	83.8	75 09.5	33 46	81.9	75 35.1	24 46	76.2	75 41.8	21 45	74.3	75 47.4	17 45	72.3	75 35.1	24 35	47.9	75 27.4	27 34	45.9	73 24.6	53 23	28.8	1
2	74 31.2	36 47	83.1	74 41.6	33 46	81.3	75 07.8	25 45	75.8	75 14.7	21 45	73.9	75 20.6	18 45	72.0	75 14.1	22 35	48.2	75 07.2	25 34	46.3	73 11.0	51 23	29.3	2
3	74 03.2	37 46	82.4	74 13.8	34 46	80.7	74 40.5	25 45	75.3	74 47.6	22 45	73.5	74 53.9	19 44	71.6	74 53.1	20 35	48.5	74 46.7	23 34	46.6	72 57.1	49 23	29.8	3
4	73 35.3	37 46	81.7	73 46.0	34 46	80.1	74 13.3	26 45	74.9	74 20.7	23 45	73.1	74 27.2	20 44	71.3	74 32.0	18 35	48.7	74 26.2	21 34	46.9	72 43.0	47 24	30.2	4
35	73 07.5	37 46	81.1	73 18.3	35 46	79.5	73 46.1	27 45	74.4	73 53.7	24 45	72.7	74 00.5	21 44	70.9	74 10.8	16 35	48.9	74 05.6	19 34	47.1	72 28.7	45 24	30.6	35
6	72 39.7	38 46	80.5	72 50.7	35 46	78.9	73 19.0	28 45	74.0	73 26.9	25 45	72.3	73 33.9	22 44	70.6	73 49.5	14 36	49.1	73 44.9	17 35	47.4	72 14.3	43 24	31.0	6
7	72 11.9	38 46	79.8	72 22.0	36 46	78.3	72 52.0	28 45	73.5	73 00.1	26 45	71.9	73 07.4	23 44	70.2	73 28.2	12 36	49.3	73 24.2	15 35	47.5	71 59.7	41 25	31.4	7
8	71 44.2	39 46	79.2	71 55.5	36 46	77.7	72 25.0	29 45	73.1	72 33.3	27 44	71.5	72 40.9	24 44	69.9	73 06.8	10 36	49.4	73 03.4	13 35	47.7	71 45.0	38 25	31.7	8
9	71 16.6	39 46	78.6	71 28.0	37 46	77.1	71 58.1	30 45	72.6	72 06.6	27 44	71.1	72 14.5	25 44	69.5	72 45.4	08 36	49.5	72 42.5	11 35	47.9	71 30.1	36 25	32.0	9
40	70 49.0	40 46	78.0	71 00.6	37 46	76.6	71 31.2	31 45	72.2	71 40.0	28 44	70.7	71 48.1	26 44	69.1	72 23.9	06 36	49.6	72 21.6						

Main table with columns for H.A., Alt., Az., and declination values for various latitude ranges from 60° 00' to 180°.

Lat. 62°

Lat. 63°

Lat. 64°

L. 65

# STAR IDENTIFICATION TABLE

78

ALTITUDE

Lat.  
62°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.																					
00	32	180	36	180	40	180	44	180	48	180	52	180	56	180	60	180	64	180	68	180	72	180	00
4	32	175	36	175	40	175	44	175	48	174	52	174	56	174	60	173	64	173	68	172	72	171	4
8	32	171	36	170	40	170	44	169	48	169	52	168	56	167	60	167	64	165	67	164	71	162	8
12	31	166	35	165	39	165	43	164	47	163	51	162	55	161	59	160	63	158	67	156	71	153	12
16	31	161	35	161	39	160	43	159	47	158	50	157	54	155	58	154	62	152	66	149	70	145	16
20	30	157	34	156	38	155	42	154	46	153	50	151	54	149	57	147	61	145	65	142	69	138	20
24	29	152	33	151	37	150	41	149	45	147	49	146	52	144	56	142	60	139	64	135	67	131	24
28	28	148	32	147	36	145	40	144	44	142	48	141	51	138	55	136	59	133	62	129	66	125	28
32	27	143	31	142	35	141	39	139	43	137	46	136	50	133	54	131	57	128	61	124	64	119	32
36	26	139	30	138	34	136	37	135	41	133	45	131	49	128	52	126	56	122	59	119	62	114	36
40	25	135	29	134	32	132	36	130	40	128	43	126	47	124	51	121	54	118	57	114	61	109	40
44	23	131	27	129	31	128	35	126	38	124	42	122	45	119	49	116	52	113	56	109	59	105	44
48	22	127	26	125	29	123	33	122	37	119	40	117	44	115	47	112	51	109	54	105	57	100	48
52	20	123	24	121	28	119	31	117	35	115	39	113	42	110	45	108	49	104	52	101	55	97	52
56	19	119	23	117	26	115	30	113	33	111	37	109	40	106	44	104	47	100	50	97	53	93	56
60	17	115	21	113	24	112	28	110	32	107	35	105	38	102	42	100	45	97	48	93	51	89	60
64	15	112	19	110	23	108	26	106	30	104	33	101	37	99	40	96	43	93	46	90	50	86	64
68	14	108	17	106	21	104	24	102	28	100	31	97	35	95	38	92	41	89	45	86	48	82	68
72	12	104	15	102	19	100	23	98	26	96	29	94	33	91	36	89	40	86	43	83	46	79	72
76	10	101	14	99	17	97	21	95	24	93	28	90	31	88	34	85	38	83	41	79	44	76	76
80	08	97	12	95	15	93	19	91	22	89	26	87	29	84	32	82	36	79	39	76	42	73	80
84	06	93	10	92	13	90	17	88	20	85	24	83	27	81	31	79	34	76	37	73	40	70	84
88	04	90	08	88	12	86	15	84	19	82	22	80	25	78	29	75	32	73	35	70	39	67	88
92	03	86	06	84	10	83	13	81	17	79	20	77	24	74	27	72	30	70	34	67	37	64	92
96	01	83	04	81	08	79	11	77	15	75	18	73	22	71	25	69	29	66	32	64	35	61	96
100	01	79	02	77	06	76	09	74	13	72	17	70	20	68	24	66	27	63	30	61	34	58	100
104	03	76	01	74	04	72	08	70	11	68	15	66	18	64	22	62	25	60	29	58	32	55	104
108	05	72	01	70	02	69	06	67	10	65	13	63	17	61	20	59	24	57	27	55	31	53	108
112	07	69	03	67	01	65	04	63	08	62	11	60	15	58	19	56	22	54	26	52	29	50	112
116	08	65	05	63	01	62	03	60	06	58	10	56	13	55	17	53	21	51	24	49	28	47	116
120	10	61	06	60	03	58	01	56	05	55	08	53	12	51	16	50	19	48	23	46	26	44	120
124	12	58	08	56	04	54	01	53	03	51	07	50	11	48	14	46	18	45	21	43	25	41	124
128	13	54	09	52	06	51	02	49	02	48	05	46	09	45	13	43	17	42	20	40	24	38	128
132	15	50	11	49	07	47	03	46	00	44	04	43	08	41	12	40	15	39	19	37	23	35	132
136	16	46	12	45	08	43	05	42	01	41	03	39	07	38	10	37	14	35	18	34	22	33	136
140	17	42	13	41	10	40	06	38	02	37	02	36	06	35	09	34	13	32	17	31	21	30	140
144	18	38	15	37	11	36	07	35	03	34	01	32	05	31	08	30	12	29	16	28	20	27	144
148	20	34	16	33	12	32	08	31	04	30	00	29	04	28	07	27	11	26	15	25	19	24	148
152	21	30	17	29	13	28	09	27	05	26	01	25	03	25	07	24	11	23	14	22	18	21	152
156	21	26	18	25	14	24	10	23	06	23	02	22	02	21	06	20	10	20	14	19	18	18	156
160	22	22	18	21	14	20	10	20	06	19	03	18	01	18	05	17	09	16	13	16	17	15	160
164	23	17	19	17	15	16	11	16	07	15	03	15	01	14	05	14	09	13	13	13	17	12	164
168	23	13	19	13	15	12	11	12	07	11	03	11	01	11	04	10	08	10	12	09	16	09	168
172	24	09	20	08	16	08	12	08	08	08	04	07	00	07	04	07	08	07	12	06	16	06	172
176	24	04	20	04	16	04	12	04	08	04	04	04	00	04	04	03	08	03	12	03	16	03	176
180	24	00	20	00	16	00	12	00	08	00	04	00	00	00	04	00	08	00	12	00	16	00	180

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

# STAR IDENTIFICATION TABLE

## ALTITUDE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.																					
00	76	180	80	180	84	180	88	180	88	00	84	00	80	00	76	00	72	00	68	00	64	00	00
4	76	169	80	166	84	159	87	134	87	40	84	14	80	07	76	04	72	02	68	01	64	00	4
8	75	158	79	153	83	142	86	114	86	58	83	26	80	14	76	08	72	04	68	02	64	01	8
12	74	149	78	142	81	129	84	104	84	65	82	35	79	20	75	12	72	07	68	03	64	01	12
16	73	140	77	132	80	119	82	97	82	68	81	41	78	25	75	15	71	09	68	04	64	01	16
20	72	132	75	124	78	111	80	93	81	69	80	46	77	29	74	18	71	11	68	05	64	02	20
24	71	125	74	117	76	105	78	89	79	69	78	49	76	33	74	21	71	12	67	06	64	02	24
28	69	119	72	111	75	100	76	86	77	69	77	51	75	35	73	23	70	14	67	07	64	02	28
32	67	113	70	106	73	96	75	83	75	68	75	52	74	37	72	25	70	15	67	08	64	02	32
36	66	108	68	101	71	92	73	80	74	67	74	53	73	39	72	27	69	17	67	09	64	03	36
40	64	104	67	97	69	88	71	78	72	66	72	53	72	40	71	28	69	18	66	10	64	03	40
44	62	99	65	93	67	85	69	76	70	65	71	53	71	41	70	29	68	19	66	10	63	03	44
48	60	95	63	89	65	82	67	73	69	63	69	52	70	41	69	30	68	20	66	11	63	03	48
52	58	92	61	86	63	79	65	71	67	62	68	52	68	41	68	30	67	20	65	11	63	03	52
56	56	88	59	83	61	76	64	69	65	61	66	51	67	41	67	31	66	21	65	12	63	04	56
60	54	85	57	80	60	74	62	67	64	59	65	50	66	41	66	31	66	21	65	12	63	04	60
64	53	81	55	77	58	71	60	65	62	57	64	49	65	40	65	31	65	22	64	12	63	04	64
68	51	78	54	74	56	68	58	63	61	56	62	48	63	40	64	31	64	22	64	13	63	04	68
72	49	75	52	71	54	66	57	60	59	54	61	47	62	39	63	31	63	22	63	13	63	04	72
76	47	72	50	68	53	64	55	58	57	52	59	46	61	38	62	30	63	22	63	13	62	04	76
80	45	70	48	66	51	61	54	56	56	51	58	44	60	37	61	30	62	21	62	13	62	04	80
84	44	67	47	63	49	59	52	54	55	49	57	43	59	36	60	29	61	21	62	13	62	04	84
88	42	64	45	60	48	56	51	52	53	47	56	41	58	35	59	28	61	21	62	13	62	04	88
92	40	61	43	58	46	54	49	50	52	45	54	40	57	34	59	28	60	20	61	13	62	04	92
96	39	58	42	55	45	52	48	48	51	43	53	38	56	33	58	27	59	20	61	12	62	04	96
100	37	56	40	53	43	49	46	46	49	41	52	37	55	32	57	26	59	19	60	12	62	04	100
104	35	53	39	50	42	47	45	43	48	40	51	35	54	30	56	25	58	19	60	12	61	04	104
108	34	50	37	47	41	44	44	41	47	38	50	34	53	29	55	24	58	18	60	11	61	04	108
112	33	47	36	45	39	42	43	39	46	36	49	32	52	28	55	23	57	17	59	11	61	04	112
116	31	45	35	42	38	40	41	37	45	34	48	30	51	26	54	22	56	16	59	10	61	04	116
120	30	42	33	40	37	37	40	35	44	32	47	28	50	25	53	20	56	16	59	10	61	04	120
124	29	39	32	37	36	35	39	32	43	30	46	27	49	23	52	19	55	15	58	09	61	03	124
128	28	36	31	35	35	32	38	30	42	28	45	25	49	22	52	18	55	14	58	09	61	03	128
132	26	34	30	32	34	30	37	28	41	26	45	23	48	20	51	17	55	13	58	08	61	03	132
136	25	31	29	29	33	28	37	26	40	23	44	21	47	18	51	15	54	12	57	08	61	03	136
140	25	28	28	27	32	25	36	23	39	21	43	19	47	17	50	14	54	11	57	07	60	03	140
144	24	25	28	24	31	23	35	21	39	19	43	17	46	15	50	13	53	10	57	06	60	02	144
148	23	23	27	21	31	20	34	19	38	17	42	16	46	14	50	11	53	09	57	06	60	02	148
152	22	20	26	19	30	18	34	16	38	15	42	14	45	12	49	10	53	08	57	05	60	02	152
156	22	17	26	16	29	15	33	14	37	13	41	12	45	10	49	09	53	07	56	04	60	02	156
160	21	14	25	13	29	13	33	12	37	11	41	10	45	09	49	07	52	06	56	04	60	01	160
164	21	11	25	11	29	10	33	09	37	09	41	08	44	07	48	06	52	04	56	03	60	01	164
168	20	09	24	08	28	08	32	07	36	06	40	06	44	05	48	04	52	03	56	02	60	01	168
172	20	06	24	05	28	05	32	05	36	04	40	04	44	03	48	03	52	02	56	01	60	01	172
176	20	03	24	03	28	03	32	02	36	02	40	02	44	02	48	01	52	01	56	01	60	00	176
180	20	00	24	00	28	00	32	00	36	00	40	00	44	00	48	00	52	00	56	00	60	00	180

Lat. 62°

Lat. 63°

Lat. 64°

Lat. 65°

Lat. 66°

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

DECLINATION SAME NAME AS LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Az.															
00	27 00.0	1.00 180.0	27 30.0	1.00 180.0	28 00.0	1.00 180.0	28 30.0	1.00 180.0	29 00.0	1.00 180.0	29 30.0	1.00 180.0	30 00.0	1.00 180.0	30 30.0	1.00 180.0	00
1	26 59.7	1.01 178.9	27 29.7	1.01 178.9	27 59.7	1.01 178.9	28 29.7	1.01 178.9	28 59.7	1.01 178.9	29 29.7	1.01 178.9	29 59.7	1.01 178.9	30 29.7	1.01 178.9	1
2	26 58.9	1.02 177.8	27 28.9	1.02 177.7	27 58.9	1.02 177.7	28 28.9	1.02 177.7	28 58.9	1.02 177.7	29 28.9	1.02 177.7	29 58.9	1.02 177.7	30 28.9	1.02 177.7	2
3	26 57.6	1.03 176.6	27 27.6	1.03 176.6	27 57.6	1.03 176.6	28 27.6	1.03 176.6	28 57.6	1.03 176.6	29 27.6	1.03 176.6	29 57.6	1.03 176.6	30 27.6	1.03 176.6	3
4	26 55.7	1.04 175.5	27 25.7	1.04 175.5	27 55.7	1.04 175.5	28 25.7	1.04 175.5	28 55.7	1.04 175.5	29 25.6	1.04 175.4	29 55.6	1.04 175.4	30 25.6	1.04 175.4	4
05	26 53.3	1.05 174.4	27 23.3	1.05 174.4	27 53.3	1.05 174.3	28 23.2	1.05 174.3	28 53.2	1.05 174.3	29 23.2	1.05 174.3	29 53.2	1.05 174.2	30 23.1	1.05 174.2	05
6	26 50.4	1.06 173.3	27 20.4	1.06 173.2	27 50.3	1.06 173.2	28 20.3	1.06 173.2	28 50.2	1.06 173.2	29 20.2	1.06 173.1	29 50.1	1.06 173.1	30 20.1	1.06 173.1	6
7	26 47.0	1.07 172.2	27 16.9	1.07 172.1	27 46.8	1.07 172.1	28 16.8	1.07 172.0	28 46.7	1.07 172.0	29 16.7	1.07 171.9	29 46.6	1.07 171.9	30 16.5	1.07 171.9	7
8	26 43.0	1.08 171.0	27 12.9	1.08 171.0	27 42.8	1.08 171.0	28 12.7	1.08 170.9	28 42.7	1.08 170.9	29 12.6	1.08 170.8	29 42.5	1.08 170.8	30 12.4	1.08 170.8	8
9	26 38.5	1.08 169.9	27 08.4	1.08 169.9	27 38.3	1.08 169.8	28 08.2	1.08 169.8	28 38.1	1.09 169.7	29 08.0	1.09 169.7	29 37.9	1.09 169.6	30 07.8	1.09 169.6	9
10	26 33.4	1.09 168.8	27 03.3	1.09 168.8	27 33.2	1.09 168.7	28 03.1	1.09 168.7	28 33.0	1.09 168.6	29 02.8	1.09 168.6	29 32.7	1.09 168.5	30 02.6	1.09 168.5	10
1	26 27.9	1.10 167.7	26 57.8	1.10 167.6	27 27.6	1.10 167.6	27 57.5	1.10 167.5	28 27.3	1.10 167.5	28 57.2	1.10 167.4	29 27.0	1.10 167.4	29 56.9	1.10 167.3	1
2	26 21.8	1.11 166.6	26 51.7	1.11 166.5	27 21.5	1.11 166.5	27 51.3	1.11 166.4	28 21.2	1.11 166.3	28 51.0	1.11 166.3	29 20.8	1.11 166.2	29 50.6	1.11 166.2	2
3	26 15.3	1.12 165.5	26 45.1	1.12 165.4	27 14.9	1.12 165.3	27 44.7	1.12 165.3	28 14.5	1.12 165.2	28 44.3	1.12 165.1	29 14.0	1.12 165.1	29 43.8	1.12 165.0	3
4	26 08.2	1.13 164.4	26 37.9	1.13 164.3	27 07.7	1.13 164.2	27 37.5	1.13 164.2	28 07.2	1.13 164.1	28 37.0	1.13 164.0	29 06.8	1.13 163.9	29 36.5	1.13 163.9	4
15	26 00.6	1.13 163.3	26 30.3	1.13 163.2	27 00.1	1.13 163.1	27 29.8	1.13 163.0	27 59.5	1.13 163.0	28 29.3	1.13 162.9	28 59.0	1.13 162.8	29 28.7	1.13 162.7	15
6	25 52.5	1.14 162.2	26 22.2	1.14 162.1	26 51.9	1.14 162.0	27 21.6	1.14 161.9	27 51.3	1.14 161.8	28 21.0	1.14 161.8	28 50.7	1.14 161.7	29 20.4	1.14 161.6	6
7	25 43.9	1.15 161.1	26 13.6	1.15 161.0	26 43.2	1.15 160.9	27 12.9	1.15 160.8	27 42.6	1.15 160.7	28 12.2	1.15 160.6	28 41.9	1.15 160.6	29 11.5	1.15 160.5	7
8	25 34.8	1.16 160.0	26 04.4	1.16 159.9	26 34.1	1.16 159.8	27 03.7	1.16 159.7	27 33.3	1.16 159.6	28 02.9	1.16 159.5	28 32.6	1.16 159.4	29 02.2	1.16 159.3	8
9	25 25.2	1.17 158.9	25 54.8	1.17 158.8	26 24.4	1.17 158.7	26 54.0	1.17 158.6	27 23.6	1.17 158.5	27 53.2	1.17 158.4	28 22.7	1.17 158.3	28 52.3	1.17 158.2	9
20	25 15.2	1.18 157.8	25 44.7	1.18 157.7	26 14.3	1.18 157.6	26 43.8	1.18 157.5	27 13.4	1.18 157.4	27 42.9	1.18 157.3	28 12.4	1.18 157.2	28 41.9	1.18 157.1	20
1	25 04.6	1.18 156.7	25 34.1	1.18 156.6	26 03.6	1.18 156.5	26 33.1	1.18 156.4	27 02.6	1.18 156.3	27 32.1	1.18 156.2	28 01.6	1.18 156.1	28 31.1	1.18 156.0	1
2	24 53.6	1.19 155.6	25 23.1	1.19 155.5	25 52.5	1.19 155.4	26 22.0	1.19 155.3	26 51.4	1.19 155.2	27 20.9	1.19 155.1	27 50.3	1.19 155.0	28 19.8	1.19 154.9	2
3	24 42.1	1.20 154.5	25 11.5	1.20 154.4	25 41.0	1.20 154.3	26 10.4	1.20 154.2	26 39.8	1.20 154.1	27 09.2	1.20 154.0	27 38.6	1.20 153.9	28 08.0	1.20 153.8	3
4	24 30.2	1.21 153.4	24 59.6	1.21 153.3	25 28.9	1.21 153.2	25 58.3	1.21 153.1	26 27.6	1.21 153.0	26 57.0	1.21 152.9	27 26.3	1.21 152.8	27 55.7	1.21 152.6	4
25	24 17.8	1.22 152.3	24 47.1	1.22 152.2	25 16.4	1.22 152.1	25 45.7	1.22 152.0	26 15.0	1.22 151.9	26 44.3	1.22 151.8	27 13.6	1.22 151.7	27 42.9	1.22 151.5	25
6	24 04.9	1.23 151.2	24 34.2	1.23 151.1	25 03.5	1.23 151.0	25 32.7	1.23 150.9	26 02.0	1.23 150.8	26 31.2	1.23 150.7	27 00.5	1.23 150.6	27 29.7	1.23 150.4	6
7	23 51.6	1.24 150.1	24 20.8	1.24 150.0	24 50.1	1.24 149.9	25 19.3	1.24 149.8	25 48.5	1.24 149.7	26 17.7	1.24 149.6	26 46.9	1.24 149.5	27 16.1	1.24 149.4	7
8	23 37.9	1.25 149.0	24 07.1	1.25 148.9	24 36.2	1.25 148.8	25 05.4	1.25 148.7	25 34.5	1.25 148.6	26 03.7	1.25 148.5	26 32.8	1.25 148.4	27 02.0	1.25 148.3	8
9	23 23.7	1.26 148.1	23 52.8	1.26 148.0	24 21.9	1.26 147.9	24 51.0	1.26 147.7	25 20.1	1.26 147.6	25 49.2	1.26 147.5	26 18.3	1.26 147.4	26 47.4	1.26 147.2	9
30	23 09.1	1.27 147.1	23 38.2	1.27 146.9	24 07.2	1.27 146.8	24 36.3	1.27 146.7	25 05.3	1.27 146.5	25 34.4	1.27 146.4	26 03.4	1.27 146.2	26 32.4	1.27 146.1	30
1	22 54.1	1.28 146.0	23 23.1	1.28 145.9	23 52.1	1.28 145.7	24 21.1	1.28 145.6	24 50.1	1.28 145.4	25 19.1	1.28 145.3	25 48.0	1.28 145.2	26 17.0	1.28 145.0	1
2	22 38.6	1.29 145.0	23 07.6	1.29 144.8	23 36.6	1.29 144.7	24 05.5	1.29 144.5	24 34.4	1.29 144.4	25 03.4	1.29 144.2	25 32.3	1.29 144.1	26 01.2	1.29 143.9	2
3	22 22.8	1.30 143.9	22 51.7	1.30 143.8	23 20.6	1.30 143.6	23 49.5	1.30 143.5	24 18.4	1.30 143.3	24 47.2	1.30 143.2	25 16.1	1.30 143.0	25 45.0	1.30 142.9	3
4	22 06.6	1.31 142.9	22 35.4	1.31 142.7	23 04.2	1.31 142.6	23 33.1	1.31 142.4	24 01.9	1.31 142.3	24 30.7	1.31 142.1	24 59.5	1.31 142.0	25 28.3	1.31 141.8	4
35	21 49.9	1.32 141.8	22 18.7	1.32 141.7	22 47.5	1.32 141.5	23 16.3	1.32 141.4	23 45.0	1.32 141.2	24 13.8	1.32 141.1	24 42.5	1.32 140.9	25 11.3	1.32 140.8	35
6	21 32.9	1.33 140.8	22 01.6	1.33 140.7	22 30.4	1.33 140.5	22 59.1	1.33 140.3	23 27.8	1.33 140.2	23 56.5	1.33 140.0	24 25.2	1.33 139.9	24 53.8	1.33 139.7	6
7	21 15.5	1.34 139.8	21 44.3	1.34 139.6	22 12.8	1.34 139.5	22 41.5	1.34 139.3	23 10.2	1.34 139.1	23 38.8	1.34 139.0	24 07.4	1.34 138.8	24 36.0	1.34 138.6	7
8	20 57.7	1.35 138.8	21 26.3	1.35 138.6	21 55.0	1.35 138.4	22 23.6	1.35 138.3	22 52.1	1.35 138.1	23 20.7	1.35 137.9	23 49.3	1.35 137.8	24 17.9	1.35 137.6	8
9	20 39.6	1.36 137.7	21 08.1	1.36 137.6	21 36.7	1.36 137.4	22 05.2	1.36 137.2	22 33.8	1.36 137.1	23 02.3	1.36 136.9	23 30.8	1.36 136.7	23 59.3	1.36 136.6	9
40	20 21.1	1.37 136.7	20 49.6	1.37 136.5	21 18.1	1.37 136.4	21 46.6	1.37 136.2	22 15.0	1.37 136.0	22 43.5	1.37 135.9	23 12.0	1.37 135.7	23 40.4	1.37 135.5	40
1	20 02.2	1.38 135.6	20 30.7	1.38 135.5	20 59.1	1.38 135.4	21 27.5	1.38 135.2	21 56.0	1.38 135.0	22 24.4	1.38 134.8	22 52.8	1.38 134.7	23 21.1	1.38 134.5	1
2	19 43.0	1.39 134.7	20 11.4	1.39 134.5	20 39.8	1.39 134.4	21 08.2	1.39 134.2	21 36.5	1.39 134.0	22 04.9	1.39 133.8	22 33.2	1.39 133.7	23 01.5	1.39 133.5	2
3	19 23.5	1.40 133.7	19 51.8	1.40 133.5	20 20.2	1.40 133.3	20 48.5	1.40 133.2	21 16.8	1.40 133.0	21 45.1	1.40 132.8	22 13.4	1.40 132.6	22 41.6	1.40 132.5	3
4	19 03.7	1.41 132.7	19 31.9	1.41 132.5	20 00.2	1.41 132.3	20 28.5	1.41 132.2	20 56.7	1.41 132.0	21 24.9	1.41 131.8	21 53.1	1.41 131.6	22 21.4	1.41 131.4	4
45	18 43.5	1.42 131.7	19 11.7	1.42 131.5	19 39.9	1.42 131.3	20 08.1	1.42 131.2	20 36.3	1.42 131.0	21 04.5	1.42 130.8	21 32.6	1.42 130.6	22 00.8	1.42 130.4	45
6	18 23.0	1.43 130.7	18 51.1	1.43 130.5	19 19.3	1.43 130.3	19 47.4	1.43 130.2	20 15.6	1.43 130.0	20 43.7	1.43 129.8	21 11.8	1.43 129.6	21 39.9	1.43 129.4	6
7	18 02.1	1.44 129.7	18 30.3	1.44 129.5	18 58.4	1.44 129.3											

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Az.															
00	27 00.0	180.0	26 39.0	180.0	26 00.0	180.0	25 39.0	180.0	25 00.0	180.0	24 39.0	180.0	24 00.0	180.0	23 39.0	180.0	00
1	26 59.7	178.9	26 29.7	178.9	25 59.7	178.9	25 29.7	178.9	24 59.7	178.9	24 29.7	178.9	23 59.7	178.9	23 29.7	178.9	1
2	26 58.9	177.8	26 28.9	177.8	25 58.9	177.8	25 28.9	177.8	24 58.9	177.8	24 28.9	177.8	23 58.9	177.8	23 28.9	177.8	2
3	26 57.6	176.6	26 27.6	176.6	25 57.6	176.6	25 27.6	176.6	24 57.6	176.6	24 27.7	176.7	23 57.7	176.7	23 27.7	176.7	3
4	26 55.7	175.5	26 25.8	175.5	25 55.8	175.5	25 25.8	175.5	24 55.8	175.5	24 25.8	175.5	23 55.8	175.5	23 25.9	175.5	4
05	26 53.3	174.4	26 23.4	174.4	25 53.4	174.4	25 23.4	174.4	24 53.5	174.5	24 23.5	174.5	23 53.5	174.5	23 23.5	174.5	05
6	26 50.4	173.3	26 20.5	173.3	25 50.5	173.3	25 20.5	173.4	24 50.6	173.4	24 20.6	173.4	23 50.7	173.4	23 20.7	173.5	6
7	26 47.0	172.2	26 17.0	172.2	25 47.1	172.2	25 17.1	172.3	24 47.2	172.3	24 17.2	172.3	23 47.3	172.4	23 17.3	172.4	7
8	26 43.0	171.0	26 13.0	171.0	25 43.1	171.0	25 13.1	171.2	24 43.3	171.2	24 13.3	171.2	23 43.4	171.3	23 13.5	171.3	8
9	26 38.5	169.9	26 08.6	170.0	25 38.7	170.0	25 08.8	170.1	24 38.8	170.1	24 08.9	170.1	23 39.0	170.2	23 09.1	170.2	9
10	26 33.4	168.8	26 03.6	168.9	25 33.7	168.9	25 03.8	169.0	24 33.9	169.0	24 04.0	169.0	23 34.1	169.1	23 04.2	169.1	10
1	26 27.9	167.7	25 58.0	167.7	25 28.2	167.8	24 58.3	167.9	24 28.4	167.9	23 58.6	168.0	23 28.7	168.0	22 58.9	168.1	1
2	26 21.8	166.6	25 52.0	166.6	25 22.2	166.7	24 52.3	166.8	24 22.5	166.8	23 52.6	166.9	23 22.8	166.9	22 53.0	167.0	2
3	26 15.3	165.5	25 45.4	165.5	25 15.6	165.6	24 45.8	165.7	24 16.0	165.7	23 46.2	165.8	23 16.4	165.8	22 46.6	165.9	3
4	26 08.2	164.4	25 38.4	164.4	25 08.6	164.5	24 38.8	164.6	24 09.1	164.6	23 39.3	164.7	23 09.5	164.8	22 39.7	164.8	4
15	26 00.6	163.3	25 30.8	163.3	25 01.1	163.4	24 31.3	163.5	24 01.6	163.5	23 31.8	163.6	23 02.1	163.7	22 32.3	163.8	15
6	25 52.5	162.2	25 22.8	162.2	24 53.1	162.3	24 23.3	162.4	23 53.6	162.5	23 23.9	162.5	22 54.2	162.6	22 24.5	162.7	6
7	25 43.9	161.1	25 14.2	161.1	24 44.5	161.2	24 14.9	161.3	23 45.2	161.4	23 15.5	161.5	22 45.8	161.5	22 16.1	161.6	7
8	25 34.8	160.0	25 05.2	160.0	24 35.5	160.1	24 05.9	160.2	23 36.2	160.3	23 06.6	160.4	22 36.9	160.4	22 07.3	160.6	8
9	25 25.2	158.9	24 55.6	159.0	24 26.0	159.1	23 56.4	159.2	23 26.8	159.3	22 57.2	159.3	22 27.6	159.5	21 58.0	159.5	9
20	25 15.2	157.8	24 45.6	157.9	24 16.0	158.0	23 46.5	158.1	23 16.9	158.2	22 47.3	158.2	22 17.8	158.3	21 48.2	158.4	20
1	25 04.6	156.7	24 35.1	156.8	24 05.6	156.9	23 36.1	157.0	23 06.5	157.0	22 37.0	157.2	22 07.5	157.3	21 37.9	157.4	1
2	24 53.6	155.6	24 24.1	155.7	23 54.7	155.8	23 25.2	155.9	22 55.7	156.0	22 26.2	156.1	21 56.7	156.2	21 27.2	156.3	2
3	24 42.1	154.5	24 12.7	154.6	23 43.3	154.7	23 13.8	154.8	22 44.4	155.0	22 15.0	155.1	21 45.5	155.2	21 16.1	155.3	3
4	24 30.2	153.4	24 00.8	153.6	23 31.4	153.7	23 02.0	153.8	22 32.6	153.9	22 03.2	154.0	21 33.8	154.1	21 04.4	154.2	4
25	24 17.8	152.4	23 48.4	152.5	23 19.1	152.6	22 49.8	152.7	22 20.4	152.8	21 51.1	152.9	21 21.7	153.1	20 52.4	153.2	25
6	24 04.9	151.3	23 35.6	151.4	23 06.4	151.5	22 37.1	151.7	22 07.8	151.8	21 38.5	151.9	21 09.2	152.0	20 39.8	152.1	6
7	23 51.6	150.2	23 22.4	150.4	22 53.2	150.5	22 23.9	150.6	21 54.7	150.7	21 25.4	150.8	20 56.2	151.0	20 26.9	151.1	7
8	23 37.9	149.2	23 08.7	149.3	22 39.5	149.4	22 10.3	149.6	21 41.1	149.7	21 11.9	149.8	20 42.7	149.9	20 13.5	150.0	8
9	23 23.7	148.1	22 54.6	148.2	22 25.4	148.4	21 56.3	148.5	21 27.2	148.6	20 58.0	148.8	20 28.8	148.9	19 59.7	149.0	9
30	23 09.1	147.1	22 40.0	147.2	22 10.9	147.3	21 41.9	147.5	21 12.8	147.6	20 43.7	147.7	20 14.6	147.8	19 45.4	148.0	30
1	22 54.1	146.0	22 25.1	146.1	21 56.0	146.3	21 27.0	146.4	20 58.0	146.5	20 28.9	146.7	19 59.9	146.8	19 30.8	146.9	1
2	22 38.6	145.0	22 09.7	145.1	21 40.7	145.2	21 11.7	145.4	20 42.7	145.5	20 13.7	145.7	19 44.7	145.8	19 15.7	145.9	2
3	22 22.8	143.9	21 53.9	144.1	21 25.0	144.2	20 56.0	144.3	20 27.1	144.5	19 58.2	144.6	19 29.2	144.8	19 00.3	144.9	3
4	22 06.6	142.9	21 37.7	143.0	21 08.8	143.2	20 40.0	143.3	20 11.1	143.5	19 42.2	143.6	19 13.3	143.7	18 44.4	143.9	4
35	21 49.9	141.8	21 21.1	142.0	20 52.3	142.1	20 23.5	142.3	19 54.7	142.4	19 25.8	142.6	18 57.0	142.7	18 28.2	142.9	35
6	21 32.9	140.8	21 04.2	141.0	20 35.4	141.1	20 06.6	141.3	19 37.9	141.4	19 09.1	141.6	18 40.3	141.7	18 11.5	141.9	6
7	21 15.6	139.8	20 46.8	139.9	20 18.1	140.1	19 49.4	140.2	19 20.7	140.3	18 52.0	140.6	18 23.3	140.7	17 54.5	140.9	7
8	20 57.7	138.8	20 29.1	138.9	20 00.5	139.1	19 31.8	139.2	19 03.2	139.4	18 34.5	139.5	18 05.8	139.7	17 37.1	139.9	8
9	20 39.6	137.7	20 11.0	137.9	19 42.4	138.1	19 13.8	138.2	18 45.2	138.4	18 16.6	138.5	17 48.0	138.7	17 19.4	138.9	9
40	20 21.1	136.7	19 52.6	136.9	19 24.0	137.0	18 55.5	137.2	18 27.0	137.4	17 58.4	137.5	17 29.9	137.7	17 01.3	137.9	40
1	20 02.2	135.7	19 33.8	135.9	19 05.3	136.0	18 36.8	136.2	18 08.4	136.4	17 39.9	136.5	17 11.4	136.7	16 42.9	136.9	1
2	19 43.0	134.7	19 14.6	134.9	18 46.2	135.0	18 17.8	135.2	17 49.4	135.4	17 21.0	135.5	16 52.5	135.7	16 24.1	135.9	2
3	19 23.5	133.7	18 55.2	133.9	18 26.8	134.0	17 58.5	134.2	17 30.1	134.4	17 01.7	134.6	16 33.3	134.7	16 04.9	134.9	3
4	19 03.7	132.7	18 35.4	132.9	18 07.1	133.0	17 38.8	133.2	17 10.5	133.4	16 42.1	133.6	16 13.8	133.7	15 45.5	133.9	4
45	18 43.5	131.7	18 15.2	131.9	17 47.0	132.1	17 18.8	132.2	16 50.5	132.4	16 22.2	132.6	15 54.0	132.8	15 25.7	132.9	45
6	18 23.0	130.7	17 54.8	130.9	17 26.6	131.1	16 58.4	131.2	16 30.2	131.4	16 02.0	131.6	15 33.8	131.8	15 05.6	132.0	6
7	18 02.4	129.7	17 34.1	129.9	17 05.9	130.1	16 37.8	130.3	16 09.7	130.5	15 41.5	130.6	15 13.3	130.8	14 45.2	131.0	7
8	17 41.1	128.7	17 13.0	128.9	16 45.0	129.1	16 16.9	129.3	15 48.8	129.5	15 20.7	129.7	14 52.6	129.8	14 24.5	129.9	8
9	17 19.7	127.8	16 51.7	127.9	16 23.7	128.1	15 55.6	128.3	15 27.6	128.5	14 59.6	128.7	14 31.5	128.9	14 03.4	129.1	9
50	16 58.0	126.8	16 30.1	127.0	16 02.1	127.2	15 34.1	127.3	15 06.1	127.5	14 38.2	127.7	14 10.2	127.9	13 42.1	128.1	50
1	16 36.1	125.8	16 08.2	126.0	15 40.3	126.2	15 12.3	126.4	14 44.4	126.6	14 16.5	126.8	13 48.5	126.9	13 20.6	127.1	1
2	16 13.8	124.8	15 46.0	125.0	15 18.1	125.2	14 50.3	125.4	14 22.4	125.6	13 54.5	125.8	13 26.6	126.0	12 58.7	126.2	2
3	15 51.4	123.9	15 23.6	124.1	14 55.8	124.3	14 27.9	124.5	14 00.1	124.7	13 32.3	124.8	13 04.5	125.0	12 36.6	125.2	3
4	15 28.6	122.9	15 00.9	123.1	14 33.1	123.3	14 05.4	123.5	13 37.6	123.7	13 09.8	123.9	12 42.0	124.1	12 14.2	124.3	4
55	15 05.6	122.0	14 37.9	122.2	14 10.2	122.4	13 42.5	122.6	13 14.8	122.8	12 47.1	122.9	12 19.3	123.1	11 51.6	123.3	55
6	14 42.4	121.0	14 14.8														

DECLINATION SAME NAME AS LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	31 00.0	1.00	180.0	31 30.0	1.00	180.0	32 00.0	1.00	180.0	32 30.0	1.00	180.0	33 00.0	1.00	180.0	34 00.0	1.00	180.0	00
1	30 59.7	1.00	178.8	31 29.7	1.00	178.8	31 59.7	1.00	178.8	32 29.7	1.00	178.8	32 59.7	1.00	178.8	33 29.7	1.00	178.8	1
2	30 58.9	1.00	177.7	31 28.9	1.00	177.7	31 58.9	1.00	177.7	32 28.9	1.00	177.7	32 58.9	1.00	177.7	33 28.9	1.00	177.7	2
3	30 57.5	1.00	176.5	31 27.5	1.00	176.5	31 57.5	1.00	176.5	32 27.5	1.00	176.5	32 57.5	1.00	176.5	33 27.5	1.00	176.5	3
4	30 55.6	1.00	175.3	31 25.6	1.00	175.3	31 55.5	1.00	175.3	32 25.5	1.00	175.3	32 55.5	1.00	175.2	33 25.5	1.00	175.2	4
05	30 53.1	1.00	174.2	31 23.1	1.00	174.2	31 53.0	1.00	174.1	32 23.0	1.00	174.1	32 52.9	1.00	174.0	33 22.9	1.00	174.0	05
6	30 50.1	1.00	173.0	31 20.0	1.00	173.0	31 50.0	1.00	173.0	32 19.9	1.00	172.9	32 49.8	1.00	172.8	33 19.8	1.00	172.8	6
7	30 46.5	1.00	171.9	31 16.4	1.00	171.8	31 46.4	1.00	171.8	32 16.3	1.00	171.7	32 46.2	1.00	171.7	33 16.2	1.00	171.7	7
8	30 42.4	1.00	170.7	31 12.3	1.00	170.7	31 42.2	1.00	170.6	32 12.1	1.00	170.6	32 41.9	1.00	170.4	33 11.8	1.00	170.4	8
9	30 37.7	1.00	169.6	31 07.6	1.00	169.5	31 37.5	1.00	169.5	32 07.4	1.00	169.4	32 37.3	1.00	169.3	33 07.2	1.00	169.2	9
10	30 32.5	1.00	168.4	31 02.3	1.00	168.3	31 32.2	1.00	168.3	32 02.1	1.00	168.2	32 32.0	1.00	168.1	33 01.8	1.00	168.1	10
1	30 26.7	09 10	167.2	30 56.6	09 10	167.2	31 26.4	09 11	167.1	31 56.3	09 11	167.1	32 26.1	09 11	166.9	33 25.8	09 11	166.8	1
2	30 20.4	09 11	166.1	30 50.3	09 11	166.0	31 20.1	09 11	166.0	31 49.9	09 12	165.8	32 19.7	09 12	165.8	33 19.3	09 12	165.7	2
3	30 13.6	09 12	164.9	30 43.4	09 12	164.9	31 13.2	09 12	164.8	31 43.0	09 12	164.7	32 12.8	09 12	164.6	33 12.3	09 12	164.5	3
4	30 06.3	09 13	163.8	30 36.1	09 13	163.7	31 05.8	09 13	163.7	31 35.6	09 13	163.6	32 05.3	09 13	163.5	33 04.8	09 13	163.3	4
15	29 58.4	09 14	162.7	30 28.2	09 14	162.6	30 57.9	09 14	162.5	31 27.6	09 14	162.4	32 07.3	09 14	162.3	33 04.5	09 14	162.1	15
6	29 50.1	09 15	161.5	30 19.7	09 15	161.4	30 49.4	09 15	161.4	31 19.1	09 15	161.3	31 48.8	09 15	161.2	33 03.8	09 15	161.0	6
7	29 41.2	09 16	160.4	30 10.8	09 16	160.3	30 40.5	09 16	160.2	31 10.1	09 16	160.1	31 39.7	09 16	159.9	33 03.0	09 16	159.7	7
8	29 31.8	09 16	159.3	30 01.4	09 17	159.2	30 31.0	09 17	159.1	31 00.6	09 17	159.0	31 30.2	09 17	158.8	33 02.3	09 17	158.6	8
9	29 21.9	09 17	158.1	29 51.4	09 17	158.0	30 21.0	09 18	157.9	30 50.5	09 18	157.8	31 20.1	09 18	157.7	33 01.4	09 18	157.5	9
20	29 11.5	09 18	157.0	29 41.0	09 18	156.9	30 10.5	09 18	156.8	30 40.0	09 18	156.7	31 09.5	09 18	156.6	31 39.0	09 18	156.5	20
1	29 00.6	09 19	155.9	29 30.1	09 19	155.8	29 59.5	09 19	155.7	30 29.0	09 19	155.5	30 58.4	09 19	155.4	31 27.9	09 19	155.2	1
2	28 49.2	09 20	154.8	29 18.6	09 20	154.6	29 48.1	09 20	154.5	30 17.5	09 20	154.4	30 46.9	09 20	154.3	31 16.3	09 20	154.2	2
3	28 37.3	09 21	153.6	29 06.7	09 21	153.5	29 36.1	09 21	153.4	30 05.5	09 21	153.3	30 34.8	09 21	153.2	31 04.2	09 21	153.0	3
4	28 25.0	09 21	152.5	28 54.3	09 21	152.4	29 23.7	09 22	152.3	29 53.0	09 22	152.2	30 22.3	09 22	152.0	30 51.6	09 22	151.9	4
25	28 12.2	09 22	151.4	28 41.5	09 22	151.3	29 10.8	09 22	151.2	29 40.0	09 22	151.0	30 09.3	09 22	150.9	30 38.5	09 22	150.7	25
6	27 59.0	09 23	150.3	28 28.2	09 23	150.2	28 57.4	09 23	150.1	29 26.6	09 23	149.9	29 55.8	09 23	149.8	30 25.0	09 23	149.5	6
7	27 45.2	09 24	149.2	28 14.4	09 24	149.1	28 43.6	09 24	149.0	29 12.7	09 24	148.8	29 41.9	09 24	148.7	30 11.0	09 24	148.5	7
8	27 31.1	09 24	148.1	28 00.2	09 24	148.0	28 29.3	09 25	147.9	28 58.4	09 25	147.7	29 27.5	09 25	147.6	29 56.6	09 25	147.3	8
9	27 16.5	09 25	147.0	27 45.5	09 25	146.9	28 14.6	09 25	146.8	28 43.6	09 25	146.6	29 12.7	09 25	146.5	29 41.7	09 25	146.2	9
30	27 01.4	09 26	146.0	27 30.4	09 26	145.8	27 59.4	09 26	145.7	28 28.4	09 26	145.5	28 57.4	09 26	145.4	29 26.4	09 26	145.2	30
1	26 46.0	09 27	144.9	27 14.9	09 27	144.7	27 43.9	09 27	144.6	28 12.8	09 27	144.4	28 41.7	09 27	144.3	29 10.6	09 27	144.1	1
2	26 30.1	09 27	143.8	26 59.0	09 27	143.6	27 27.9	09 27	143.5	27 56.7	09 27	143.3	28 25.6	09 28	143.2	28 54.4	09 28	143.0	2
3	26 13.8	09 28	142.7	26 42.6	09 28	142.6	27 11.5	09 28	142.4	27 40.3	09 28	142.3	28 09.1	09 28	142.1	28 37.9	09 28	141.9	3
4	25 57.1	09 28	141.6	26 25.9	09 29	141.5	26 54.6	09 29	141.3	27 23.4	09 29	141.2	27 52.1	09 29	141.0	28 20.9	09 29	140.9	4
35	25 40.0	09 29	140.6	26 08.7	09 29	140.4	26 37.4	09 29	140.3	27 06.1	09 29	140.1	27 34.8	09 30	139.9	28 03.5	09 30	139.8	35
6	25 22.5	09 30	139.5	25 51.2	09 30	139.4	26 19.8	09 30	139.2	26 48.4	09 30	139.0	27 17.1	09 30	138.8	27 45.7	09 30	138.7	6
7	25 04.6	09 30	138.4	25 33.2	09 30	138.3	26 01.8	09 31	138.1	26 30.4	09 31	138.0	26 59.0	09 31	137.8	27 27.5	09 31	137.6	7
8	24 46.4	09 31	137.4	25 14.9	09 31	137.3	25 43.5	09 31	137.1	26 12.0	09 31	136.9	26 40.5	09 31	136.7	27 09.0	09 31	136.6	8
9	24 27.8	09 32	136.4	24 56.3	09 32	136.2	25 24.7	09 32	136.0	25 53.2	09 32	135.9	26 21.6	09 32	135.7	26 50.1	09 32	135.5	9
40	24 08.8	09 33	135.4	24 37.3	09 33	135.2	25 05.7	09 33	135.0	25 34.1	09 33	134.8	26 02.4	09 33	134.6	26 30.8	09 33	134.5	40
1	23 49.5	09 33	134.3	24 17.9	09 33	134.1	24 46.2	09 33	134.0	25 14.6	09 33	133.8	25 42.9	09 33	133.6	26 11.2	09 33	133.4	1
2	23 29.9	09 33	133.3	23 58.2	09 33	133.1	24 26.4	09 34	132.9	24 54.7	09 34	132.7	25 23.0	09 34	132.6	25 51.2	09 34	132.4	2
3	23 09.9	09 34	132.3	23 38.1	09 34	132.1	24 05.3	09 34	131.9	24 34.6	09 34	131.7	25 02.8	09 34	131.5	25 30.9	09 34	131.3	3
4	22 49.6	09 34	131.2	23 17.7	09 34	131.1	23 45.9	09 34	130.9	24 14.1	09 34	130.7	24 42.2	09 34	130.5	25 10.3	09 34	130.3	4
45	22 28.9	09 35	130.2	22 57.0	09 35	130.0	23 25.1	09 35	129.9	23 53.2	09 35	129.7	24 21.3	09 35	129.5	24 49.4	09 35	129.3	45
6	22 08.0	09 35	129.2	22 36.0	09 35	129.0	23 04.1	09 36	128.8	23 32.1	09 36	128.6	24 00.1	09 36	128.5	24 28.2	09 36	128.3	6
7	21 46.7	09 36	128.2	22 14.7	09 36	128.0	22 42.7	09 36	127.8	23 10.7	09 36	127.6	23 38.7	09 36	127.4	24 06.6	09 36	127.2	7
8	21 25.2	09 36	127.2	21 53.1	09 36	127.0	22 21.1	09 37	126.8	22 49.0	09 37	126.6	23 16.9	09 37	126.4	23 44.8	09 37	126.2	8
9	21 03.3	09 37	126.2	21 31.2	09 37	126.0	21 59.1	09 37	125.8	22 27.0	09 37	125.6	22 54.8	09 37	125.4	23 22.7	09 37	125.2	9
50	20 41.2	09 37	125.2	21 09.1	09 37	125.0	21 36.9	09 37	124.8	22 04.7	09 38	124.6	22 32.5	09 38	124.4	23 00.3	09 38	124.2	50
1	20 18.8	09 38	124.2	20 46.6	09 38	124.0	21 14.4	09 38	123.8	21 42.2	09 38	123.6	22 09.9	09 38	123.4	22 37.6	09 38	123.2	1
2	19 56.2	09 38																	

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.															
00	23 00.0	1.00 180.0	22 30.0	1.00 180.0	22 00.0	1.00 180.0	21 30.0	1.00 180.0	21 00.0	1.00 180.0	20 30.0	1.00 180.0	20 00.0	1.00 180.0	19 30.0	1.00 180.0	00
1	22 59.7	1.001 178.9	22 29.7	1.001 178.9	21 59.7	1.001 178.9	21 29.7	1.001 178.9	20 59.7	1.001 178.9	20 29.7	1.001 178.9	19 59.7	1.001 178.9	19 29.8	1.001 178.9	1
2	22 59.0	1.002 177.8	22 29.0	1.002 177.8	21 59.0	1.002 177.9	21 29.0	1.002 177.9	20 59.0	1.002 177.9	20 29.0	1.002 177.9	19 59.0	1.002 177.9	19 29.0	1.002 177.9	2
3	22 57.7	1.003 176.8	22 27.7	1.003 176.8	21 57.7	1.003 176.8	21 27.7	1.003 176.8	20 57.7	1.003 176.8	20 27.7	1.003 176.8	19 57.7	1.003 176.8	19 27.8	1.003 176.8	3
4	22 55.9	1.004 175.7	22 25.9	1.004 175.7	21 55.9	1.004 175.7	21 25.9	1.004 175.7	20 56.0	1.004 175.7	20 26.0	1.004 175.8	19 56.0	1.004 175.8	19 26.0	1.004 175.8	4
5	22 53.6	1.005 174.6	22 23.6	1.005 174.6	21 53.6	1.005 174.6	21 23.6	1.005 174.7	20 53.7	1.005 174.7	20 23.7	1.005 174.7	19 53.7	1.005 174.7	19 23.8	1.005 174.7	5
6	22 50.7	1.006 173.5	22 20.8	1.006 173.5	21 50.8	1.006 173.6	21 20.9	1.006 173.6	20 50.9	1.006 173.6	20 20.9	1.006 173.6	19 51.0	1.006 173.7	19 21.0	1.006 173.7	6
7	22 47.4	1.006 172.4	22 17.5	1.006 172.4	21 47.5	1.006 172.5	21 17.6	1.006 172.5	20 47.6	1.006 172.6	20 17.7	1.006 172.6	19 47.7	1.006 172.6	19 17.8	1.006 172.6	7
8	22 43.6	1.007 171.3	22 13.6	1.007 171.4	21 43.7	1.007 171.4	21 13.8	1.007 171.5	20 43.8	1.007 171.5	20 13.9	1.007 171.5	19 44.0	1.007 171.6	19 14.0	1.007 171.6	8
9	22 39.2	1.008 170.3	22 09.3	1.008 170.3	21 39.4	1.008 170.3	21 09.5	1.008 170.4	20 39.6	1.008 170.4	20 09.6	1.008 170.5	19 39.7	1.008 170.5	19 09.8	1.008 170.5	9
10	22 34.3	1.009 169.2	22 04.5	1.009 169.2	21 34.6	1.009 169.3	21 04.7	1.009 169.3	20 34.8	1.009 169.4	20 04.9	1.009 169.4	19 35.0	1.009 169.5	19 05.1	1.009 169.5	10
1	22 29.0	1.010 168.1	21 59.1	1.010 168.2	21 29.2	1.010 168.2	20 59.4	1.010 168.3	20 29.5	1.010 168.3	19 59.6	1.010 168.4	19 29.8	1.010 168.4	18 59.9	1.010 168.5	1
2	22 23.1	99 11 167.0	21 53.3	99 11 167.1	21 23.4	99 10 167.1	20 53.6	99 10 167.2	20 23.7	99 10 167.3	19 53.9	99 10 167.3	19 24.0	99 10 167.4	18 54.2	1.010 167.4	2
3	22 16.8	99 11 166.0	21 46.9	99 11 166.0	21 17.1	99 11 166.1	20 47.3	99 11 166.1	20 17.5	99 11 166.2	19 47.7	99 11 166.3	19 17.8	99 11 166.3	18 48.0	99 11 166.4	3
4	22 09.9	99 12 164.9	21 40.1	99 12 165.0	21 10.3	99 12 165.0	20 40.5	99 12 165.1	20 10.7	99 12 165.1	19 41.0	99 12 165.2	19 11.2	99 12 165.3	18 41.4	99 12 165.3	4
15	22 02.6	99 13 163.8	21 32.8	99 13 163.9	21 03.0	99 13 164.0	20 33.3	99 13 164.0	20 03.5	99 13 164.1	19 33.8	99 13 164.2	19 04.0	99 13 164.2	18 34.2	99 13 164.3	15
6	21 54.7	99 14 162.8	21 25.0	99 14 162.8	20 55.3	99 14 162.9	20 25.6	99 14 163.0	19 55.8	99 14 163.0	19 26.1	99 14 163.1	18 56.4	99 14 163.2	18 26.6	99 13 163.3	6
7	21 46.4	99 15 161.7	21 16.7	99 15 161.8	20 47.0	99 15 161.8	20 17.3	99 15 161.9	19 47.6	99 15 162.0	19 17.9	99 15 162.1	18 48.2	99 15 162.1	18 18.5	99 14 162.2	7
8	21 37.6	99 15 160.6	21 08.0	99 15 160.7	20 38.3	99 15 160.8	20 08.7	99 15 160.9	19 39.0	99 15 161.0	19 09.3	99 15 161.0	18 39.7	99 15 161.1	18 10.0	99 15 161.2	8
9	21 28.4	99 16 159.6	20 58.7	99 16 159.7	20 29.1	99 16 159.7	19 59.5	99 16 159.8	19 29.9	99 16 159.9	19 00.2	99 16 160.0	18 30.6	99 16 160.1	18 01.0	99 16 160.2	9
20	21 18.6	99 17 158.5	20 49.0	99 17 158.6	20 19.5	99 17 158.7	19 49.9	99 17 158.8	19 20.3	99 17 158.9	18 50.7	99 17 159.0	18 21.1	99 17 159.0	17 51.5	99 17 159.1	20
1	21 08.4	98 18 157.5	20 39.3	98 18 157.6	20 09.3	98 18 157.6	19 39.8	98 18 157.7	19 10.2	98 18 157.8	18 40.7	98 18 157.9	18 11.1	98 18 158.0	17 41.6	98 17 158.1	1
2	20 57.7	98 19 156.4	20 28.2	98 18 156.5	19 58.7	98 18 156.6	19 29.2	98 18 156.7	18 59.7	98 18 156.8	18 30.2	98 18 156.9	18 00.7	98 18 157.0	17 31.2	98 18 157.1	2
3	20 46.6	98 19 155.4	20 17.2	98 19 155.5	19 47.7	98 19 155.6	19 18.2	98 19 155.7	18 48.8	98 19 155.8	18 19.3	98 19 155.9	17 49.8	98 19 156.0	17 20.3	98 19 156.1	3
4	20 35.0	98 20 154.3	20 05.6	98 20 154.4	19 36.2	98 20 154.5	19 06.8	98 20 154.6	18 37.4	98 20 154.7	18 07.9	98 20 154.8	17 38.5	98 20 154.9	17 09.1	98 20 155.0	4
25	20 23.0	98 21 153.3	19 53.6	98 21 153.4	19 24.3	98 21 153.5	18 54.9	98 21 153.6	18 25.5	98 21 153.7	17 56.1	98 21 153.8	17 26.7	98 21 153.9	16 57.4	98 21 154.0	25
6	20 10.5	98 22 152.2	19 41.2	98 21 152.3	19 11.9	98 21 152.5	18 42.6	98 21 152.6	18 13.2	98 21 152.7	17 43.9	98 21 152.8	17 14.5	98 21 152.9	16 45.2	98 21 153.0	6
7	19 57.6	98 22 151.2	19 28.3	98 22 151.3	18 59.1	98 22 151.4	18 29.8	98 22 151.5	18 00.5	98 22 151.7	17 31.2	98 22 151.8	17 01.9	98 22 151.9	16 32.6	98 22 152.0	7
8	19 44.3	97 23 150.2	19 15.1	97 23 150.3	18 45.8	97 23 150.4	18 16.6	97 23 150.5	17 47.4	97 23 150.6	17 18.1	97 23 150.8	16 48.9	97 23 150.9	16 19.6	98 22 151.0	8
9	19 30.5	97 24 149.1	19 01.3	97 24 149.3	18 32.2	97 23 149.4	18 03.0	97 23 149.5	17 33.8	97 23 149.6	17 04.6	97 23 149.7	16 35.4	97 23 149.9	16 06.2	97 23 150.0	9
30	19 16.3	97 24 148.1	18 47.2	97 24 148.2	18 18.1	97 24 148.4	17 48.9	97 24 148.5	17 19.8	97 24 148.6	16 50.7	97 24 148.7	16 21.5	97 24 148.9	15 52.4	97 24 149.0	30
1	19 01.7	97 25 147.1	18 32.7	97 25 147.2	18 03.6	97 25 147.3	17 34.5	97 25 147.5	17 05.4	97 25 147.6	16 36.3	97 25 147.7	16 07.2	97 24 147.9	15 38.1	97 24 148.0	1
2	18 46.7	97 26 146.1	18 17.7	97 26 146.2	17 48.7	97 26 146.3	17 19.7	97 26 146.5	16 50.6	97 26 146.6	16 21.6	97 26 146.7	15 52.5	97 26 146.9	15 23.5	97 26 147.0	2
3	18 31.3	97 26 145.0	18 02.4	97 26 145.2	17 33.4	97 26 145.3	17 04.4	97 26 145.5	16 35.4	97 26 145.6	16 06.4	97 26 145.7	15 37.4	97 26 145.9	15 08.4	97 26 146.0	3
4	18 15.5	96 27 144.0	17 46.6	96 27 144.2	17 17.7	96 27 144.3	16 48.8	96 27 144.4	16 19.8	96 27 144.6	15 50.9	96 27 144.7	15 22.0	96 26 144.9	14 53.0	96 26 145.0	4
35	17 59.3	96 28 143.0	17 30.5	96 28 143.2	17 01.6	96 27 143.3	16 32.7	96 27 143.4	16 03.9	96 27 143.6	15 35.0	96 27 143.7	15 06.1	96 27 143.9	14 37.2	96 27 144.0	35
6	17 42.7	96 28 142.0	17 13.9	96 28 142.2	16 45.1	96 28 142.3	16 16.3	96 28 142.4	15 47.5	96 28 142.6	15 18.7	96 28 142.7	14 49.8	96 28 142.9	14 21.0	96 28 143.0	6
7	17 25.8	96 29 141.0	16 57.0	96 29 141.2	16 28.3	96 29 141.3	15 59.5	96 29 141.5	15 30.8	96 29 141.6	15 02.0	96 29 141.7	14 33.2	96 29 141.9	14 04.4	96 28 142.0	7
8	17 08.5	96 30 140.0	16 39.8	96 29 140.2	16 11.1	96 29 140.3	15 42.4	96 29 140.5	15 13.7	96 29 140.6	14 44.9	96 29 140.8	14 16.2	96 29 140.9	13 47.5	96 29 141.1	8
9	16 50.8	95 30 139.0	16 22.1	95 30 139.2	15 53.5	95 30 139.3	15 24.8	95 30 139.5	14 56.2	95 30 139.6	14 27.5	95 30 139.8	13 58.9	95 30 139.9	13 30.2	95 29 140.1	9
40	16 32.7	95 31 138.0	16 04.1	95 31 138.2	15 35.6	95 30 138.3	15 07.0	95 30 138.5	14 38.4	95 30 138.6	14 09.8	95 30 138.8	13 41.2	95 30 139.0	13 12.5	95 30 139.1	40
1	16 14.3	95 31 137.0	15 45.8	95 31 137.2	15 17.3	95 31 137.3	14 48.7	95 31 137.5	14 20.2	95 31 137.7	13 51.6	95 31 137.8	13 23.1	95 31 138.0	12 54.5	95 31 138.1	1
2	15 55.6	95 32 136.0	15 27.1	95 32 136.2	14 58.7	95 32 136.4	14 30.2	95 32 136.5	14 01.7	95 31 136.7	13 33.2	95 31 136.9	13 04.7	95 31 137.0	12 36.2	95 31 137.2	2
3	15 36.5	95 32 135.1	15 08.1	95 32 135.2	14 39.7	95 32 135.4	14 11.3	95 32 135.6	13 42.8	95 32 135.7	13 14.4	95 32 135.9	12 45.9	95 32 136.0	12 17.5	95 32 136.2	3
4	15 17.1	95 33 134.1	14 48.8	95 33 134.2	14 20.4	95 33 134.4	13 52.0	95 33 134.6	13 23.7	95 32 134.8	12 55.3	95 32 134.9	12 26.9	95 32 135.1	11 58.5	95 32 135.2	4
45	14 57.4	94 33 133.1	14 29.1	94 33 133.3	14 00.8	94 33 133.4	13 32.5	94 33 133.6	13 04.1	94 33 133.8	12 35.8	94 33 134.0	12 07.5	94 33 134.1	11 39.1	94 33	

Lat. 63°

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Az.															
00	35 00.0	180.0	35 30.9	180.0	36 00.0	180.0	36 30.0	180.0	37 00.0	180.0	37 30.0	180.0	38 00.0	180.0	38 30.0	180.0	00
1	34 59.7	178.8	35 29.7	178.8	35 59.7	178.8	36 29.7	178.8	36 59.7	178.8	37 29.7	178.8	37 59.7	178.8	38 29.7	178.8	1
2	34 58.9	177.6	35 28.8	177.6	35 58.8	177.6	36 28.8	177.6	36 58.8	177.6	37 28.8	177.6	37 58.8	177.6	38 28.8	177.6	2
3	34 57.4	176.4	35 27.4	176.4	35 57.4	176.4	36 27.4	176.4	36 57.4	176.4	37 27.3	176.3	37 57.3	176.3	38 27.3	176.3	3
4	34 55.4	175.2	35 25.4	175.1	35 55.4	175.1	36 25.3	175.0	36 55.3	175.0	37 25.3	175.0	37 55.3	175.0	38 25.2	175.0	4
05	34 52.8	174.0	35 22.8	173.9	35 52.8	173.9	36 22.7	173.9	36 52.7	173.9	37 22.6	173.8	37 52.6	173.8	38 22.6	173.8	05
6	34 49.7	172.8	35 19.6	172.7	35 49.6	172.7	36 19.5	172.6	36 49.5	172.6	37 19.4	172.6	37 49.4	172.5	38 19.3	172.5	6
7	34 46.0	171.6	35 15.9	171.5	35 45.8	171.5	36 15.7	171.4	36 45.7	171.4	37 15.6	171.3	37 45.5	171.3	38 15.5	171.3	7
8	34 41.7	170.4	35 11.6	170.3	35 41.5	170.3	36 11.4	170.2	36 41.3	170.2	37 11.2	170.1	37 41.1	170.1	38 11.0	170.0	8
9	34 36.8	169.2	35 06.7	169.1	35 36.6	169.0	36 06.5	168.9	36 36.4	168.9	37 06.2	168.8	37 36.1	168.8	38 06.0	168.8	9
10	34 31.4	168.0	35 01.3	167.9	35 31.1	167.8	36 01.0	167.8	36 30.9	167.7	37 00.7	167.7	37 30.6	167.6	38 00.4	167.5	10
1	34 25.5	166.8	34 55.3	166.7	35 25.1	166.6	35 55.0	166.6	36 24.8	166.5	36 54.6	166.4	37 24.4	166.4	37 54.2	166.3	1
2	34 18.9	165.6	34 48.7	165.5	35 18.5	165.4	35 48.3	165.4	36 18.1	165.3	36 47.9	165.2	37 17.7	165.1	37 47.5	165.1	2
3	34 11.9	164.4	34 41.6	164.3	35 11.4	164.2	35 41.2	164.1	36 10.9	164.1	36 40.7	164.0	37 10.4	163.9	37 40.2	163.8	3
4	34 04.3	163.2	34 34.0	163.1	35 03.7	163.0	35 33.5	162.9	36 03.2	162.9	36 32.9	162.8	37 02.6	162.7	37 32.3	162.6	4
15	33 56.1	162.0	34 25.8	161.9	34 55.5	161.8	35 25.2	161.7	35 54.9	161.6	36 24.6	161.5	36 54.2	161.5	37 23.9	161.4	15
6	33 47.4	160.8	34 17.1	160.7	34 46.7	160.6	35 16.4	160.6	35 46.0	160.5	36 15.7	160.4	36 45.3	160.3	37 14.9	160.2	6
7	33 38.2	159.6	34 07.8	159.6	34 37.5	159.5	35 07.1	159.4	35 36.7	159.3	36 06.3	159.2	36 35.8	159.1	37 05.4	159.0	7
8	33 28.5	158.5	33 58.1	158.4	34 27.6	158.3	34 57.2	158.2	35 26.7	158.1	35 56.3	158.0	36 25.8	157.9	36 55.4	157.8	8
9	33 18.2	157.3	33 47.8	157.2	34 17.3	157.1	34 46.8	157.0	35 16.3	156.9	35 45.8	156.8	36 15.3	156.7	36 44.8	156.6	9
20	33 07.5	156.1	33 37.0	156.0	34 06.4	155.9	34 35.9	155.8	35 05.4	155.7	35 34.8	155.6	36 04.3	155.5	36 33.7	155.3	20
1	32 56.2	155.0	33 25.6	154.9	33 55.1	154.8	34 24.5	154.6	34 53.9	154.5	35 23.3	154.4	35 52.7	154.3	36 22.0	154.1	1
2	32 44.5	153.8	33 13.8	153.7	33 43.2	153.6	34 12.6	153.5	34 41.9	153.3	35 11.3	153.2	35 40.6	153.1	36 09.9	153.0	2
3	32 32.2	152.7	33 01.5	152.6	33 30.8	152.4	34 00.1	152.3	34 29.4	152.2	34 58.7	152.0	35 28.0	151.9	35 57.3	151.8	3
4	32 19.5	151.5	32 48.7	151.4	33 18.0	151.3	33 47.2	151.1	34 16.5	150.9	34 45.7	150.7	35 15.0	150.6	35 44.2	150.4	4
25	32 06.2	150.4	32 35.4	150.3	33 04.7	150.1	33 33.9	150.0	34 03.2	149.8	34 32.2	149.7	35 01.4	149.6	35 30.5	149.4	25
6	31 52.5	149.3	32 21.7	149.1	32 50.8	148.9	33 20.0	148.8	33 49.1	148.7	34 18.2	148.5	34 47.4	148.4	35 16.5	148.3	6
7	31 38.4	148.1	32 07.5	148.0	32 36.6	147.8	33 05.7	147.7	33 34.7	147.5	34 03.8	147.4	34 32.8	147.2	35 01.9	147.1	7
8	31 23.8	147.0	31 52.8	146.9	32 21.9	146.7	32 50.9	146.6	33 19.9	146.4	33 48.9	146.2	34 17.9	146.1	34 46.9	145.9	8
9	31 08.7	145.9	31 37.7	145.7	32 06.7	145.6	32 35.6	145.4	33 04.6	145.3	33 33.5	145.1	34 02.5	144.9	34 31.4	144.8	9
30	30 53.2	144.8	31 22.1	144.6	31 51.1	144.5	32 20.0	144.3	32 48.8	144.1	33 17.7	144.0	33 46.6	143.8	34 15.4	143.6	30
1	30 37.3	143.7	31 06.1	143.5	31 35.0	143.4	32 03.8	143.2	32 32.7	143.0	33 01.5	142.8	33 30.3	142.7	33 59.1	142.5	1
2	30 20.9	142.5	30 49.7	142.4	31 18.5	142.2	31 47.3	142.1	32 16.1	141.9	32 44.8	141.7	33 13.6	141.5	33 42.3	141.4	2
3	30 04.2	141.4	30 32.9	141.3	31 01.6	141.1	31 30.4	140.9	31 59.1	140.8	32 27.7	140.6	32 56.4	140.4	33 25.1	140.3	3
4	29 47.0	140.2	30 15.7	140.1	30 44.3	140.0	31 13.0	139.8	31 41.6	139.7	32 10.3	139.5	32 38.9	139.3	33 07.5	139.1	4
35	29 29.4	139.3	29 58.0	139.1	30 26.6	138.9	30 55.2	138.7	31 23.8	138.6	31 52.4	138.4	32 20.9	138.2	32 49.4	138.0	35
6	29 11.4	138.2	29 40.0	138.0	30 08.5	137.8	30 37.1	137.7	31 05.6	137.5	31 34.1	137.3	32 02.6	137.1	32 31.0	136.9	6
7	28 53.1	137.1	29 21.6	136.9	29 50.1	136.7	30 18.5	136.6	30 47.0	136.4	31 15.4	136.2	31 43.8	136.0	32 12.2	135.8	7
8	28 34.4	136.0	29 02.8	135.9	29 31.2	135.7	29 59.6	135.5	30 28.0	135.3	30 56.4	135.1	31 24.7	134.9	31 53.1	134.7	8
9	28 15.3	135.0	28 43.6	134.8	29 12.0	134.6	29 40.3	134.4	30 08.7	134.2	30 37.0	134.0	31 05.3	133.8	31 33.5	133.6	9
40	27 55.8	133.9	28 24.1	133.7	28 52.4	133.5	29 20.7	133.3	29 49.0	133.1	30 17.2	132.9	30 45.4	132.8	31 13.6	132.6	40
1	27 36.0	132.9	28 04.3	132.7	28 32.5	132.5	29 00.7	132.3	29 28.9	132.1	29 57.1	131.9	30 25.3	131.7	30 53.4	131.5	1
2	27 15.9	131.8	27 44.1	131.6	28 12.2	131.4	28 40.4	131.2	29 08.5	131.0	29 36.6	130.8	30 04.7	130.6	30 32.8	130.4	2
3	26 55.4	130.8	27 23.5	130.6	27 51.6	130.4	28 19.7	130.2	28 47.8	130.0	29 15.9	129.8	29 43.9	129.6	30 11.9	129.4	3
4	26 34.6	129.7	27 02.7	129.5	27 30.7	129.3	27 58.8	129.1	28 26.8	128.9	28 54.8	128.7	29 22.7	128.5	29 50.7	128.3	4
45	26 13.5	128.7	26 41.5	128.5	27 09.5	128.3	27 37.5	128.1	28 05.4	127.9	28 33.4	127.7	29 01.3	127.5	29 29.2	127.2	45
6	25 52.1	127.7	26 20.0	127.5	26 48.0	127.3	27 15.9	127.0	27 43.8	126.8	28 11.6	126.6	28 39.5	126.4	29 07.3	126.2	6
7	25 30.4	126.6	25 58.3	126.4	26 26.1	126.2	26 54.0	126.0	27 21.8	125.8	27 49.6	125.6	28 17.4	125.4	28 45.2	125.2	7
8	25 08.4	125.6	25 36.2	125.4	26 04.0	125.2	26 31.8	125.0	26 59.6	124.8	27 27.4	124.6	27 55.1	124.4	28 22.8	124.2	8
9	24 46.1	124.6	25 13.9	124.4	25 41.6	124.2	26 09.4	124.0	26 37.1	123.8	27 04.8	123.6	27 32.5	123.3	28 00.1	123.1	9
50	24 23.5	123.6	24 51.3	123.4	25 19.0	123.2	25 46.6	123.0	26 14.3	122.7	26 41.9	122.5	27 09.6	122.3	27 37.2	122.1	50
1	24 00.7	122.6	24 28.4	122.4	24 56.0	122.2	25 23.7	122.0	25 51.3	121.7	26 18.9	121.5	26 46.4	121.3	27 14.0	121.1	1
2	23 37.6	121.6	24 05.3	121.4	24 32.8	121.2	25 00.4	121.0	25 28.0	120.7	25 55.5	120.5	26 23.0	120.3	26 50.5	120.1	2
3	23 14.3	120.6	23 41.9	120.4	24 09.4	120.2	24 36.9	120.0	25 04.4	119.7	25 31.9	119.5	25 59.4	119.3	26 26.8	119.1	3
4	22 50.8	119.6	23 18.3	119.4	23 45.8	119.2	24 13.2	119.0	24 40.7	118.7	25 08.1	118.5	25 35.5	118.3	26 02.9	118.1	4
55	22 27.0	118.6	22 54.4	118.4	23 21.9	118.2	23 49.3	118.0	24 16.7	117.7	24 44.1	117.5	25 11.4	117.3	25 38.8	117.1	55
6																	

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Az.															
00	19 00.0	1.000	18 30.0	1.000	18 00.0	1.000	17 30.0	1.000	17 00.0	1.000	16 30.0	1.000	16 00.0	1.000	15 30.0	1.000	00
1	18 59.8	1.001	18 29.8	1.001	17 59.8	1.001	17 29.8	1.001	16 59.8	1.001	16 29.8	1.001	15 59.8	1.001	15 29.8	1.001	1
2	18 59.0	1.002	18 29.0	1.002	17 59.0	1.002	17 29.0	1.002	16 59.0	1.002	16 29.0	1.002	15 59.0	1.002	15 29.0	1.002	2
3	18 57.8	1.003	18 27.8	1.003	17 57.8	1.003	17 27.8	1.003	16 57.8	1.003	16 27.8	1.003	15 57.8	1.003	15 27.8	1.003	3
4	18 56.0	1.004	18 26.0	1.004	17 56.1	1.004	17 26.1	1.004	16 56.1	1.004	16 26.1	1.004	15 56.1	1.004	15 26.1	1.004	4
05	18 53.8	1.005	18 23.8	1.005	17 53.8	1.005	17 23.9	1.004	16 53.9	1.004	16 23.9	1.004	15 53.9	1.004	15 24.0	1.004	05
6	18 51.0	1.005	18 21.1	1.005	17 51.1	1.005	17 21.2	1.005	16 51.2	1.005	16 21.2	1.005	15 51.3	1.005	15 21.3	1.005	6
7	18 47.8	1.006	18 17.9	1.006	17 47.9	1.006	17 18.0	1.006	16 48.0	1.006	16 18.1	1.006	15 48.1	1.006	15 18.2	1.006	7
8	18 44.1	1.007	18 14.2	1.007	17 44.2	1.007	17 14.3	1.007	16 44.4	1.007	16 14.4	1.007	15 44.5	1.007	15 14.6	1.007	8
9	18 39.9	1.008	18 10.0	1.008	17 40.1	1.008	17 10.1	1.008	16 40.2	1.008	16 10.3	1.008	15 40.4	1.008	15 10.5	1.008	9
10	18 35.2	1.009	18 05.3	1.009	17 35.4	1.009	17 05.5	1.009	16 35.6	1.009	16 05.7	1.009	15 35.8	1.009	15 05.9	1.009	10
1	18 30.0	1.009	18 00.1	1.009	17 30.3	1.009	17 00.4	1.009	16 30.5	1.009	16 00.6	1.009	15 30.7	1.009	15 00.8	1.009	1
2	18 24.3	1.010	17 54.5	1.010	17 24.6	1.010	16 54.8	1.010	16 24.9	1.010	15 55.1	1.010	15 25.2	1.010	14 55.4	1.010	2
3	18 18.2	99 11 166.4	17 48.4	99 11 166.5	17 18.5	99 11 166.5	16 48.7	99 11 166.6	16 18.9	99 11 166.7	15 49.1	99 11 166.7	15 19.2	99 11 166.8	14 49.4	99 11 166.8	3
4	18 11.6	99 12 165.4	17 41.8	99 12 165.5	17 12.0	99 12 165.5	16 42.2	99 12 165.6	16 12.4	99 12 165.6	15 42.6	99 12 165.6	15 12.7	99 12 165.8	14 42.9	99 12 165.8	4
15	18 04.5	99 13 164.4	17 34.7	99 13 164.4	17 04.9	99 13 164.5	16 35.1	99 12 164.6	16 05.4	99 12 164.6	15 35.6	99 12 164.7	15 05.8	99 12 164.7	14 36.0	99 12 164.8	15
6	17 56.9	99 13 163.3	17 27.1	99 13 163.4	16 57.4	99 13 163.5	16 27.7	99 13 163.5	15 57.9	99 13 163.6	15 28.2	99 13 163.7	14 58.4	99 13 163.7	14 28.7	99 13 163.8	6
7	17 48.8	99 14 162.3	17 19.1	99 14 162.4	16 49.4	99 14 162.4	16 19.7	99 14 162.5	15 50.0	99 14 162.6	15 20.3	99 14 162.7	14 50.6	99 14 162.7	14 20.8	99 14 162.8	7
8	17 40.3	99 15 161.3	17 10.6	99 15 161.3	16 41.0	99 15 161.4	16 11.3	99 15 161.5	15 41.6	99 15 161.6	15 11.9	99 15 161.6	14 42.2	99 15 161.7	14 12.6	99 15 161.8	8
9	17 31.3	99 16 160.2	17 01.7	99 16 160.3	16 32.1	99 16 160.4	16 02.4	99 16 160.5	15 32.8	99 16 160.6	15 03.1	99 16 160.6	14 33.5	99 16 160.7	14 03.8	99 16 160.8	9
20	17 21.9	99 16 159.2	16 52.3	99 16 159.3	16 22.7	99 16 159.4	15 53.1	99 16 159.5	15 23.5	99 16 159.6	14 53.9	99 16 159.6	14 24.3	99 16 159.7	13 54.6	99 16 159.8	20
1	17 12.0	99 17 158.2	16 42.4	99 17 158.3	16 12.9	99 17 158.4	15 43.3	99 17 158.5	15 13.7	99 17 158.5	14 44.2	99 17 158.6	14 14.6	99 17 158.7	13 45.0	99 17 158.8	1
2	17 01.7	98 18 157.2	16 32.1	98 18 157.3	16 02.6	98 18 157.4	15 33.1	98 18 157.4	15 03.5	98 18 157.5	14 34.0	98 18 157.6	14 04.5	98 18 157.7	13 34.9	98 18 157.8	2
3	16 50.9	98 19 156.2	16 21.4	98 19 156.3	15 51.9	98 19 156.3	15 22.4	98 19 156.4	14 52.9	98 18 156.5	14 23.4	98 18 156.6	13 53.9	98 18 156.7	13 24.4	98 18 156.8	3
4	16 39.6	98 19 155.1	16 10.2	98 19 155.2	15 40.8	98 19 155.3	15 11.3	98 19 155.4	14 41.9	98 19 155.5	14 12.4	98 19 155.6	13 43.0	98 19 155.7	13 13.5	98 19 155.8	4
25	16 28.0	98 20 154.1	15 58.6	98 20 154.2	15 29.2	98 20 154.3	14 59.8	98 20 154.4	14 30.4	98 20 154.5	14 01.0	98 20 154.6	13 31.5	98 20 154.7	13 02.1	98 20 154.8	25
6	16 15.9	98 21 153.1	15 46.5	98 21 153.2	15 17.2	98 21 153.3	14 47.8	98 21 153.4	14 18.4	98 21 153.5	13 49.1	98 21 153.6	13 19.7	98 21 153.8	12 50.3	98 21 153.9	6
7	16 03.3	98 22 152.1	15 34.0	98 22 152.2	15 04.7	98 21 152.3	14 35.4	98 21 152.4	14 06.1	98 21 152.5	13 36.8	98 21 152.7	13 07.5	98 21 152.8	12 38.1	98 21 152.9	7
8	15 50.4	98 22 151.1	15 21.1	98 22 151.2	14 51.9	98 22 151.3	14 22.6	98 22 151.4	13 53.3	98 22 151.6	13 24.1	98 22 151.7	12 54.8	98 22 151.8	12 25.5	98 22 151.9	8
9	15 37.0	97 23 150.1	15 07.8	97 23 150.2	14 38.6	97 23 150.3	14 09.4	97 23 150.5	13 40.1	97 23 150.6	13 10.9	97 23 150.7	12 41.7	97 23 150.8	12 15.9	97 23 150.9	9
30	15 23.2	97 24 149.1	14 54.1	97 24 149.2	14 24.9	97 24 149.3	13 55.7	97 24 149.5	13 26.6	97 24 149.6	12 57.4	97 24 149.7	12 28.2	97 24 149.8	11 59.0	97 24 149.9	30
1	15 09.0	97 24 148.1	14 39.9	97 24 148.2	14 10.8	97 24 148.4	13 41.7	97 24 148.5	13 12.6	97 24 148.6	12 43.4	97 24 148.7	12 14.3	97 24 148.8	11 45.2	97 24 149.0	1
2	14 54.4	97 25 147.1	14 25.4	97 25 147.2	13 56.3	97 25 147.4	13 27.2	97 25 147.5	12 58.2	97 25 147.6	12 29.1	97 25 147.7	12 00.0	97 24 147.9	11 30.9	97 24 148.0	2
3	14 39.4	97 26 146.1	14 10.4	97 26 146.3	13 41.4	97 26 146.4	13 12.4	97 26 146.5	12 43.4	97 26 146.6	12 14.4	97 26 146.7	11 45.3	97 26 146.9	11 16.3	97 26 147.0	3
4	14 24.1	97 26 145.1	13 55.1	97 26 145.3	13 26.2	97 26 145.4	12 57.2	97 26 145.5	12 28.2	97 26 145.7	11 59.3	97 26 145.8	11 30.3	97 26 145.9	11 01.3	97 26 146.1	4
35	14 08.3	96 27 144.1	13 39.4	96 27 144.3	13 10.5	96 27 144.4	12 41.6	96 27 144.6	12 12.7	96 27 144.7	11 43.8	96 27 144.8	11 14.8	96 27 145.0	10 45.9	96 27 145.1	35
6	13 52.2	96 28 143.2	13 23.3	96 27 143.3	12 54.5	96 27 143.4	12 25.6	96 27 143.6	11 56.7	96 27 143.7	11 27.9	96 27 143.9	10 59.0	96 27 144.0	10 30.1	96 27 144.1	6
7	13 35.6	96 28 142.2	13 06.8	96 28 142.3	12 38.0	96 28 142.5	12 09.2	96 28 142.6	11 40.4	96 28 142.8	11 11.6	96 28 142.9	10 42.8	96 28 143.0	10 14.0	96 28 143.2	7
8	13 18.8	96 29 141.2	12 50.0	96 29 141.4	12 21.3	96 29 141.5	11 52.5	96 28 141.6	11 23.8	96 28 141.8	10 55.0	96 28 141.9	10 26.3	96 28 142.1	9 57.5	96 28 142.2	8
9	13 01.5	96 29 140.2	12 32.8	96 29 140.4	12 04.1	96 29 140.5	11 35.4	96 29 140.7	11 06.7	96 29 140.8	10 38.0	96 29 141.0	10 09.3	96 29 141.1	9 40.6	96 29 141.3	9
40	12 43.9	95 30 139.3	12 15.3	95 30 139.4	11 46.6	95 30 139.6	11 18.0	95 30 139.7	10 49.4	95 30 139.9	10 20.7	95 29 140.0	9 52.1	95 29 140.2	9 23.4	95 29 140.3	40
1	12 26.0	95 30 138.3	11 57.4	95 30 138.5	11 28.8	95 30 138.6	11 00.2	95 30 138.8	10 31.6	95 30 138.9	10 03.0	95 30 139.1	9 34.4	95 30 139.2	9 05.8	95 30 139.4	1
2	12 07.7	95 31 137.3	11 39.2	95 31 137.5	11 10.6	95 31 137.6	10 42.1	95 31 137.8	10 13.6	95 31 138.0	9 45.0	95 31 138.1	9 16.5	95 30 138.3	8 47.9	95 30 138.4	2
3	11 49.0	95 32 136.4	11 20.6	95 32 136.5	10 52.1	95 31 136.7	10 23.6	95 31 136.9	9 55.2	95 31 137.0	9 26.7	95 31 137.2	8 58.2	95 31 137.3	8 29.7	95 31 137.5	3
4	11 30.1	95 32 135.4	11 01.7	95 32 135.6	10 33.3	95 32 135.7	10 04.8	95 32 135.9	9 36.4	95 32 136.1	9 08.0	95 32 136.2	8 39.6	95 32 136.4	8 11.1	95 32 136.6	4
45	11 10.8	94 33 134.5	10 42.4	94 33 134.6	10 14.1	94 32 134.8	9 45.7	94 32 135.0	9 17.4	94 32 135.1	8 49.0	94 32 135.3	8 20.6	94 32 135.4	7 52.2	94 32 135.6	45
6	10 51.2	94 33 133.5	10 22.9	94 33 133.7	9 54.6	94 33 133.8	9 26.3	94 33 134.0	8 58.0	94 33 134.2	8 29.7	94 33 134.3	8 01.4	94 33 134.5	7 33.0	94 33 134.7	6
7	10 31.3	94 34 132.6	10 03.0	94 34 132.7	9 34.8	94 34 132.9	9 06.6	94 33 133.1	8 38.3	94 33 133.2	8 10.0	94 33 133.4	7 41.8	94 33 133.6	7 13.5	94 33 133.7	7
8	10 11.1	94 34 131.6	9 42.9	94 34 131.8	9 14.7	94 34 132.0	8										

DECLINATION SAME NAME AS LATITUDE

Lat. 63°

Table with columns for H.A., Alt., Az., and declination values for various latitudes from 12° 00' to 15° 30'.

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.
	Alt.	Az.															
00	1506.0	180.0	1439.0	180.0	1409.0	180.0	1339.0	180.0	1309.0	180.0	1239.0	180.0	1209.0	180.0	1139.0	180.0	00
1	1459.8	179.0	1429.8	179.0	1359.8	179.0	1329.8	179.0	1259.8	179.0	1229.8	179.0	1159.8	179.0	1129.8	179.0	1
2	1459.0	178.0	1429.0	178.0	1359.0	178.0	1329.0	178.0	1259.0	178.0	1229.0	178.0	1159.0	178.0	1129.0	178.0	2
3	1457.8	177.0	1427.8	177.0	1357.8	177.0	1327.8	177.0	1257.8	177.0	1227.8	177.0	1157.8	177.0	1127.8	177.0	3
4	1456.2	176.0	1426.2	176.0	1356.2	176.0	1326.2	176.0	1256.2	176.0	1226.2	176.0	1156.2	176.0	1126.2	176.0	4
05	1454.0	174.9	1424.0	175.0	1354.0	175.0	1324.1	175.0	1254.1	175.0	1224.1	175.0	1154.1	175.1	1124.2	175.1	05
6	1451.3	173.9	1421.4	174.0	1351.4	174.0	1321.5	174.0	1251.5	174.0	1221.5	174.1	1151.6	174.1	1121.6	174.1	6
7	1448.2	172.9	1418.3	173.0	1348.3	173.0	1318.4	173.0	1248.4	173.0	1218.5	173.1	1148.5	173.1	1118.6	173.1	7
8	1444.6	171.9	1414.7	171.9	1344.8	172.0	1314.8	172.0	1244.9	172.0	1214.9	172.1	1145.0	172.1	1115.1	172.1	8
9	1440.6	170.9	1410.6	170.9	1340.7	171.0	1310.8	171.0	1240.9	171.0	1211.0	171.1	1141.0	171.1	1111.1	171.2	9
10	1436.0	169.9	1406.1	169.9	1336.2	170.0	1306.3	170.0	1236.4	170.1	1206.5	170.1	1136.6	170.1	1106.7	170.2	10
1	1431.0	168.9	1401.1	168.9	1331.2	169.0	1301.4	169.0	1231.5	169.1	1201.6	169.1	1131.7	169.2	1101.8	169.2	1
2	1425.5	167.9	1395.7	167.9	1325.8	168.0	1295.9	168.0	1226.1	168.1	1196.2	168.1	1126.3	168.2	1096.4	168.2	2
3	1419.6	166.9	1389.7	166.9	1319.9	167.0	1290.0	167.0	1220.2	167.1	1190.3	167.1	1120.4	167.2	1090.5	167.2	3
4	1413.1	165.9	1383.3	165.9	1313.5	166.0	1283.7	166.0	1213.9	166.1	1184.1	166.2	1114.3	166.2	1084.5	166.3	4
15	1406.3	164.9	1376.5	164.9	1306.7	165.0	1273.9	165.0	1207.1	165.1	1177.4	165.2	1107.6	165.2	1077.8	165.3	15
6	1358.9	163.9	1329.2	163.9	1259.4	164.0	1229.7	164.1	1159.9	164.1	1130.2	164.2	1100.4	164.3	1030.6	164.3	6
7	1351.1	162.9	1321.4	162.9	1251.7	163.0	1222.0	163.1	1152.2	163.1	1122.5	163.2	1092.8	163.3	1023.1	163.4	7
8	1342.9	161.9	1313.2	161.9	1243.5	162.0	1213.8	162.1	1144.1	162.2	1114.4	162.2	1084.7	162.3	1015.0	162.4	8
9	1334.2	160.9	1304.5	161.0	1234.9	161.0	1205.2	161.1	1135.6	161.2	1105.9	161.3	1076.2	161.3	1006.6	161.4	9
20	1325.0	159.9	1295.4	160.0	1225.8	160.0	1196.2	160.1	1126.6	160.2	1096.9	160.3	1067.3	160.4	997.7	160.4	20
1	1315.4	158.9	1285.9	159.0	1216.3	159.1	1186.7	159.1	1117.1	159.2	1087.5	159.3	1057.9	159.4	988.4	159.5	1
2	1305.4	157.9	1275.9	158.0	1206.3	158.1	1176.8	158.2	1107.2	158.3	1077.7	158.3	1048.1	158.4	978.6	158.5	2
3	1294.9	156.9	1265.4	157.0	1195.9	157.1	1166.4	157.2	1096.9	157.3	1067.4	157.4	1037.9	157.5	969.1	157.6	3
4	1284.0	155.9	1254.6	156.0	1185.1	156.1	1155.7	156.2	1086.2	156.3	1056.7	156.4	1027.2	156.5	958.4	156.6	4
25	1272.7	154.9	1243.3	155.0	1173.9	155.1	1144.5	155.2	1076.8	155.3	1047.3	155.4	1017.8	155.5	947.3	155.6	25
6	1261.0	154.0	1231.6	154.1	1162.2	154.2	1132.9	154.3	1065.9	154.4	1036.4	154.5	1006.9	154.6	936.8	154.7	6
7	1249.8	153.0	1220.3	153.1	1150.2	153.2	1120.4	153.3	1053.4	153.4	1023.9	153.5	994.4	153.6	926.8	153.7	7
8	1238.2	152.0	1208.7	152.1	1138.5	152.2	1108.7	152.3	1041.5	152.4	1012.0	152.5	982.5	152.6	918.2	152.7	8
9	1226.2	151.0	1196.7	151.1	1126.8	151.2	1097.0	151.3	1030.0	151.4	1000.5	151.5	971.0	151.6	909.1	151.7	9
30	1214.9	150.1	1185.0	150.2	1115.1	150.3	1085.3	150.4	1018.3	150.5	988.8	150.6	969.3	150.7	908.6	150.8	30
1	1203.2	149.1	1173.3	149.2	1103.4	149.3	1073.6	149.4	1006.6	149.5	977.1	149.6	957.6	149.7	897.9	149.8	1
2	1191.1	148.1	1161.6	148.2	1091.7	148.3	1061.9	148.4	994.9	148.5	965.4	148.6	945.9	148.7	886.2	148.8	2
3	1178.6	147.2	1149.1	147.3	1079.2	147.4	1049.4	147.5	982.4	147.6	952.9	147.7	933.4	147.8	876.7	147.9	3
4	1165.8	146.2	1136.3	146.3	1066.7	146.4	1036.9	146.5	970.1	146.6	940.6	146.7	921.1	146.8	869.0	146.9	4
35	1152.7	145.2	1123.8	145.3	1053.8	145.4	1024.0	145.5	957.2	145.6	927.7	145.7	908.2	145.8	856.3	145.9	35
6	1140.2	144.3	1111.3	144.4	1041.3	144.5	1011.5	144.6	944.6	144.7	915.1	144.8	895.6	144.9	844.4	145.0	6
7	1127.4	143.3	1098.4	143.4	1028.4	143.5	998.6	143.6	931.9	143.7	902.4	143.8	883.4	143.9	832.2	144.0	7
8	1114.2	142.4	1085.4	142.5	1015.4	142.6	985.6	142.7	918.9	142.8	889.4	142.9	870.9	143.0	819.7	143.1	8
9	1100.6	141.4	1072.4	141.5	1002.4	141.6	972.6	141.7	905.9	141.8	876.4	141.9	857.9	142.0	806.6	142.1	9
40	1087.6	140.5	1059.4	140.6	989.4	140.7	959.6	140.8	892.9	140.9	863.4	141.0	844.9	141.1	793.6	141.2	40
1	1074.2	139.5	1046.0	139.6	976.0	139.7	946.2	139.8	879.5	139.9	850.0	140.0	831.5	140.1	780.2	140.2	1
2	1060.4	138.6	1032.2	138.7	962.2	138.8	932.4	138.9	865.7	139.0	836.2	139.1	817.7	139.2	766.4	139.3	2
3	1046.2	137.6	1018.0	137.7	948.0	137.8	918.2	137.9	851.5	138.0	822.0	138.1	803.5	138.2	753.2	138.3	3
4	1031.6	136.7	1003.4	136.8	933.4	136.9	903.6	137.0	837.9	137.1	808.4	137.2	789.9	137.3	740.6	137.4	4
45	1017.6	145.2	989.4	145.3	919.4	145.4	889.6	145.5	822.9	145.6	793.4	145.7	773.9	145.8	722.6	145.9	45
6	1004.2	144.3	976.0	144.4	906.0	144.5	876.2	144.6	809.5	144.7	780.0	144.8	760.5	144.9	709.2	145.0	6
7	990.4	143.3	962.2	143.4	892.2	143.5	862.4	143.6	795.7	143.7	766.2	143.8	746.7	143.9	695.4	144.0	7
8	976.2	142.4	948.0	142.5	878.0	142.6	848.2	142.7	781.5	142.8	752.0	142.9	732.5	143.0	684.2	143.1	8
9	961.6	141.4	933.4	141.5	863.4	141.6	833.6	141.7	767.9	141.8	738.4	141.9	718.9	142.0	670.6	142.1	9
50	947.6	140.5	919.4	140.6	849.4	140.7	819.6	140.8	752.9	140.9	723.4	141.0	703.9	141.1	652.6	141.2	50
1	934.2	139.5	906.0	139.6	836.0	139.7	806.2	139.8	739.5	139.9	710.0	140.0	690.5	140.1	639.2	140.2	1
2	920.4	138.6	892.2	138.7	822.2	138.8	792.4	138.9	725.7	139.0	696.2	139.1	676.7	139.2	625.4	139.3	2
3	906.2	137.6	878.0	137.7	808.0	137.8	778.2	137.9	711.5	138.0	682.0	138.1	662.5	138.2	611.2	138.3	3
4	891.6	136.7	863.4	136.8	793.4	136.9	763.6	137.0	696.9	137.1	667.4	137.2	647.9	137.3	599.6	137.4	4
45	877.6	135.8	849.4	135.9	779.4	136.0	749.6	136.1	682.9	136.2	653.4	136.3	633.9	136.4	582.6	136.5	45
6	864.2	134.8	836.0	134.9	766.0	135.0	736.2	135.1	669.5	135.2	640.0	135.3	620.5	135.4	569.2	135.5	6
7	850.4	133.8	822.2	133.9	752.2	134.0	722.4	134.1	655.7	134.2	626.2	134.3	606.7	134.4	555.4	134.5	7
8	836.2	132.8	808.0	132.9	738.0	133.0	708.2	133.1	641.5	133.2	612.0	133.3	592.5	133.4	541.2	133.5	8
9	821.6	131.8	793.4	131.9	723.4</												

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
00	43 00.0	1.001 180.0	43 30.0	1.001 180.0	44 00.0	1.001 180.0	44 30.0	1.001 180.0	45 00.0	1.001 180.0	45 30.0	1.001 180.0	46 00.0	1.001 180.0	46 30.0	1.001 180.0	00
1	42 59.7	1.002 178.7	43 29.7	1.002 178.7	43 59.7	1.002 178.7	44 29.7	1.002 178.7	44 59.7	1.002 178.7	45 29.7	1.002 178.6	45 59.7	1.002 178.6	46 29.7	1.002 178.6	1
2	42 58.8	1.003 177.4	43 28.7	1.003 177.4	43 58.7	1.003 177.3	44 28.7	1.003 177.3	44 58.7	1.003 177.3	45 28.7	1.003 177.3	45 58.7	1.003 177.3	46 28.7	1.003 177.3	2
3	42 57.2	1.004 176.1	43 27.2	1.004 176.0	43 57.2	1.004 176.0	44 27.1	1.004 176.0	44 57.1	1.004 176.0	45 27.1	1.004 175.9	45 57.1	1.004 175.9	46 27.1	1.004 175.9	3
4	42 55.0	1.005 174.7	43 25.0	1.005 174.7	43 54.9	1.005 174.7	44 24.9	1.005 174.7	44 54.9	1.005 174.6	45 24.9	1.005 174.6	45 54.8	1.005 174.6	46 24.8	1.005 174.5	4
05	42 52.2	1.006 173.4	43 22.2	1.006 173.4	43 52.1	1.006 173.4	44 22.1	1.006 173.3	44 52.0	1.006 173.3	45 22.0	1.006 173.2	45 51.9	1.006 173.2	46 21.9	1.006 173.2	05
6	42 48.8	1.007 172.1	43 18.7	1.007 172.1	43 48.7	1.007 172.0	44 18.6	1.007 172.0	44 48.5	1.007 171.9	45 18.5	1.007 171.9	45 48.4	1.007 171.8	46 18.3	1.007 171.8	6
7	42 44.7	1.008 170.8	43 14.7	1.008 170.8	43 44.6	1.008 170.7	44 14.5	1.008 170.7	44 44.4	1.008 170.6	45 14.3	1.008 170.6	45 44.2	1.008 170.5	46 14.1	1.008 170.4	7
8	42 40.1	1.009 169.5	43 10.0	1.009 169.5	43 39.9	1.009 169.4	44 09.7	1.009 169.3	44 39.6	1.009 169.3	45 09.5	1.009 169.2	45 39.4	1.009 169.1	46 09.3	1.009 169.1	8
9	42 34.8	1.010 168.2	43 04.7	1.010 168.2	43 34.5	1.010 168.1	44 04.4	1.010 168.0	44 34.3	1.010 167.9	45 04.1	1.010 167.9	45 33.9	1.010 167.8	46 03.8	1.010 167.7	9
10	42 29.0	1.011 166.9	42 58.8	1.011 166.8	43 28.6	1.011 166.8	43 58.4	1.011 166.7	44 28.3	1.011 166.6	44 58.1	1.011 166.5	45 27.9	1.011 166.5	45 57.7	1.011 166.4	10
1	42 22.5	1.012 165.6	42 52.3	1.012 165.5	43 22.1	1.012 165.5	43 51.9	1.012 165.4	44 21.6	1.012 165.3	44 51.4	1.012 165.2	45 21.2	1.012 165.1	45 51.0	1.012 165.0	1
2	42 15.4	1.013 164.3	42 45.2	1.013 164.2	43 14.9	1.013 164.2	43 44.7	1.013 164.1	44 14.4	1.013 164.0	44 44.2	1.013 163.9	45 13.9	1.013 163.8	45 43.6	1.013 163.7	2
3	42 07.8	1.014 163.0	42 37.5	1.014 163.0	43 07.2	1.014 162.9	43 36.9	1.014 162.8	44 06.6	1.014 162.7	44 36.3	1.014 162.6	45 06.0	1.014 162.5	45 35.7	1.014 162.4	3
4	41 59.6	1.015 161.8	42 29.2	1.015 161.7	42 58.9	1.015 161.6	43 28.5	1.015 161.5	43 58.2	1.015 161.4	44 27.8	1.015 161.2	44 57.5	1.015 161.1	45 27.1	1.015 161.0	4
15	41 50.7	1.016 160.5	42 20.4	1.016 160.4	42 50.0	1.016 160.3	43 19.6	1.016 160.2	43 49.2	1.016 160.1	44 18.8	1.016 159.9	44 48.4	1.016 159.8	45 18.0	1.016 159.7	15
6	41 41.4	1.017 159.2	42 10.9	1.017 159.1	42 40.5	1.017 159.0	43 10.1	1.017 158.9	43 39.6	1.017 158.8	44 09.2	1.017 158.6	44 38.7	1.017 158.5	45 08.2	1.017 158.4	6
7	41 31.4	1.018 158.0	42 00.9	1.018 157.8	42 30.5	1.018 157.7	43 00.0	1.018 157.6	43 29.5	1.018 157.5	44 08.9	1.018 157.3	44 38.4	1.018 157.2	45 07.9	1.018 157.1	7
8	41 20.9	1.019 156.7	41 50.4	1.019 156.6	42 19.8	1.019 156.4	42 49.3	1.019 156.3	43 18.7	1.019 156.2	43 48.2	1.019 156.0	44 17.6	1.019 155.9	44 47.0	1.019 155.8	8
9	41 09.9	1.020 155.4	41 39.3	1.020 155.3	42 08.7	1.020 155.2	42 38.1	1.020 155.0	43 07.5	1.020 154.9	43 36.8	1.020 154.8	44 06.2	1.020 154.6	44 35.5	1.020 154.5	9
20	40 58.3	1.021 154.2	41 27.6	1.021 154.0	41 57.0	1.021 153.9	42 26.3	1.021 153.8	42 55.6	1.021 153.6	43 24.9	1.021 153.5	43 54.2	1.021 153.3	44 23.5	1.021 153.2	20
1	40 46.1	1.022 152.9	41 15.4	1.022 152.8	41 44.7	1.022 152.7	42 14.0	1.022 152.5	42 43.3	1.022 152.4	43 12.5	1.022 152.2	43 41.7	1.022 152.1	44 11.0	1.022 151.9	1
2	40 33.5	1.023 151.7	41 02.7	1.023 151.6	41 32.0	1.023 151.4	42 01.2	1.023 151.3	42 30.4	1.023 151.1	42 59.5	1.023 150.9	43 28.7	1.023 150.8	43 57.9	1.023 150.6	2
3	40 20.3	1.024 150.5	40 49.7	1.024 150.3	41 18.7	1.024 150.2	41 47.8	1.024 150.0	42 16.9	1.024 149.8	42 46.1	1.024 149.7	43 15.2	1.024 149.5	43 44.2	1.024 149.3	3
4	40 06.7	1.025 149.3	40 35.8	1.025 149.1	41 04.9	1.025 148.9	41 33.9	1.025 148.8	42 03.0	1.025 148.6	42 32.0	1.025 148.4	43 01.1	1.025 148.3	43 30.1	1.025 148.1	4
25	39 52.5	1.026 148.0	40 21.5	1.026 147.7	40 50.5	1.026 147.5	41 19.6	1.026 147.4	41 48.6	1.026 147.2	42 17.5	1.026 147.2	42 46.5	1.026 147.0	43 15.5	1.026 146.8	25
6	39 37.8	1.027 146.8	40 06.8	1.027 146.6	40 35.8	1.027 146.5	41 04.7	1.027 146.3	41 33.6	1.027 146.1	42 02.5	1.027 146.0	42 31.4	1.027 145.8	43 00.3	1.027 145.6	6
7	39 22.7	1.028 145.6	39 51.6	1.028 145.5	40 20.5	1.028 145.3	40 49.3	1.028 145.1	41 18.2	1.028 144.9	41 47.0	1.028 144.7	42 15.9	1.028 144.5	42 44.7	1.028 144.4	7
8	39 07.1	1.029 144.4	39 35.9	1.029 144.3	40 04.7	1.029 144.1	40 33.5	1.029 143.9	41 02.3	1.029 143.7	41 31.1	1.029 143.5	41 59.8	1.029 143.3	42 28.6	1.029 143.1	8
9	38 51.0	1.030 143.2	39 19.8	1.030 143.1	39 48.5	1.030 142.9	40 17.2	1.030 142.7	40 46.0	1.030 142.5	41 14.7	1.030 142.3	41 43.3	1.030 142.1	42 12.0	1.030 141.9	9
30	38 34.5	1.031 142.1	39 03.2	1.031 141.9	39 31.8	1.031 141.7	40 00.5	1.031 141.5	40 29.2	1.031 141.3	40 57.8	1.031 141.1	41 26.4	1.031 140.9	41 55.0	1.031 140.7	30
1	38 17.5	1.032 140.9	38 46.1	1.032 140.7	39 14.7	1.032 140.5	39 43.3	1.032 140.3	40 11.9	1.032 140.1	40 40.4	1.032 139.9	41 09.0	1.032 139.7	41 37.5	1.032 139.5	1
2	38 00.1	1.033 139.7	38 28.7	1.033 139.5	38 57.2	1.033 139.3	39 25.7	1.033 139.1	39 54.2	1.033 138.9	40 22.7	1.033 138.7	40 51.1	1.033 138.5	41 19.6	1.033 138.3	2
3	37 42.3	1.034 138.6	38 10.8	1.034 138.4	38 39.2	1.034 138.2	39 07.7	1.034 138.0	39 36.1	1.034 137.8	40 04.5	1.034 137.5	40 32.9	1.034 137.3	41 01.3	1.034 137.1	3
4	37 24.1	1.035 137.4	37 52.5	1.035 137.2	38 20.9	1.035 137.0	38 49.2	1.035 136.8	39 17.6	1.035 136.6	39 45.9	1.035 136.4	40 14.2	1.035 136.2	40 42.5	1.035 136.0	4
35	37 05.4	1.036 136.3	37 33.8	1.036 136.1	38 02.1	1.036 135.9	38 30.4	1.036 135.6	38 58.7	1.036 135.4	39 26.9	1.036 135.2	39 55.2	1.036 135.0	40 23.4	1.036 134.8	35
6	36 46.4	1.037 135.1	37 14.7	1.037 134.9	37 42.9	1.037 134.7	38 11.2	1.037 134.5	38 39.4	1.037 134.3	39 07.6	1.037 134.1	39 35.7	1.037 133.8	40 03.8	1.037 133.6	6
7	36 27.0	1.038 134.0	36 55.2	1.038 133.8	37 23.4	1.038 133.6	37 51.6	1.038 133.4	38 19.7	1.038 133.1	38 47.8	1.038 132.9	39 15.9	1.038 132.7	39 43.9	1.038 132.5	7
8	36 07.2	1.039 132.9	36 35.4	1.039 132.7	37 03.5	1.039 132.5	37 31.6	1.039 132.2	37 59.6	1.039 132.0	38 27.7	1.039 131.8	38 55.7	1.039 131.6	39 23.7	1.039 131.3	8
9	35 47.1	1.040 131.8	36 15.4	1.040 131.6	36 43.2	1.040 131.3	37 11.2	1.040 131.1	37 39.2	1.040 130.9	38 07.2	1.040 130.7	38 35.1	1.040 130.4	39 03.0	1.040 130.2	9
40	35 26.6	1.041 130.7	35 54.6	1.041 130.5	36 22.6	1.041 130.2	36 50.5	1.041 130.0	37 18.4	1.041 129.8	37 46.3	1.041 129.5	38 14.2	1.041 129.3	38 42.0	1.041 129.1	40
1	35 05.8	1.042 129.6	35 33.7	1.042 129.4	36 01.6	1.042 129.1	36 29.5	1.042 128.9	36 57.3	1.042 128.7	37 25.2	1.042 128.4	37 53.0	1.042 128.2	38 20.7	1.042 128.0	1
2	34 44.6	1.043 128.5	35 12.5	1.043 128.3	35 40.3	1.043 128.0	36 08.2	1.043 127.8	36 35.9	1.043 127.6	37 03.7	1.043 127.3	37 31.4	1.043 127.1	37 59.1	1.043 126.8	2
3	34 23.1	1.044 127.4	34 50.9	1.044 127.2	35 18.7	1.044 126.9	35 46.4	1.044 126.7	36 14.2	1.044 126.5	36 41.9	1.044 126.2	37 09.5	1.044 126.0	37 37.1	1.044 125.7	3
4	34 01.3	1.045 126.3	34 29.1	1.045 126.1	34 56.8	1.045 125.9	35 24.5	1.045 125.6	35 52.1	1.045 125.4	36 19.7	1.045 125.1	36 47.3	1.045 124.9	37 14.9	1.045 124.7	4
45	33 39.2	1.046 125.3	34 06.9	1.046 125.0	34 34.6	1.046 124.8	35 02.2	1.046 124.6	35 29.8	1.046 124.3	35 57.3	1.046 124.1	36 24.8	1.046 123.8	36 52.3		

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
00	11 00.0	1.000 180.0	10 30.0	1.000 180.0	10 00.0	1.000 180.0	9 30.0	1.000 180.0	9 00.0	1.000 180.0	8 30.0	1.000 180.0	8 00.0	1.000 180.0	7 30.0	1.000 180.0	00
1	10 59.8	1.001 179.0	10 29.8	1.001 179.0	9 59.8	1.001 179.0	9 29.8	1.001 179.0	8 59.8	1.001 179.0	8 29.8	1.001 179.0	7 59.8	1.001 179.0	7 29.8	1.001 179.0	1
2	10 59.1	1.002 178.0	10 29.1	1.002 178.0	9 59.1	1.002 178.1	9 29.1	1.002 178.1	8 59.1	1.002 178.1	8 29.1	1.002 178.1	7 59.1	1.002 178.1	7 29.1	1.002 178.1	2
3	10 57.9	1.003 177.1	10 27.9	1.003 177.1	9 57.9	1.003 177.1	9 27.9	1.003 177.1	8 57.9	1.003 177.1	8 27.9	1.003 177.1	7 57.9	1.003 177.1	7 27.9	1.003 177.1	3
4	10 56.3	1.004 176.1	10 26.3	1.003 176.1	9 56.3	1.003 176.1	9 26.3	1.003 176.1	8 56.3	1.003 176.1	8 26.3	1.003 176.2	7 56.4	1.003 176.2	7 26.4	1.003 176.2	4
05	10 54.2	1.004 175.1	10 24.2	1.004 175.1	9 54.2	1.004 175.1	9 24.3	1.004 175.2	8 54.3	1.004 175.2	8 24.3	1.004 175.2	7 54.3	1.004 175.2	7 24.4	1.004 175.2	05
6	10 51.6	1.005 174.1	10 21.7	1.005 174.2	9 51.7	1.005 174.2	9 21.7	1.005 174.2	8 51.8	1.005 174.2	8 21.8	1.005 174.2	7 51.8	1.005 174.3	7 21.9	1.005 174.3	6
7	10 48.6	1.006 173.2	10 18.7	1.006 173.2	9 48.7	1.006 173.2	9 18.8	1.006 173.2	8 48.8	1.006 173.3	8 18.8	1.006 173.3	7 48.9	1.006 173.3	7 18.9	1.006 173.3	7
8	10 45.1	1.007 172.2	10 15.2	1.007 172.2	9 45.3	1.006 172.2	9 15.3	1.006 172.3	8 45.4	1.006 172.3	8 15.4	1.006 172.3	7 45.5	1.006 172.4	7 15.6	1.006 172.4	8
9	10 41.2	1.007 171.2	10 11.3	1.007 171.2	9 41.4	1.007 171.3	9 11.4	1.007 171.3	8 41.5	1.007 171.3	8 11.6	1.007 171.4	7 41.7	1.007 171.4	7 11.7	1.007 171.5	9
10	10 36.8	1.008 170.2	10 06.9	1.008 170.3	9 37.0	1.008 170.3	9 07.1	1.008 170.3	8 37.2	1.008 170.4	8 07.3	1.008 170.4	7 37.4	1.008 170.5	7 07.5	1.008 170.5	10
1	10 31.9	1.009 169.2	10 02.1	1.009 169.3	9 32.2	1.009 169.3	9 02.3	1.009 169.4	8 32.4	1.009 169.4	8 02.5	1.009 169.5	7 32.6	1.009 169.5	7 02.8	1.009 169.6	1
2	10 26.6	1.010 168.3	9 56.8	1.010 168.3	9 26.9	1.010 168.4	9 02.0	1.010 168.4	8 27.2	1.009 168.5	7 57.3	1.009 168.5	7 27.5	1.009 168.6	6 57.6	1.009 168.6	2
3	10 20.9	99 10 167.3	9 51.0	99 10 167.4	9 21.2	99 10 167.4	8 51.4	99 10 167.5	8 21.5	99 10 167.5	7 51.7	99 10 167.6	7 21.8	99 10 167.6	6 52.0	99 10 167.7	3
4	10 14.7	99 11 166.3	9 44.8	99 11 166.4	9 15.0	99 11 166.4	8 45.2	99 11 166.5	8 15.4	99 11 166.6	7 45.6	99 11 166.6	7 15.8	99 11 166.7	6 46.0	99 11 166.7	4
15	10 08.0	99 12 165.4	9 38.2	99 12 165.4	9 08.4	99 12 165.5	8 38.6	99 12 165.5	8 08.9	99 12 165.6	7 39.1	99 12 165.7	7 09.3	99 12 165.7	6 39.5	99 12 165.8	15
6	10 00.9	99 13 164.4	9 31.1	99 13 164.5	9 01.4	99 12 164.5	8 31.6	99 12 164.6	8 01.9	99 12 164.6	7 32.1	99 12 164.7	7 02.3	99 12 164.8	6 32.6	99 12 164.8	6
7	9 53.3	99 13 163.4	9 23.6	99 13 163.5	8 53.9	99 13 163.6	8 24.2	99 13 163.6	7 54.4	99 13 163.7	7 24.7	99 13 163.8	6 55.0	99 13 163.8	6 25.2	99 13 163.9	7
8	9 45.3	99 14 162.5	9 15.7	99 14 162.5	8 46.0	99 14 162.6	8 16.3	99 14 162.7	7 46.6	99 14 162.7	7 16.9	99 14 162.8	6 47.2	99 14 162.9	6 17.5	99 14 163.0	8
9	9 36.9	99 15 161.5	9 07.3	99 15 161.6	8 37.6	99 15 161.6	8 07.9	99 15 161.7	7 38.3	99 15 161.8	7 08.6	99 14 161.9	6 38.9	99 14 161.9	6 09.3	99 14 162.0	9
20	9 28.1	99 16 160.5	8 58.4	99 16 160.6	8 28.8	99 16 160.7	7 59.2	99 16 160.8	7 29.5	99 16 160.8	6 59.9	99 16 160.9	6 30.3	99 16 161.0	6 00.7	99 16 161.1	20
1	9 18.8	99 16 159.6	8 49.2	99 16 159.7	8 19.6	99 16 159.7	7 50.0	99 16 159.8	7 20.4	99 16 159.9	6 50.8	99 16 160.0	6 21.2	99 16 160.1	5 51.6	99 16 160.1	1
2	9 09.0	99 17 158.6	8 39.5	99 17 158.7	8 09.9	99 17 158.8	7 40.4	99 17 158.9	7 10.8	99 17 159.0	6 41.3	99 17 159.0	6 11.7	99 17 159.1	5 42.2	99 16 159.2	2
3	8 58.9	98 18 157.7	8 29.4	98 18 157.7	7 59.9	98 17 157.8	7 30.4	98 17 157.9	7 00.8	98 17 158.0	6 31.3	98 17 158.1	6 01.8	98 17 158.2	5 32.3	98 17 158.3	3
4	8 48.3	98 18 156.7	8 18.9	98 18 156.8	7 49.4	98 18 156.9	7 19.9	98 18 157.0	6 50.4	98 18 157.1	6 21.0	98 18 157.2	5 51.5	98 18 157.3	5 22.0	98 18 157.4	4
25	8 37.3	98 19 155.7	8 07.9	98 19 155.8	7 38.5	98 19 155.9	7 09.0	98 19 156.0	6 39.6	98 19 156.1	6 10.2	98 19 156.2	5 40.7	98 19 156.3	5 11.3	98 18 156.4	25
6	8 25.9	98 20 154.8	7 56.6	98 20 154.9	7 27.2	98 20 155.0	6 57.8	98 19 155.1	6 28.4	98 19 155.2	5 59.0	98 19 155.3	5 29.6	98 19 155.4	5 00.2	98 19 155.5	6
7	8 14.1	98 20 153.8	7 44.8	98 20 153.9	7 15.4	98 20 154.0	6 46.1	98 20 154.2	6 16.8	98 20 154.3	5 47.4	98 20 154.4	5 18.1	98 20 154.5			7
8	8 01.9	98 21 152.9	7 32.6	98 21 153.0	7 03.3	98 21 153.1	6 34.0	98 21 153.2	6 04.7	98 21 153.3	5 35.4	98 21 153.4	5 06.1	98 20 153.5			8
9	7 49.3	98 22 151.9	7 20.1	98 22 152.1	6 50.8	98 22 152.2	6 21.6	98 21 152.3	5 52.3	98 21 152.4	5 23.0	98 21 152.5					9
30	7 36.3	97 23 151.0	7 07.1	97 23 151.1	6 37.9	97 23 151.2	6 08.7	97 23 151.3	5 39.5	97 23 151.5	5 10.3	97 23 151.6					30
1	7 22.9	97 23 150.1	6 53.7	97 23 150.2	6 24.6	97 23 150.3	5 55.4	97 23 150.4	5 26.3	97 23 150.5							1
2	7 09.1	97 24 149.1	6 40.0	97 24 149.2	6 10.9	97 23 149.4	5 41.8	97 23 149.5	5 12.7	97 23 149.6							2
3	6 54.9	97 24 148.2	6 25.9	97 24 148.3	5 56.8	97 24 148.4	5 27.8	97 24 148.5									3
4	6 40.4	97 25 147.2	6 11.4	97 25 147.4	5 42.4	97 25 147.5	5 13.4	97 25 147.6									4
35	6 25.4	97 26 146.3	5 56.5	97 25 146.4	5 27.5	97 25 146.6											35
6	6 10.1	96 26 145.4	5 41.2	96 26 145.5	5 12.3	96 26 145.6											6
7	5 54.5	96 27 144.4	5 25.6	96 27 144.6													7
8	5 38.5	96 27 143.5	5 09.7	96 27 143.7													8
9	5 22.1	96 28 142.6															9
40	5 05.4	96 28 141.7															40

Lat. 63°

Lat. 64°

Lat. 65°

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
91	13 46.0	88 45 81.7	14 12.5	88 45 81.5	14 39.1	88 45 81.2	15 05.5	88 45 81.0	15 32.0	88 45 80.7	15 58.5	88 45 80.5	16 24.9	88 45 80.2	16 51.3	88 45 80.0	91
2	13 19.1	88 45 80.8	13 45.6	88 45 80.6	14 12.2	88 45 80.4	14 38.7	88 45 80.1	15 05.2	88 45 79.9	15 31.6	88 45 79.6	15 58.1	88 45 79.4	16 24.5	88 45 79.1	2
3	12 52.3	88 45 80.0	13 18.8	88 45 79.7	13 45.3	88 45 79.5	14 11.9	88 45 79.2	14 38.4	88 45 79.0	15 04.9	88 44 78.8	15 31.4	88 44 78.5	15 57.8	88 44 78.3	3
4	12 25.5	88 44 79.1	12 52.0	88 44 78.8	13 18.6	88 44 78.6	13 45.1	88 44 78.4	14 11.7	88 44 78.1	14 38.2	88 44 77.9	15 04.7	88 44 77.6	15 31.2	88 44 77.4	4
95	11 58.8	88 44 78.2	12 25.4	88 44 78.0	12 51.9	88 44 77.7	13 18.5	88 44 77.5	13 45.1	88 44 77.3	14 11.6	88 44 77.0	14 38.1	88 44 76.8	15 04.7	88 44 76.5	95
6	11 32.1	88 44 77.3	11 58.8	88 44 77.1	12 25.4	88 44 76.9	12 52.0	88 44 76.6	13 18.5	88 44 76.4	13 45.1	88 44 76.2	14 11.7	88 44 75.9	14 38.2	88 44 75.7	6
7	11 05.6	88 44 76.5	11 32.3	88 44 76.2	11 58.9	88 44 76.0	12 25.5	88 44 75.8	12 52.1	88 44 75.5	13 18.7	88 44 75.3	13 45.3	88 44 75.1	14 11.9	88 44 74.8	7
8	10 39.2	88 44 75.6	11 05.8	88 44 75.4	11 32.5	88 44 75.1	11 59.2	88 44 74.9	12 25.8	88 44 74.7	12 52.4	88 44 74.4	13 19.0	88 44 74.2	13 45.6	88 44 74.0	8
9	10 12.8	88 44 74.7	10 39.5	88 44 74.5	11 06.2	88 44 74.3	11 32.9</										

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.
	Alt.	As.															
00	47 00.0	1.001 180.0	47 30.0	1.001 180.0	48 00.0	1.000 180.0	48 30.0	1.001 180.0	49 00.0	1.000 180.0	49 30.0	1.001 180.0	50 00.0	1.000 180.0	50 30.0	1.001 180.0	00
1	46 59.7	1.002 178.6	47 29.7	1.002 178.6	47 59.7	1.002 178.6	48 29.7	1.002 178.6	48 59.7	1.002 178.6	49 29.7	1.002 178.6	49 59.7	1.002 178.6	50 29.7	1.002 178.6	1
2	46 58.7	1.003 177.2	47 28.7	1.003 177.2	47 58.7	1.003 177.2	48 28.7	1.003 177.2	48 58.7	1.003 177.2	49 28.7	1.003 177.2	49 58.7	1.003 177.2	50 28.7	1.003 177.2	2
3	46 57.1	1.004 175.9	47 27.0	1.004 175.8	47 57.0	1.004 175.8	48 27.0	1.004 175.8	48 57.0	1.004 175.8	49 27.0	1.004 175.8	49 56.9	1.004 175.7	50 26.9	1.004 175.7	3
4	46 54.8	1.005 174.5	47 24.7	1.005 174.5	47 54.7	1.005 174.4	48 24.7	1.005 174.4	48 54.6	1.005 174.4	49 24.6	1.005 174.3	49 54.6	1.005 174.3	50 24.5	1.005 174.2	4
05	46 51.8	1.006 173.1	47 21.8	1.006 173.1	47 51.7	1.006 173.0	48 21.7	1.006 173.0	48 51.6	1.006 172.9	49 21.6	1.006 172.9	49 51.5	1.006 172.9	50 21.5	1.006 172.8	05
6	46 48.2	1.007 171.7	47 18.2	1.007 171.7	47 48.1	1.007 171.6	48 18.0	1.007 171.6	48 47.9	1.007 171.5	49 17.9	1.007 171.5	49 47.8	1.007 171.4	50 17.7	1.007 171.4	6
7	46 44.0	1.008 170.4	47 13.9	1.008 170.3	47 43.8	1.008 170.3	48 13.7	1.008 170.2	48 43.6	1.008 170.1	49 13.5	1.008 170.1	49 43.4	1.008 170.0	50 13.3	1.008 169.9	7
8	46 39.1	1.009 169.0	47 09.0	1.009 168.9	47 38.9	1.009 168.9	48 08.7	1.009 168.8	48 38.6	1.009 168.7	49 08.5	1.009 168.7	49 38.3	1.010 168.6	50 08.2	1.010 168.5	8
9	46 33.6	99 10 167.7	47 03.5	99 10 167.6	47 33.3	99 10 167.5	48 03.1	99 10 167.4	48 33.0	99 10 167.3	49 02.8	99 10 167.3	49 32.6	99 11 167.2	50 02.4	99 11 167.1	9
10	46 27.5	99 11 166.3	46 57.3	99 11 166.2	47 27.1	99 12 166.1	47 56.9	99 11 166.0	48 26.7	99 12 166.0	48 56.5	99 12 165.9	49 26.2	99 12 165.8	49 56.0	99 12 165.7	10
1	46 20.7	99 12 164.9	46 50.5	99 12 164.9	47 20.2	99 12 164.8	47 50.0	99 13 164.7	48 19.7	99 12 164.6	48 49.5	99 13 164.5	49 19.2	99 13 164.4	49 49.0	99 13 164.3	1
2	46 13.3	99 13 163.6	46 43.1	99 13 163.5	47 12.8	99 14 163.4	47 42.5	99 14 163.3	48 12.2	99 14 163.2	48 41.9	99 14 163.1	49 11.6	99 14 163.0	49 41.2	99 14 162.9	2
3	46 05.3	99 14 162.3	46 35.0	99 14 162.1	47 04.7	99 14 162.0	47 34.3	99 15 161.9	48 04.0	99 15 161.8	48 33.6	99 15 161.7	49 03.3	99 15 161.6	49 32.9	99 15 161.5	3
4	45 56.7	99 15 160.9	46 26.4	99 16 160.8	46 56.0	99 16 160.7	47 25.6	99 16 160.6	47 55.2	99 16 160.4	48 24.8	99 16 160.3	48 54.4	99 16 160.2	49 23.9	99 16 160.1	4
15	45 47.5	98 16 159.6	46 17.1	98 16 159.5	46 46.7	98 16 159.3	47 16.2	98 17 159.1	47 45.8	98 17 159.0	48 15.3	98 17 158.9	48 44.8	98 17 158.8	49 14.3	98 17 158.7	15
6	45 37.7	98 17 158.3	46 07.3	98 17 158.1	46 36.8	98 18 158.0	47 06.3	98 18 157.9	47 35.7	98 18 157.7	48 05.2	98 18 157.6	48 34.7	98 18 157.5	49 04.1	98 18 157.3	6
7	45 27.4	98 18 156.9	45 56.8	98 18 156.8	46 26.3	98 18 156.7	46 55.7	98 19 156.5	47 25.1	98 19 156.4	47 54.5	98 19 156.2	48 23.9	98 19 156.1	48 53.3	98 19 155.9	7
8	45 16.4	98 20 155.6	45 45.8	98 20 155.5	46 15.2	98 20 155.3	46 44.6	98 20 155.2	47 13.9	98 20 155.0	47 43.3	98 20 154.9	48 12.6	98 20 154.7	48 41.9	98 20 154.6	8
9	45 04.9	98 20 154.3	45 34.2	98 20 154.2	46 03.5	98 20 154.0	46 32.8	98 20 153.9	47 02.1	98 20 153.7	47 31.4	98 21 153.5	48 00.7	98 21 153.4	48 29.9	97 21 153.2	9
20	44 52.8	98 21 153.0	45 22.1	98 21 152.9	45 51.3	97 21 152.7	46 20.6	97 21 152.6	46 49.8	97 22 152.4	47 19.0	97 22 152.2	47 48.2	97 22 152.0	48 17.4	97 22 151.9	20
1	44 40.2	97 22 151.7	45 09.4	97 22 151.6	45 38.6	97 22 151.4	46 07.7	97 22 151.2	46 36.9	97 22 151.1	47 06.0	97 23 150.9	47 35.1	97 23 150.7	48 04.3	97 23 150.5	1
2	44 27.0	97 23 150.5	44 56.1	97 23 150.3	45 25.3	97 23 150.1	45 54.4	97 23 149.9	46 23.4	97 23 149.8	46 52.5	97 23 149.6	47 21.5	97 24 149.4	47 50.6	97 24 149.2	2
3	44 13.3	97 24 149.2	44 42.4	97 24 149.0	45 11.4	97 24 148.8	45 40.4	97 24 148.6	46 09.5	97 24 148.5	46 38.4	97 24 148.3	47 07.4	97 24 148.1	47 36.4	97 25 147.9	3
4	43 59.1	97 25 147.9	44 28.1	97 25 147.7	44 57.1	97 25 147.6	45 26.0	97 25 147.4	45 55.0	97 25 147.2	46 23.9	97 25 147.0	46 52.8	97 25 146.8	47 21.6	97 25 146.6	4
25	43 44.4	96 25 146.7	44 13.3	96 26 146.5	44 42.2	96 26 146.3	45 11.1	96 26 146.1	45 39.9	96 26 145.9	46 08.8	96 26 145.7	46 37.6	96 26 145.5	47 06.4	96 26 145.3	25
6	43 29.2	96 26 145.4	43 58.0	96 26 145.2	44 26.8	96 26 145.0	44 55.6	96 27 144.8	45 24.4	96 27 144.6	45 53.2	96 27 144.4	46 21.9	96 27 144.2	46 50.6	96 27 144.0	6
7	43 13.5	96 27 144.2	43 42.2	96 27 144.0	44 11.0	96 27 143.8	44 39.7	96 27 143.6	45 08.4	96 28 143.4	45 37.1	96 28 143.2	46 05.7	96 28 142.9	46 34.4	96 28 142.7	7
8	42 57.3	96 28 142.9	43 26.0	96 28 142.7	43 54.6	96 28 142.5	44 23.3	96 28 142.3	44 51.9	96 28 142.1	45 20.5	96 28 141.9	45 49.1	96 28 141.7	46 17.6	96 28 141.5	8
9	42 40.6	96 28 141.7	43 09.2	96 29 141.5	43 37.8	96 29 141.3	44 06.4	96 29 141.1	44 34.9	96 29 140.9	45 03.5	96 29 140.6	45 32.0	96 29 140.4	46 00.4	96 29 140.2	9
30	42 23.5	96 29 140.5	42 52.1	96 29 140.3	43 20.6	96 30 140.1	43 49.1	96 30 139.9	44 17.5	96 30 139.6	44 46.0	96 30 139.4	45 14.4	96 30 139.2	45 42.8	96 30 139.0	30
1	42 06.0	96 30 139.3	42 34.4	96 30 139.1	43 02.9	96 30 138.9	43 31.3	96 30 138.6	43 59.7	96 30 138.4	44 28.0	96 31 138.2	44 56.3	96 31 138.0	45 24.6	96 31 137.7	1
2	41 48.0	96 31 138.1	42 16.4	96 31 137.9	42 44.7	96 31 137.6	43 13.1	96 31 137.4	43 41.4	96 31 137.2	44 09.6	96 31 137.0	44 37.9	96 32 136.7	45 06.1	96 32 136.5	2
3	41 29.6	96 31 136.9	41 57.9	96 31 136.7	42 26.2	96 32 136.5	42 54.4	96 32 136.2	43 22.6	96 32 136.0	43 50.8	96 32 135.8	44 19.0	96 32 135.5	44 47.1	96 32 135.3	3
4	41 10.8	96 32 135.7	41 39.0	96 32 135.5	42 07.2	96 32 135.3	42 35.4	96 32 135.0	43 03.5	96 32 134.8	43 31.6	96 33 134.6	44 00.8	96 33 134.4	44 27.8	96 33 134.1	4
35	40 51.5	96 33 134.6	41 19.7	96 33 134.3	41 47.8	96 33 134.1	42 15.9	96 33 133.9	42 44.0	96 33 133.6	43 12.0	96 33 133.4	43 40.0	96 33 133.1	44 08.0	96 33 132.9	35
6	40 31.9	96 33 133.4	41 00.0	96 33 133.2	41 28.1	96 33 132.9	41 56.1	96 33 132.7	42 24.1	96 33 132.4	42 52.0	96 33 132.2	43 20.0	96 33 131.9	43 47.8	96 33 131.7	6
7	40 12.0	96 34 132.2	40 40.0	96 34 132.0	41 07.9	96 34 131.8	41 35.9	96 34 131.5	42 03.8	96 34 131.3	42 31.7	96 35 131.0	42 59.5	96 35 130.8	43 27.3	96 35 130.5	7
8	39 51.6	96 35 131.1	40 19.5	96 35 130.9	40 47.4	96 35 130.6	41 15.3	96 35 130.4	41 43.1	96 35 130.1	42 10.9	96 35 129.9	42 38.7	96 35 129.6	43 06.4	96 35 129.3	8
9	39 30.9	96 35 130.0	39 58.8	96 35 129.7	40 26.6	96 35 129.5	40 54.4	96 35 129.2	41 22.1	96 35 129.0	41 49.9	96 35 128.7	42 17.5	96 35 128.5	42 45.2	96 35 128.2	9
40	39 09.9	96 36 128.8	39 37.6	96 36 128.6	40 05.4	96 36 128.3	40 33.1	96 36 128.0	41 00.8	96 36 127.8	41 28.4	96 36 127.6	41 56.0	96 36 127.3	42 23.6	96 36 127.0	40
1	38 48.5	96 36 127.7	39 16.2	96 36 127.5	39 43.9	96 36 127.2	40 11.5	96 36 127.0	40 39.1	96 36 126.7	41 06.7	96 36 126.4	41 34.2	96 36 126.2	42 01.7	96 36 125.9	1
2	38 26.8	96 37 126.6	38 54.4	96 37 126.3	39 22.0	96 37 126.1	39 49.6	96 37 125.8	40 17.1	96 37 125.6	40 44.6	96 37 125.3	41 12.1	96 38 125.1	41 39.5	96 38 124.8	2
3	38 04.7	96 37 125.5	38 32.3	96 37 125.2	38 59.8	96 37 125.0	39 27.3	96 37 124.7	39 54.8	96 38 124.4	40 22.2	96 38 124.2	40 49.6	96 38 123.9	41 17.0	96 38 123.7	3
4	37 42.4	96 38 124.4	38 09.9	96 38 124.1	38 37.4	96 38 123.9	39 04.8	96 38 123.6	39 32.2	96 38 123.4	39 59.6	96 38 123.1	40 26.9	96 38 122.8	40 54.2	96 38 122.6	4
45	37 19.8	96 38 123.3	37 47.2	96 38 123.1	38 14.6	96 38 122.8	38 42.0	96 38 122.5	39 09.3	96 38 122.3	39 36.6	96 38 122.0	40 03.8	96 38 121.7	40 31.1		

DECLINATION CONTRARY NAME TO LATITUDE

HA.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		HA.	
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.		
00	700.0	1.00	180.0	630.0	1.00	180.0	600.0	1.00	180.0	530.0	1.00	180.0	500.0	1.00	180.0			00
1	659.8	1.00	179.1	629.8	1.00	179.1	559.8	1.00	179.1	529.8	1.00	179.1						01
2	659.1	1.00	178.1	629.1	1.00	178.1	559.1	1.00	178.1	529.1	1.00	178.1						02
3	658.0	1.00	177.2	628.0	1.00	177.2	558.0	1.00	177.2	528.0	1.00	177.2						03
4	656.4	1.00	176.2	626.4	1.00	176.2	556.4	1.00	176.2	526.4	1.00	176.2						04
05	654.4	1.00	175.3	624.4	1.00	175.3	554.4	1.00	175.3	524.4	1.00	175.3						05
6	651.9	1.00	174.3	621.9	1.00	174.3	552.0	1.00	174.4	522.0	1.00	174.4						06
7	649.0	1.00	173.4	619.0	1.00	173.4	549.1	1.00	173.4	519.1	1.00	173.5						07
8	645.6	1.00	172.4	615.7	1.00	172.5	545.7	1.00	172.5	515.8	1.00	172.5						08
9	641.8	1.00	171.5	611.9	1.00	171.5	542.0	1.00	171.6	512.0	1.00	171.6						09
10	637.6	1.00	170.5	607.7	1.00	170.6	537.7	1.00	170.6	507.8	1.00	170.7						10
1	632.9	1.00	169.6	603.0	1.00	169.6	533.1	1.00	169.7	503.2	1.00	169.7						11
2	627.7	1.00	168.7	597.9	1.00	168.7	528.0	1.00	168.8									12
3	622.2	09	10	167.7	592.3	09	10	167.8	522.5	09	10	167.8						13
4	616.1	09	11	166.8	586.3	09	11	166.8	516.5	09	11	166.9						14
15	609.7	09	11	165.8	579.9	09	11	165.9	510.1	09	11	166.0						15
6	602.8	09	12	164.9	573.1	09	12	165.0	503.3	09	12	165.0						16
7	595.5	09	13	164.0	565.5	09	13	164.0										17
8	587.8	09	14	163.0	557.8	09	14	163.1										18
9	579.6	09	14	162.1	549.9	09	14	162.2										19
20	571.0	09	15	161.2	541.4	09	15	161.2										20
1	562.0	09	16	160.2														21
2	552.6	09	16	159.3														22
3	542.8	09	17	158.4														23

Lat. 63°

DECLINATION SAME NAME AS LATITUDE

HA.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		HA.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
91	17 17.7	88 45	79.8	17 44.1	88 45	79.5	18 10.5	88 45	79.3	18 36.8	88 44	79.0	19 03.1	88 44	78.7	19 29.4	88 44	78.5	19 55.7	88 44	78.2	20 22.0	87 44	78.0	91
2	16 51.0	88 44	78.9	17 17.4	88 44	78.6	17 43.7	88 44	78.4	18 10.1	88 44	78.1	18 36.5	88 44	77.9	19 02.8	88 44	77.6	19 29.1	88 44	77.4	19 55.4	88 44	77.1	92
3	16 24.3	88 44	78.0	16 50.7	88 44	77.8	17 17.1	88 44	77.5	17 43.5	88 44	77.3	18 09.9	88 44	77.0	18 36.2	88 44	76.8	19 02.6	88 44	76.5	19 28.9	88 44	76.3	93
4	15 57.7	88 44	77.2	16 24.1	88 44	76.9	16 50.6	88 44	76.7	17 17.0	88 44	76.4	17 43.4	88 44	76.2	18 09.8	88 44	75.9	18 36.1	88 44	75.7	19 02.5	88 44	75.4	94
95	15 31.1	88 44	76.3	15 57.6	88 44	76.1	16 24.1	88 44	75.8	16 50.5	88 44	75.6	17 17.0	88 44	75.3	17 43.4	88 44	75.1	18 09.8	88 44	74.8	18 36.2	88 44	74.6	95
6	15 04.7	88 44	75.4	15 31.2	88 44	75.2	15 57.7	88 44	75.0	16 24.2	88 44	74.7	16 50.7	88 44	74.5	17 17.1	88 44	74.2	17 43.5	88 44	74.0	18 10.0	88 43	73.7	96
7	14 38.4	88 44	74.6	15 05.0	88 44	74.3	15 31.5	88 44	74.1	15 58.0	88 44	73.8	16 24.5	88 44	73.6	16 51.0	88 43	73.4	17 17.4	88 43	73.1	17 43.9	88 43	72.9	97
8	14 12.2	88 43	73.7	14 38.8	88 43	73.5	15 05.3	88 43	73.2	15 31.9	88 43	73.0	15 58.4	88 43	72.8	16 24.9	88 43	72.5	16 51.4	88 43	72.3	17 17.9	88 43	72.0	98
9	13 46.1	88 43	72.9	14 12.7	88 43	72.6	14 39.3	88 43	72.4	15 05.9	88 43	72.1	15 32.5	88 43	71.9	15 59.0	88 43	71.7	16 25.5	88 43	71.4	16 52.0	88 43	71.2	99
100	13 20.2	88 43	72.0	13 46.8	88 43	71.8	14 13.4	88 43	71.5	14 40.0	88 43	71.3	15 06.6	88 43	71.0	15 33.2	88 43	70.8	15 59.8	88 43	70.6	16 26.3	88 43	70.3	100
1	12 54.3	88 43	71.1	13 21.0	88 43	70.9	13 47.7	88 43	70.7	14 14.3	88 43	70.4	14 40.9	88 42	70.2	15 07.6	88 43	70.0	15 34.2	88 42	69.7	16 00.7	88 42	69.5	101
2	12 28.6	88 43	70.3	12 55.3	88 43	70.1	13 22.0	88 42	69.8	13 48.7	88 42	69.6	14 15.4	88 42	69.3	14 42.0	88 42	69.1	15 08.7	88 42	68.9	15 35.3	88 42	68.6	102
3	12 03.0	88 42	69.4	12 29.8	88 42	69.2	12 56.5	88 42	69.0	13 23.2	88 42	68.7	13 50.0	88 42	68.5	14 16.7	88 42	68.3	14 43.3	88 42	68.0	15 10.0	88 42	67.8	103
4	11 37.6	88 42	68.6	12 04.4	88 42	68.3	12 31.2	88 42	68.1	12 57.9	88 42	67.9	13 24.7	88 42	67.6	13 51.4	88 42	67.4	14 18.2	88 42	67.2	14 44.9	88 42	66.9	104
105	11 12.3	88 42	67.7	11 39.2	88 42	67.5	12 06.0	88 42	67.3	12 32.8	88 42	67.0	12 59.6	88 42	66.8	13 26.4	88 42	66.6	13 53.1	88 41	66.3	14 19.9	88 41	66.1	105
6	10 47.2	90 42	66.9	11 14.1	90 42	66.6	11 40.9	90 41	66.4	12 07.8	89 41	66.2	12 34.6	89 41	65.9	13 01.4	89 41	65.7	13 28.3	89 41	65.5	13 55.1	89 41	65.3	106
7	10 22.2	90 41	66.0	10 49.1	90 41	65.8	11 16.1	90 41	65.6	11 42.9	90 41	65.3	12 09.8	90 41	65.1	12 36.7	90 41	64.9	13 03.6	90 41	64.6	13 30.4	89 41	64.4	107
8	9 57.4	90 41	65.1	10 24.4	90 41	64.9	10 51.3	90 41	64.7	11 18.3	90 41	64.5	11 45.2	90 41	64.2	12 12.1	90 41	64.0	12 39.0	90 40	63.8	13 05.9	90 40	63.6	108
9	9 32.8	90 41	64.3	9 59.8	90 41	64.1	10 26.8	90 41	63.8	10 53.8	90 41	63.6	11 20.8	90 40	63.4	11 47.7	90 40	63.2	12 14.7	90 40	63.0	12 41.6	90 40	62.7	109
110	9 08.3	90 40	63.4	9 35.4	90 40	63.2	10 02.4	90 40	63.0	10 29.5	90 40	62.8	10 56.5	90 40	62.5	11 23.5	90 40	62.3	11 50.5	90 40	62.1	12 17.5	90 40	61.9	110
1	8 44.1	90 40	62.6	9 11.2	90 40	62.4	9 38.3	90 40	62.1	10 05.3	90 40	61.9	10 32.4	90 40	61.7	10 59.5	90 40	61.5	11 26.5	90 40	61.3	11 53.6	90 40	61.0	111
2	8 20.0	90 40	61.7	8 47.1	90 40	61.5	9 14.3	90 40	61.3	9 41.4	90 40	61.1	10 08.5	90 40	60.8	10 35.6	90 39	60.6	11 02.8	90 39	60.4	11 29.9	90 39	60.2	112
3	7 56.1	91 39	60.9	8 23.3	91 39	60.6	8 50.5	91 39	60.4	9 17.7	91 39	60.2	9 44.8	91 39	60.0	10 12.0	91 39	59.8	10 39.2	91 39	59.6	11 06.3	90 39	59.3	113
4	7 32.4	91 39	60.0	7 59.8	91 39	59.8	8 26.9	91 39	59.6	8 54.1	91 39	59.4	9 21.4	91 39	59.1	9 48.6	91 39	58.9	10 15.8	91 39	58.7	10 43.0	91 39	58.5	114
115	7 08.9	91 39	59.1	7 36.2	91 39	58.9	8 03.5	91 39	58.7	8 30.8	91 39	58.5	8 58.1	91 38	58.3	9 25.4	91 38	58.1	9 52.6	91 38	57.9	10 19.9	91 38	57.7	115
6	6 45.7	91 38	58.3	7 13.0	91 38	58.1	7 40.3	91 38	57.9	8 07.7	91 38	57.6	8 35.0	91 38	57.4	9 02.3	91 38	57.2	9 29.7	91 38	57.0	9 57.0	91 38	56.8	116
7	6 22.6	91 38	57.4	6 50.0	91 38	57.2																			

Lat. 63°

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.		
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.			
00	51 00.0	1.001	180.0	51 30.0	1.001	180.0	52 00.0	1.001	180.0	52 30.0	1.001	180.0	53 00.0	1.001	180.0	53 30.0	1.001	180.0	00
1	50 58.7	1.002	178.5	51 29.7	1.002	178.5	51 59.6	1.002	178.5	52 29.6	1.002	178.5	52 59.6	1.002	178.5	53 29.6	1.002	178.5	1
2	50 58.6	1.003	177.1	51 28.6	1.003	177.1	51 58.6	1.003	177.1	52 28.6	1.003	177.0	52 58.6	1.003	177.0	53 28.6	1.003	177.0	2
3	50 56.9	1.004	175.6	51 26.9	1.004	175.6	51 56.9	1.004	175.6	52 26.8	1.004	175.6	52 56.8	1.004	175.5	53 26.8	1.004	175.5	3
4	50 54.5	1.005	174.2	51 24.4	1.005	174.2	51 54.4	1.005	174.1	52 24.4	1.005	174.1	52 54.3	1.005	174.0	53 24.3	1.005	174.0	4
05	50 51.4	1.006	172.8	51 21.3	1.006	172.7	51 51.3	1.006	172.7	52 21.2	1.006	172.6	52 51.1	1.006	172.5	53 21.1	1.006	172.4	05
6	50 47.6	1.007	171.3	51 17.5	1.007	171.3	51 47.4	1.007	171.2	52 17.4	1.007	171.1	52 47.3	1.007	171.0	53 17.2	1.007	170.9	6
7	50 43.2	1.009	169.9	51 13.0	1.009	169.8	51 42.9	1.009	169.7	52 12.8	1.009	169.7	52 42.7	1.009	169.6	53 12.6	1.009	169.5	7
8	50 38.0	1.010	168.4	51 07.9	1.010	168.4	51 37.7	1.010	168.3	52 07.6	1.010	168.2	52 37.4	1.010	168.1	53 07.2	1.010	168.0	8
9	50 32.2	1.011	167.0	51 02.1	1.011	166.9	51 31.9	1.011	166.8	52 01.7	1.011	166.7	52 31.5	1.011	166.6	53 01.3	1.011	166.5	9
10	50 25.8	1.012	165.6	50 55.6	1.012	165.5	51 25.3	1.012	165.4	51 55.1	1.012	165.3	52 24.8	1.012	165.2	52 54.6	1.012	165.1	10
1	50 18.7	1.013	164.2	50 48.4	1.013	164.1	51 18.1	1.013	163.9	51 47.8	1.013	163.8	52 17.5	1.013	163.7	52 47.2	1.013	163.6	1
2	50 10.9	1.014	162.7	50 40.6	1.014	162.6	51 10.3	1.014	162.5	51 39.9	1.014	162.4	52 09.6	1.014	162.3	52 39.2	1.014	162.2	2
3	50 02.5	1.015	161.3	50 32.1	1.015	161.2	51 01.7	1.015	161.1	51 31.3	1.015	161.0	52 00.9	1.015	160.8	52 30.5	1.015	160.7	3
4	49 53.5	1.016	159.9	50 23.0	1.016	159.8	50 52.6	1.016	159.7	51 22.1	1.016	159.6	51 51.7	1.016	159.5	52 21.2	1.016	159.4	4
15	49 43.8	1.017	158.5	50 13.3	1.017	158.4	50 42.8	1.017	158.3	51 12.3	1.017	158.2	51 41.8	1.017	158.1	52 11.2	1.017	158.0	15
6	49 33.6	1.018	157.2	50 03.0	1.018	157.0	50 32.4	1.018	156.9	51 01.8	1.018	156.8	51 31.2	1.018	156.7	52 00.6	1.018	156.6	6
7	49 22.7	1.019	155.8	49 52.1	1.019	155.6	50 21.4	1.019	155.5	50 50.7	1.019	155.3	51 20.1	1.019	155.1	51 49.4	1.019	155.0	7
8	49 11.2	1.020	154.4	49 40.5	1.020	154.2	50 09.8	1.020	154.1	50 39.1	1.020	153.9	51 08.3	1.020	153.7	51 37.5	1.020	153.6	8
9	48 59.2	1.021	153.0	49 28.4	1.021	152.9	49 57.6	1.021	152.7	50 26.8	1.021	152.6	50 56.0	1.021	152.3	51 25.1	1.021	152.2	9
20	48 46.5	1.022	151.7	49 15.7	1.022	151.5	49 44.8	1.022	151.3	50 13.9	1.022	151.1	50 43.0	1.022	150.9	51 12.1	1.022	150.8	20
1	48 33.3	1.023	150.4	49 02.4	1.023	150.2	49 31.5	1.023	150.0	50 02.5	1.023	149.8	50 29.5	1.023	149.6	50 58.5	1.023	149.4	1
2	48 19.6	1.024	149.0	48 48.6	1.024	148.8	49 17.6	1.024	148.6	49 46.5	1.024	148.4	50 15.4	1.024	148.2	50 44.3	1.024	148.0	2
3	48 05.3	1.025	147.7	48 34.2	1.025	147.5	49 03.1	1.025	147.3	49 32.0	1.025	147.1	50 00.8	1.025	146.9	50 29.6	1.025	146.7	3
4	47 50.5	1.026	146.4	48 19.3	1.026	146.2	48 48.1	1.026	146.0	49 16.9	1.026	145.8	49 45.7	1.026	145.5	50 14.4	1.026	145.3	4
25	47 35.1	1.027	145.1	48 03.9	1.027	144.9	48 32.6	1.027	144.7	49 01.3	1.027	144.4	49 30.0	1.027	144.2	49 58.6	1.027	144.0	25
6	47 19.3	1.028	143.8	47 48.0	1.028	143.6	48 16.6	1.028	143.3	48 45.2	1.028	143.1	49 13.8	1.028	142.9	49 42.4	1.028	142.7	6
7	47 03.0	1.029	142.5	47 31.5	1.029	142.3	48 00.1	1.029	142.1	48 28.6	1.029	141.8	48 57.1	1.029	141.6	49 25.6	1.029	141.3	7
8	46 46.1	1.030	141.2	47 14.6	1.030	141.0	47 43.1	1.030	140.8	48 11.6	1.030	140.5	48 40.0	1.030	140.3	49 08.3	1.030	140.0	8
9	46 28.9	1.031	140.0	46 57.3	1.031	139.7	47 25.7	1.031	139.5	47 54.0	1.031	139.3	48 22.3	1.031	139.0	48 50.6	1.031	138.8	9
30	46 11.1	1.032	138.7	46 39.4	1.032	138.5	47 07.7	1.032	138.2	47 36.0	1.032	138.0	48 04.2	1.032	137.7	48 32.4	1.032	137.5	30
1	45 52.9	1.033	137.5	46 21.2	1.033	137.2	46 49.4	1.033	137.0	47 17.5	1.033	136.7	47 45.7	1.033	136.5	48 13.8	1.033	136.2	1
2	45 34.3	1.034	136.2	46 02.5	1.034	136.0	46 30.6	1.034	135.7	46 58.7	1.034	135.5	47 26.7	1.034	135.2	47 54.7	1.034	135.0	2
3	45 15.2	1.035	135.0	45 43.3	1.035	134.8	46 11.4	1.035	134.5	46 39.7	1.035	134.3	47 07.3	1.035	134.0	47 35.3	1.035	133.7	3
4	44 55.8	1.036	133.8	45 23.8	1.036	133.6	45 51.7	1.036	133.3	46 19.8	1.036	133.0	46 47.5	1.036	132.8	47 15.4	1.036	132.5	4
35	44 35.9	1.037	132.6	45 03.8	1.037	132.4	45 31.7	1.037	132.1	45 59.5	1.037	131.8	46 27.3	1.037	131.6	46 55.1	1.037	131.3	35
6	44 15.7	1.038	131.4	44 43.5	1.038	131.2	45 11.3	1.038	130.9	45 39.1	1.038	130.6	46 06.8	1.038	130.4	46 34.4	1.038	130.1	6
7	43 55.1	1.039	130.2	44 22.8	1.039	130.0	44 50.5	1.039	129.7	45 18.2	1.039	129.4	45 45.8	1.039	129.2	46 13.4	1.039	128.9	7
8	43 34.1	1.040	129.1	44 01.8	1.040	128.8	44 29.4	1.040	128.5	44 57.0	1.040	128.3	45 25.4	1.040	128.0	45 52.0	1.040	127.7	8
9	43 12.8	1.041	127.9	43 40.4	1.041	127.7	44 07.9	1.041	127.4	44 35.4	1.041	127.1	45 02.9	1.041	126.8	45 30.3	1.041	126.5	9
40	42 51.2	1.042	126.8	43 18.7	1.042	126.5	43 46.1	1.042	126.2	44 13.5	1.042	125.9	44 40.9	1.042	125.6	45 08.3	1.042	125.3	40
1	42 29.2	1.043	125.6	42 56.6	1.043	125.4	43 24.0	1.043	125.1	43 51.3	1.043	124.8	44 18.6	1.043	124.5	44 45.9	1.043	124.2	1
2	42 06.9	1.044	124.5	42 34.2	1.044	124.2	43 01.5	1.044	123.9	43 28.8	1.044	123.7	44 56.0	1.044	123.4	44 23.2	1.044	123.1	2
3	41 44.3	1.045	123.4	42 11.6	1.045	123.1	42 38.8	1.045	122.8	43 06.0	1.045	122.5	43 33.0	1.045	122.2	44 00.2	1.045	121.9	3
4	41 21.4	1.046	122.3	41 48.6	1.046	122.0	42 15.8	1.046	121.7	42 42.9	1.046	121.4	43 10.0	1.046	121.1	43 37.0	1.046	120.8	4
45	40 58.2	1.047	121.2	41 25.4	1.047	120.9	41 52.5	1.047	120.6	42 19.5	1.047	120.3	42 46.5	1.047	120.0	43 13.5	1.047	119.7	45
6	40 34.8	1.048	120.1	41 01.9	1.048	119.8	41 28.9	1.048	119.5	41 55.9	1.048	119.2	42 22.8	1.048	118.9	42 49.7	1.048	118.6	6
7	40 11.1	1.049	119.0	40 38.1	1.049	118.7	41 05.1	1.049	118.4	41 32.0	1.049	118.1	42 58.8	1.049	117.8	42 25.4	1.049	117.5	7
8	39 47.2	1.050	117.9	40 14.1	1.050	117.6	40 41.0	1.050	117.4	41 07.8	1.050	117.1	41 34.6	1.050	116.8	42 01.4	1.050	116.5	8
9	39 23.0	1.051	116.9	39 49.8	1.051	116.6	40 16.7	1.051	116.3	40 43.5	1.051	116.0	41 10.2	1.051	115.7	41 36.9	1.051	115.4	9
50	38 58.6	1.052	115.8	39 25.4	1.052	115.5	39 52.1	1.052	115.2	40 18.9	1.052	114.9	40 45.5	1.052	114.6	41 12.2	1.052	114.3	50
1	38 33.9	1.053	114.8	39 00.7	1.053	114.5	39 27.4	1.053	114.2	39 54.1	1.053	113.9							

H.A.	24° 00'			24° 30'			25° 00'			25° 30'			26° 00'			26° 30'			27° 00'			27° 30'			H.A.
	Alt.	Ad	Az.																						
91	20 48.2	87 44	77.7	21 14.4	87 44	77.5	21 40.6	87 44	77.2	22 06.8	87 44	76.9	22 32.9	87 44	76.7	22 59.0	87 44	76.4	23 25.1	87 44	76.1	23 51.2	87 44	75.9	91
2	20 21.6	88 44	76.9	20 47.9	87 44	76.6	21 14.1	87 44	76.3	21 40.3	87 44	76.1	22 06.5	87 44	75.8	22 32.6	87 44	75.6	22 58.7	87 44	75.3	23 24.8	87 44	75.0	2
3	19 55.2	88 44	76.0	20 21.4	88 44	75.8	20 47.7	87 44	75.5	21 13.9	87 44	75.2	21 40.1	87 44	75.0	22 06.3	87 44	74.7	22 32.4	87 44	74.4	22 58.6	87 44	74.2	3
4	19 28.8	88 44	75.2	19 55.1	88 44	74.9	20 21.4	88 44	74.6	20 47.6	87 44	74.4	21 13.9	87 44	74.1	21 40.1	87 44	73.9	22 06.2	87 43	73.6	22 32.4	87 43	73.3	4
95	19 02.5	88 44	74.3	19 28.8	88 44	74.1	19 55.2	88 44	73.8	20 21.4	88 43	73.5	20 47.7	88 43	73.3	21 14.0	87 43	73.0	21 40.2	87 43	72.8	22 06.4	87 43	72.5	95
6	18 36.3	88 43	73.5	19 02.7	88 43	73.2	19 29.1	88 43	73.0	19 55.4	88 43	72.7	20 21.7	88 43	72.4	20 48.0	88 43	72.2	21 14.2	87 43	71.9	21 40.5	87 43	71.7	6
7	18 10.3	88 43	72.6	18 36.7	88 43	72.4	19 03.1	88 43	72.1	19 29.4	88 43	71.9	19 55.8	88 43	71.6	20 22.1	88 43	71.4	20 48.4	88 43	71.1	21 14.7	88 43	70.8	7
8	17 44.3	88 43	71.8	18 10.8	88 43	71.5	18 37.2	88 43	71.3	19 03.6	88 43	71.0	19 30.0	88 43	70.8	19 56.3	88 43	70.5	20 22.7	88 43	70.3	20 49.0	88 43	70.0	8
9	17 18.5	88 43	70.9	17 45.0	88 43	70.7	18 11.5	88 43	70.4	18 37.9	88 43	70.2	19 04.3	88 42	69.9	19 30.7	88 42	69.7	19 57.1	88 42	69.4	20 23.5	88 42	69.2	9
100	16 52.9	88 43	70.1	17 19.4	88 42	69.8	17 45.9	88 42	69.6	18 12.4	88 42	69.3	18 38.8	88 42	69.1	19 05.3	88 42	68.8	19 31.7	88 42	68.6	19 58.1	88 42	68.3	100
1	16 27.3	89 42	69.2	16 53.9	89 42	69.0	17 20.4	88 42	68.8	17 46.9	88 42	68.5	18 13.4	88 42	68.3	18 39.9	88 42	68.0	19 06.4	88 42	67.8	19 32.8	88 42	67.5	1
2	16 01.9	89 42	68.4	16 28.5	89 42	68.2	16 55.1	89 42	67.9	17 21.7	89 42	67.7	17 48.2	88 42	67.4	18 14.7	88 42	67.2	18 41.3	88 42	66.9	19 07.7	88 42	66.7	2
3	15 36.7	89 42	67.6	16 03.3	89 42	67.3	16 29.9	89 42	67.1	16 56.5	89 42	66.8	17 23.1	89 42	66.6	17 49.7	89 41	66.3	18 16.3	88 42	66.1	18 42.8	88 41	65.9	3
4	15 11.6	89 42	66.7	15 38.3	89 42	66.5	16 04.9	89 41	66.2	16 31.6	89 41	66.0	16 58.2	89 41	65.8	17 24.8	89 41	65.5	17 51.4	89 41	65.3	18 18.0	89 41	65.0	4
105	14 46.6	89 41	65.9	15 13.4	89 41	65.6	15 40.1	89 41	65.4	16 06.8	89 41	65.2	16 33.5	89 41	64.9	17 00.1	89 41	64.7	17 26.8	89 41	64.4	17 53.4	89 41	64.2	105
6	14 21.9	89 41	65.0	14 48.6	89 41	64.8	15 15.4	89 41	64.6	15 42.1	89 41	64.3	16 08.9	89 41	64.1	16 35.6	89 41	63.9	17 02.3	89 40	63.6	17 29.0	89 40	63.4	6
7	13 57.3	89 41	64.2	14 24.1	89 41	64.0	14 50.9	89 40	63.7	15 17.7	89 40	63.5	15 44.5	89 40	63.3	16 11.2	89 40	63.0	16 38.0	89 40	62.8	17 04.7	89 40	62.5	7
8	13 32.8	90 40	63.3	13 59.7	90 40	63.1	14 26.6	90 40	62.9	14 53.4	90 40	62.7	15 20.2	89 40	62.4	15 47.0	89 40	62.2	16 13.9	89 40	62.0	16 40.6	89 40	61.7	8
9	13 08.6	90 40	62.5	13 35.5	90 40	62.3	14 02.4	90 40	62.0	14 29.3	90 40	61.8	14 56.2	90 40	61.6	15 23.0	90 40	61.4	15 49.9	89 40	61.1	16 16.7	89 40	60.9	9
110	12 44.5	90 40	61.7	13 11.5	90 40	61.4	13 38.4	90 40	61.2	14 05.4	90 40	61.0	14 32.3	90 40	60.8	14 59.2	90 39	60.5	15 26.1	90 39	60.3	15 53.0	90 39	60.1	110
1	12 20.6	90 40	60.8	12 47.6	90 39	60.6	13 14.7	90 39	60.4	13 41.7	90 39	60.1	14 08.6	90 39	59.9	14 35.6	90 39	59.7	15 02.6	90 39	59.5	15 29.5	90 39	59.2	1
2	11 56.9	90 39	60.0	12 24.0	90 39	59.8	12 51.1	90 39	59.5	13 18.1	90 39	59.3	13 45.2	90 39	59.1	14 12.2	90 39	58.9	14 39.2	90 38	58.6	15 06.2	90 38	58.4	2
3	11 33.5	90 39	59.1	12 00.6	90 39	58.9	12 27.7	90 39	58.7	12 54.8	90 39	58.5	13 21.9	90 38	58.3	13 49.0	90 38	58.0	14 16.1	90 38	57.8	14 43.1	90 38	57.6	3
4	11 10.2	91 38	58.3	11 37.4	91 38	58.1	12 04.5	91 38	57.9	12 31.7	91 38	57.6	12 58.9	90 38	57.4	13 26.0	90 38	57.2	13 53.1	90 38	57.0	14 20.2	90 38	56.8	4
115	10 47.1	91 38	57.4	11 14.3	91 38	57.2	11 41.6	91 38	57.0	12 08.8	91 38	56.8	12 36.0	91 38	56.6	13 03.2	91 38	56.4	13 30.4	91 38	56.1	13 57.6	91 37	55.9	115
6	10 24.3	91 38	56.6	10 51.6	91 38	56.4	11 18.8	91 38	56.2	11 46.1	91 37	56.0	12 13.4	91 37	55.7	12 40.6	91 37	55.5	13 07.9	91 37	55.3	13 35.1	91 37	55.1	6
7	10 01.6	91 37	55.8	10 29.0	91 37	55.5	10 56.3	91 37	55.3	11 23.7	91 37	55.1	11 51.0	91 37	54.9	12 18.3	91 37	54.7	12 45.6	91 37	54.5	13 12.9	91 37	54.3	7
8	9 39.2	91 37	54.9	10 06.6	91 37	54.7	10 34.0	91 37	54.5	11 01.4	91 37	54.3	11 28.8	91 36	54.1	11 56.2	91 36	53.9	12 23.5	91 36	53.7	12 50.9	91 36	53.4	8
9	9 17.1	92 37	54.1	9 44.5	92 36	53.9	10 12.0	92 36	53.6	10 39.4	91 36	53.4	11 06.9	91 36	53.2	11 34.3	91 36	53.0	12 01.7	91 36	52.8	12 29.1	91 36	52.6	9
120	8 55.1	92 36	53.2	9 22.6	92 36	53.0	9 50.2	92 36	52.8	10 17.7	92 36	52.6	10 45.2	92 36	52.4	11 12.6	92 36	52.2	11 40.1	92 36	52.0	12 07.6	92 35	51.8	120
1	8 33.4	92 36	52.4	9 01.0	92 36	52.2	9 28.6	92 36	52.0	9 56.1	92 35	51.8	10 23.7	92 35	51.6	10 51.2	92 35	51.4	11 18.8	92 35	51.2	11 46.3	92 35	51.0	1
2	8 12.0	92 35	51.5	8 39.6	92 35	51.3	9 07.3	92 35	51.1	9 34.9	92 35	50.9	10 02.5	92 35	50.7	10 30.1	92 35	50.5	10 57.7	92 35	50.3	11 25.3	92 35	50.1	2
3	7 50.8	92 35	50.7	8 18.5	92 35	50.5	8 46.2	92 35	50.3	9 13.9	92 35	50.1	9 41.5	92 34	49.9	10 09.2	92 34	49.7	10 36.9	92 34	49.5	11 04.5	92 34	49.3	3
4	7 29.9	93 34	49.8	7 57.6	92 34	49.6	8 25.4	92 34	49.4	8 53.1	92 34	49.2	9 20.8	92 34	49.0	9 48.6	92 34	48.8	10 16.3	92 34	48.7	10 44.0	92 34	48.5	4
125	7 09.2	93 34	49.0	7 37.0	93 34	48.8	8 04.8	93 34	48.6	8 32.6	93 34	48.4	9 00.4	93 34	48.2	9 28.2	93 34	48.0	9 56.0	93 34	47.8	10 23.7	93 33	47.6	125
6	6 48.8	93 34	48.1	7 16.6	93 33	47.9	7 44.5	93 33	47.7	8 12.4	93 33	47.5	8 40.2	93 33	47.4	9 08.1	93 33	47.2	9 35.9	93 33	47.0	10 03.8	93 33	46.8	6
7	6 28.6	93 33	47.2	6 56.6	93 33	47.1	7 24.5	93 33	46.9	7 52.4	93 33	46.7	8 20.3	93 33	46.5	8 48.2	93 33	46.3	9 16.1	93 32	46.1	9 44.0	93 32	46.0	7
8	6 08.8	93 33	46.4	6 36.8	93 33	46.2	7 04.7	93 32	46.0	7 32.7	93 32	45.8	8 00.7	93 32	45.7	8 28.7	93 32	45.5	8 56.6	93 32	45.3	9 24.6	93 32	45.1	8
9	5 49.2	94 32	45.5	6 17.2	93 32	45.4	6 45.3	93 32	45.2	7 13.3	93 32	45.0	7 41.4	93 32	44.8	8 09.4	93 32	44.6	8 37.4	93 32	44.5	9 05.4	93 31	44.3	9
130	5 29.9	94 32	44.7	5 58.0	94 32	44.5	6 26.1	94 32	44.3	6 54.2	94 31	44.1	7 22.3	94 31	44.0	7 50.4	94 31	43.8	8 18.5	94 31	43.6	8 46.6	94 31	43.4	130
1	5 10.9	94 31	43.8	5 39.1	94 31	43.6	6 07.2	94 31	43.5	6 35.4	94 31	43.3	7 03.5	94 31	43.1	7 31.7	94 31	42.9	7 59.8	94 30	42.8	8 28.0			

DECLINATION SAME NAME AS LATITUDE

Lat. 63°

Table with columns for H.A., Alt., Az., and rows for various declination values (e.g., 28° 00', 28° 30', 29° 00', 30° 00', 32° 00', 34° 00', 34° 30', 35° 30'). Each cell contains numerical data representing astronomical coordinates.

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 63° to 180°.

Lat. 63°

Lat. 64°

Lat. 65°

Lat. 66°

Lat. 63°

H.A.	36° 00'		37° 00'		38° 30'		40° 00'		42° 00'		42° 30'		43° 00'		45° 00'		H.A.		
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.			
00	63 00.0	1.001	180.0	64 00.0	1.001	180.0	65 30.0	1.001	180.0	67 00.0	1.001	180.0	69 00.0	1.001	180.0	70 00.0	1.001	180.0	00
1	62 59.6	1.002	178.2	63 59.6	1.002	178.2	65 29.6	1.002	178.1	66 59.5	1.002	177.9	68 59.5	1.002	177.9	69 59.5	1.002	177.9	1
2	62 58.3	1.004	176.4	63 58.3	1.004	176.4	65 28.2	1.004	176.2	66 58.1	1.004	176.1	68 58.0	1.004	175.9	69 58.0	1.004	175.9	2
3	62 56.2	1.006	174.5	63 56.2	1.006	174.5	65 26.0	1.006	174.3	66 55.8	1.006	174.1	68 55.5	1.006	173.8	69 55.4	1.006	173.7	3
4	62 53.2	1.008	172.9	63 53.1	1.008	172.7	65 22.8	1.007	172.5	66 52.6	1.007	172.2	68 52.1	1.007	171.7	69 51.9	1.008	171.5	4
05	62 49.4	1.008	171.1	63 49.2	1.008	170.9	65 18.8	1.008	170.7	66 48.4	09 08	170.2	68 47.4	09 09	169.5	69 47.4	09 09	169.4	05
6	62 44.8	09 09	169.4	63 44.5	09 09	169.1	65 13.9	09 10	168.7	66 43.3	09 10	168.3	68 42.4	09 10	167.6	69 41.8	09 11	167.3	6
7	62 39.9	09 10	167.9	63 39.9	09 11	167.3	65 08.2	09 11	166.9	66 37.4	09 11	166.4	68 36.1	09 12	165.8	69 35.4	09 12	165.2	7
8	62 33.1	09 12	165.9	63 32.6	09 12	165.6	65 01.6	09 12	165.0	66 30.5	09 13	164.5	68 28.9	09 14	163.6	69 32.9	09 14	163.1	8
9	62 26.1	09 13	164.1	63 25.4	09 13	163.8	64 54.1	09 14	163.2	66 22.8	09 14	162.6	68 20.7	09 15	161.6	69 29.6	09 15	161.1	9
10	62 18.2	09 14	162.4	63 17.3	09 15	162.0	64 45.9	09 15	161.4	66 14.2	09 16	160.7	68 11.0	09 17	159.7	69 10.3	09 17	159.1	10
1	62 09.6	09 16	160.7	63 08.5	09 16	160.3	64 36.8	09 16	159.6	66 04.8	09 17	158.9	68 01.8	09 18	157.7	69 00.1	09 18	157.1	1
2	62 00.0	09 17	159.0	62 59.0	09 17	158.6	64 26.9	09 18	157.8	65 54.6	09 18	157.0	68 20.9	09 19	155.8	68 49.9	09 20	155.1	2
3	61 50.1	09 18	157.6	62 48.6	09 18	156.8	64 16.2	09 19	156.1	65 43.6	09 20	155.2	68 08.4	09 21	153.9	68 37.2	09 21	153.2	3
4	61 39.2	09 19	155.7	62 37.6	09 20	155.2	64 04.8	09 20	154.3	65 31.8	09 21	153.4	67 27.1	09 22	152.0	67 55.8	09 22	151.7	4
15	61 27.7	09 20	154.0	62 25.8	09 21	153.5	63 52.6	09 21	152.6	65 19.2	09 22	151.7	67 14.0	09 23	150.2	67 42.5	09 23	149.8	15
1	61 15.4	09 22	152.4	62 13.2	09 22	151.8	63 39.8	09 23	150.9	65 05.9	09 23	149.9	67 00.1	09 24	148.4	67 28.4	09 24	148.0	1
2	61 02.4	09 23	150.8	62 00.0	09 23	150.2	63 26.2	09 24	149.2	64 51.9	09 25	148.2	66 45.4	09 26	146.6	67 13.6	09 26	146.2	2
3	60 48.8	09 24	149.2	61 46.1	09 24	148.6	63 11.9	09 25	147.6	64 37.2	09 26	146.5	66 30.1	09 27	144.8	66 58.1	09 27	144.4	3
4	60 34.5	09 25	147.6	61 31.6	09 25	146.9	62 57.0	09 26	145.9	64 21.8	09 27	144.8	66 14.9	09 28	143.3	66 41.9	09 28	142.6	4
20	60 19.6	09 26	146.0	61 16.4	09 26	145.4	62 41.4	09 27	144.3	64 05.8	09 28	143.1	65 57.4	09 29	141.4	66 25.1	09 29	140.9	20
1	60 04.0	09 27	144.5	61 00.7	09 27	143.8	62 25.2	09 28	142.7	63 49.1	09 29	141.5	65 40.1	09 30	139.7	66 07.6	09 30	139.2	1
2	59 47.9	09 28	143.0	60 44.3	09 28	142.3	62 08.4	09 29	141.1	63 31.9	09 30	139.9	65 22.2	09 31	138.1	65 49.5	09 31	137.6	2
3	59 31.2	09 29	141.5	60 27.3	09 29	140.7	61 51.0	09 30	139.6	63 14.1	09 31	138.3	65 03.7	09 32	136.5	65 30.9	09 32	136.0	3
4	59 14.0	09 30	140.0	60 09.8	09 30	139.2	61 33.1	09 31	138.1	62 55.7	09 32	136.8	64 44.7	09 33	134.9	65 11.6	09 33	134.4	4
25	58 56.2	09 30	138.5	59 51.8	09 31	137.8	61 14.6	09 32	136.6	62 36.8	09 33	135.3	64 25.1	09 34	133.9	65 41.9	09 34	132.8	25
6	58 37.9	09 31	137.1	59 33.2	09 32	136.3	60 55.6	09 32	135.1	62 17.4	09 33	133.8	64 05.0	09 34	131.8	64 31.7	09 34	131.3	6
7	58 19.1	09 32	135.6	59 14.1	09 33	134.9	60 36.2	09 33	133.6	61 57.5	09 34	132.3	63 44.5	09 35	130.3	64 11.0	09 35	129.8	7
8	57 59.8	09 33	134.2	58 54.6	09 33	133.4	60 16.2	09 34	132.2	61 37.1	09 35	130.8	63 23.5	09 36	128.8	63 49.8	09 36	128.3	8
9	57 40.0	09 34	132.8	58 34.6	09 34	132.0	59 55.8	09 35	130.8	61 16.2	09 36	129.4	63 02.1	09 37	127.4	63 28.2	09 37	126.8	9
30	57 19.8	09 34	131.5	58 14.1	09 35	130.7	59 35.0	09 35	129.4	60 55.0	09 36	128.0	62 40.2	09 37	126.0	63 06.2	09 37	125.4	30
1	56 59.2	09 36	130.1	57 53.3	09 36	129.3	59 13.7	09 36	128.0	60 33.3	09 37	126.6	62 18.0	09 38	124.6	62 43.8	09 38	124.0	1
2	56 38.2	09 36	128.8	57 32.0	09 36	128.0	58 52.0	09 37	126.7	60 11.3	09 38	125.3	61 55.4	09 38	123.2	62 21.1	09 39	122.7	2
3	56 16.8	09 36	127.5	57 10.3	09 37	126.6	58 30.0	09 37	125.3	59 48.8	09 38	123.9	61 32.4	09 39	121.9	61 58.0	09 39	121.3	3
4	55 54.9	09 37	126.2	56 48.3	09 37	125.3	58 07.6	09 38	124.2	59 26.1	09 38	122.6	61 09.1	09 39	120.5	61 34.6	09 40	120.0	4
35	55 32.8	09 38	124.9	56 25.9	09 38	124.1	57 44.9	09 38	122.7	59 03.0	09 39	121.3	60 45.5	09 40	119.2	61 10.8	09 40	118.7	35
6	55 10.3	09 38	123.6	56 03.1	09 38	122.8	57 21.8	09 39	121.5	58 39.5	09 40	120.0	60 21.6	09 40	118.0	60 46.8	09 41	117.4	6
7	54 47.4	09 39	122.4	55 40.1	09 39	121.5	56 58.4	09 39	120.2	58 15.8	09 40	118.8	59 57.4	09 41	116.7	60 22.4	09 41	116.2	7
8	54 24.3	09 39	121.2	55 16.7	09 39	120.3	56 34.7	09 40	119.0	57 51.8	09 40	117.6	59 32.9	09 41	115.5	59 57.9	09 41	114.9	8
9	54 00.8	09 40	119.9	54 53.1	09 40	119.1	56 10.7	09 40	117.8	57 27.5	09 41	116.3	59 08.2	09 42	114.3	59 33.1	09 42	113.7	9
40	53 37.1	09 40	118.8	54 29.1	09 40	117.9	55 46.5	09 41	116.6	57 03.0	09 41	115.1	58 43.3	09 42	113.1	59 08.0	09 42	112.5	40
1	53 13.1	09 40	117.6	54 04.9	09 41	116.7	55 22.0	09 41	115.4	56 38.2	09 42	114.0	58 18.1	09 42	111.9	58 42.7	09 42	111.3	1
2	52 48.8	09 41	116.4	53 40.5	09 41	115.6	54 57.3	09 42	114.2	56 13.2	09 42	112.8	57 52.7	09 43	110.7	58 17.3	09 43	110.2	2
3	52 24.3	09 41	115.3	53 15.8	09 42	114.4	54 32.4	09 42	113.1	55 48.0	09 43	111.6	57 27.1	09 43	109.6	57 51.6	09 43	109.1	3
4	51 59.5	09 42	114.1	52 50.9	09 42	113.3	54 07.2	09 42	111.9	55 22.6	09 43	110.5	57 01.1	09 43	108.5	57 25.8	09 43	107.9	4
45	51 34.5	09 42	113.0	52 25.7	09 42	112.2	53 41.8	09 43	110.8	54 57.0	09 43	109.4	56 35.5	09 43	107.4	56 59.8	09 44	106.8	45
6	51 09.4	09 42	111.9	52 00.4	09 43	111.0	53 16.3	09 43	109.7	54 31.2	09 43	108.3	56 09.4	09 44	106.3	56 33.6	09 44	105.8	6
7	50 44.0	09 43	110.0	51 34.9	09 43	110.0	52 50.5	09 43	108.6	54 05.2	09 43	107.2	55 42.2	09 44	105.2	56 07.2	09 44	104.7	7
8	50 18.4	09 43	109.7	51 09.2	09 43	108.9	52 24.6	09 43	107.6	53 39.1	09 44	106.2	55 16.8	09 44	104.2	55 40.9	09 44	103.6	8
9	49 52.7	09 43	108.6	50 43.4	09 43	107.8	51 58.6	09 44	106.5	53 12.9	09 44	105.1	54 50.4	09 44	103.1	55 14.4	09 44	102.6	9
50	49 26.8	09 44	107.6	50 17.3	09 44	106.8	51 32.4	09 44	105.4	52 46.5	09 44	104.1	54 23.8	09 44	102.1	54 47.8	09 45	101.6	50
1	49 00.8	09 44	106.5	49 51.2	09 44	105.7	51 06.1	09 44	104.4	52 20.1	09 44	103.0	53 57.1	09 45	101.1	54 21.0	09 45	100.5	1
2	48 34.6	09 44	105.5	49 24.9	09 44	104.7	50 39.7	09 44	103.4	51 53.5	09 44	102.0	53 30.3	09 45	100.1	53 54.2	09 45	99.5	2
3	48 08.3	09 44	104.5	48 58.5	09 44	103.7	50 13.1	09 44	102.4	51 26.8	09 45	101.0	53 03.5	09 45	98.1	53 27.3	09 45	98.6	3
4	47 41.9	09 44	103.5	48 32.0	09 44	102.7	49 46.4	09 45	101.4	51 00.0	09 45	100.0	52 36.5	09 45	98.1	53 00.4	09 45	97.6	4
55	47 15.3	09 44	102.5	48 05.3	09 45	101.7	49 19.7	09 45	100.4	50 33.1	09 45	99.0	52 09.5	09 45	97.1	52 33.3	09 45	96.6	55
6	46 48.7	09 45	101.5	47 38.6	09 45														

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00'		37° 00'		38° 30'		40° 00'		42° 00'		42° 30'		43° 00'		45° 00'		H.A.							
	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.								
91	31 09.1	85 43	70.9	31 59.9	84 43	70.3	33 15.7	84 42	68.4	34 31.1	83 42	68.4	36 10.7	83 42	66.7	36 35.5	82 42	66.3	38 38.4	81 41	64.8	91		
2	30 43.4	85 43	70.1	31 34.3	84 42	69.5	32 50.3	84 42	68.6	34 05.8	84 42	67.6	35 45.7	83 41	66.2	36 10.6	83 41	65.9	36 35.4	83 41	65.5	38 13.9	82 41	64.1
3	30 17.9	85 42	69.3	31 08.9	84 42	68.7	32 25.0	84 42	67.8	33 40.7	84 42	66.8	35 20.9	83 41	65.5	35 45.8	83 41	65.1	36 10.6	83 41	64.8	37 49.4	82 40	63.4
4	29 52.5	85 42	68.5	30 43.5	84 42	67.9	31 59.8	84 42	67.0	33 15.7	84 41	66.1	34 56.2	83 41	64.7	35 21.2	83 41	64.4	35 46.1	83 41	64.0	37 25.2	82 40	62.6
95	29 27.2	85 42	67.8	30 18.4	85 42	67.2	31 34.8	85 41	66.2	32 50.9	84 41	65.3	34 31.6	84 41	64.0	34 56.7	83 41	63.6	35 21.7	83 40	63.3	37 01.0	82 40	61.9
6	29 02.0	86 42	67.0	29 53.3	86 41	66.4	31 10.0	85 41	65.5	32 26.2	84 41	64.5	34 07.2	84 40	63.2	34 32.3	84 40	62.9	34 57.4	83 40	62.6	36 37.1	83 40	61.2
7	28 37.0	86 41	66.2	29 28.5	86 41	65.6	30 45.3	85 41	64.7	32 01.7	85 41	63.7	33 43.0	84 40	62.5	34 08.2	84 40	62.1	34 33.3	84 40	61.8	36 13.3	83 39	60.5
8	28 12.2	86 41	65.4	29 03.7	86 41	64.8	30 20.7	85 41	63.9	31 37.4	85 40	63.0	33 18.9	84 40	61.7	33 44.2	84 40	61.4	34 09.4	84 40	61.1	35 49.7	83 39	59.7
9	27 47.5	86 41	64.6	28 39.2	86 41	64.0	29 56.4	86 40	63.1	31 13.2	85 40	62.2	32 55.0	85 40	61.0	33 20.4	84 39	60.7	33 45.6	84 39	60.3	35 26.3	83 39	59.0
100	27 23.0	86 41	63.8	28 14.8	86 40	63.2	29 32.2	86 40	62.4	30 49.2	85 40	61.5	32 31.3	85 39	60.2	32 56.7	85 39	59.9	33 22.1	84 39	59.6	35 03.0	84 38	58.3
1	26 58.6	87 40	63.0	27 50.5	86 40	62.4	29 08.1	86 40	61.6	30 25.3	86 39	60.7	32 07.7	85 39	59.5	32 33.2	85 39	59.2	32 58.7	85 39	58.8	34 39.9	84 38	57.6
2	26 34.5	87 40	62.2	27 26.5	87 40	61.7	28 44.2	86 39	60.8	30 01.7	86 39	59.9	31 44.4	85 39	58.7	32 09.9	85 39	58.4	32 35.4	85 38	58.1	34 17.0	84 38	56.8
3	26 10.4	87 40	61.4	27 02.6	87 40	60.9	28 20.5	86 39	60.0	29 38.2	86 39	59.2	31 21.2	86 38	58.0	31 46.8	85 38	57.7	32 12.4	85 38	57.4	33 54.3	85 38	56.1
4	25 46.6	87 39	60.7	26 38.9	87 39	60.1	27 57.0	87 39	59.3	29 14.9	86 38	58.4	30 58.2	86 38	57.2	31 23.9	86 38	56.9	31 49.6	86 38	56.6	33 31.8	85 37	55.4
105	25 23.0	87 39	59.9	26 15.4	87 39	59.3	27 33.7	87 39	58.5	28 51.8	87 38	57.7	30 35.4	86 38	56.5	31 01.1	86 38	56.2	31 26.9	86 37	55.9	33 09.5	85 37	54.7
6	24 59.5	88 39	59.1	25 52.0	87 39	58.6	27 10.6	87 38	57.7	28 28.9	87 38	56.9	30 12.7	86 37	55.8	30 38.6	86 37	55.5	31 04.4	86 37	55.2	32 47.4	85 37	54.0
7	24 36.2	88 38	58.3	25 28.9	88 38	57.8	26 47.6	87 38	57.0	28 06.1	87 38	56.1	29 50.3	87 37	55.0	30 16.3	86 37	54.7	30 42.2	86 37	54.4	32 25.4	86 36	53.2
8	24 13.1	88 38	57.5	25 05.9	88 38	57.0	26 24.9	88 38	56.2	27 43.6	87 37	55.4	29 28.1	87 37	54.3	29 54.1	87 37	54.0	30 20.1	87 36	53.7	32 03.7	86 36	52.5
9	23 50.2	88 38	56.7	24 43.2	88 38	56.2	26 02.4	88 37	55.4	27 21.3	88 37	54.6	29 06.1	87 36	53.5	29 32.2	87 36	53.2	29 58.3	87 36	53.0	31 42.2	86 36	51.8
110	23 27.6	89 37	56.0	24 20.6	89 37	55.5	25 40.0	89 37	54.7	26 59.2	88 36	53.9	28 44.3	87 36	52.8	29 10.5	87 36	52.5	29 36.6	87 36	52.2	31 20.9	87 35	51.1
1	23 05.1	89 37	55.2	23 58.3	89 37	54.7	25 17.9	88 36	53.9	26 37.3	88 36	53.1	28 22.7	88 36	52.0	28 49.0	88 36	51.8	29 15.2	87 35	51.5	30 59.8	87 35	50.4
2	22 42.8	89 37	54.4	23 36.2	89 36	53.9	24 56.0	89 36	53.2	26 15.6	88 36	52.4	28 01.3	88 36	51.3	28 27.7	88 36	51.0	28 54.0	88 35	50.8	30 39.0	87 34	49.6
3	22 20.8	89 36	53.6	23 14.3	89 36	53.1	24 34.3	89 36	52.4	25 54.1	89 35	51.6	27 40.2	88 35	50.6	28 06.6	88 35	50.3	28 33.0	88 35	50.0	30 18.3	88 34	48.9
4	21 59.0	89 36	52.8	22 52.6	89 36	52.4	24 12.9	89 35	51.6	25 32.9	89 35	50.9	27 19.3	88 34	49.8	27 45.8	88 34	49.6	28 12.3	88 34	49.3	29 57.9	88 34	48.2
115	21 37.4	90 36	52.1	22 31.4	90 35	51.6	23 51.6	89 35	50.9	25 11.9	89 35	50.1	26 58.6	89 34	49.1	27 25.2	89 34	48.8	27 51.7	89 34	48.6	29 37.7	88 33	47.5
6	21 16.0	90 35	51.3	22 09.9	90 35	50.8	23 30.6	90 35	50.1	24 51.1	89 34	49.4	26 38.1	89 34	48.4	27 04.8	89 34	48.1	27 31.4	89 33	47.8	29 17.7	88 33	46.8
7	20 54.9	90 35	50.5	21 48.9	90 35	50.0	23 09.8	90 34	49.3	24 30.6	90 34	48.6	26 17.9	89 33	47.6	26 44.6	89 33	47.4	27 11.3	89 33	47.1	28 58.0	88 32	46.1
8	20 34.0	90 34	49.7	21 28.2	90 34	49.3	22 49.3	90 34	48.6	24 10.2	90 34	47.8	25 57.9	89 33	46.9	26 24.7	89 33	46.6	26 51.5	89 33	46.3	28 38.5	88 32	45.3
9	20 13.3	91 34	48.9	21 07.6	90 34	48.5	22 29.0	90 33	47.8	23 50.2	90 33	47.1	25 38.1	90 32	46.1	26 05.0	90 32	45.9	26 31.9	90 32	45.6	28 19.2	89 32	44.6
120	19 52.9	91 34	48.2	20 47.4	91 33	47.7	22 08.9	91 33	47.0	23 30.3	90 33	46.3	25 18.6	90 32	45.4	25 45.6	90 32	45.2	26 12.6	90 32	44.9	28 00.2	90 31	43.9
1	19 32.7	91 33	47.4	20 27.3	91 33	46.9	21 49.1	91 33	46.3	23 10.8	91 32	45.6	24 59.3	90 32	44.7	25 26.4	90 32	44.4	25 53.5	90 31	44.2	27 41.4	90 31	43.2
2	19 12.8	91 33	46.6	20 07.1	91 33	46.2	21 29.6	91 32	45.5	22 51.4	91 32	44.8	24 40.3	91 31	43.9	25 07.5	91 31	43.7	25 34.6	90 31	43.4	27 22.9	90 30	42.5
3	18 53.1	92 32	45.8	19 48.0	91 32	45.4	21 10.3	91 32	44.7	22 32.4	91 31	44.1	24 21.5	91 31	43.2	24 48.8	91 31	42.9	25 16.0	91 31	42.7	27 04.7	90 30	41.8
4	18 33.7	92 32	45.0	19 28.8	92 32	44.6	20 51.2	92 31	44.0	22 13.5	91 31	43.3	24 03.0	91 30	42.4	24 30.3	91 30	42.2	24 57.6	91 30	42.0	26 46.6	91 30	41.0
125	18 14.6	92 31	44.2	19 09.8	92 31	43.8	20 32.5	92 31	43.2	21 55.0	92 30	42.6	23 44.8	91 30	41.7	24 12.2	91 30	41.5	24 39.6	91 30	41.2	26 28.9	91 29	40.3
6	17 55.7	92 31	43.5	18 51.1	92 31	43.1	20 13.9	92 30	42.4	21 36.7	92 30	41.8	23 26.8	92 30	40.9	23 54.3	92 29	40.7	24 21.7	92 29	40.5	26 11.4	91 29	39.6
7	17 37.1	92 31	42.7	18 32.6	92 30	42.3	19 55.7	92 30	41.7	21 18.7	92 30	41.0	23 09.1	92 29	40.2	23 36.6	92 29	40.0	24 04.2	92 29	39.8	25 54.2	92 28	38.9
8	17 18.8	93 30	41.9	18 14.4	93 30	41.5	19 37.7	93 30	40.9	21 00.9	92 29	40.3	22 51.6	92 29	39.5	23 19.3	92 28	39.2	23 46.9	92 28	39.0	25 37.2	92 28	38.2
9	17 00.7	93 30	41.1	17 56.5	93 29	40.7	19 20.0	93 29	40.1	20 43.4	93 29	39.5	22 34.5	92 28	38.7	23 02.2	92 28	38.5	23 29.9	92 28	38.3	25 20.5	92 27	37.4
130	16 43.0	93 29	40.3	17 38.9	93 29	39.9	19 02.6	93 29	39.4	20 26.2	93 28	38.8	22 17.6	93 28	38.0	22 45.3	93 28	37.8	23 13.1	93 27	37.6	25 04.1	92 27	36.7
1	16 25.5	93 29	39.5	17 21.5	93 28	39.2	18 45.5	93 28	38.6	20 09.3	93 28	38.0	22 00.9	93 27	37.2	22 28.8	93 27	37.0	23 06.7	93 27	36.8	24 47.9	93 26	36.0
2	16 08.3	94 28	38.7	17 04.5	94 28	38.4	18 28.6	93 28	37.8	19 52.7	93 27	37.3	21 44.6	93 27	36.5	22 12.5	93 27	36.3	22 40.5	93 26	36.1	24 32.0	93 26	

Lat. 63°

H.A.	46° 00'		47° 00'		48° 30'		49° 30'		50° 30'		51° 30'		52° 30'		54° 00'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
00	73 00.0	1.001	180.0	74 00.0	1.001	180.0	75 30.0	1.001	180.0	76 30.0	1.001	180.0	77 30.0	1.001	180.0	78 30.0	1.001	180.0	81 00.0	1.001	180.0	00			
1	72 59.4	1.003	177.6	73 59.4	1.003	177.5	75 29.4	1.003	177.4	76 29.3	1.003	177.2	77 29.3	1.003	177.1	78 29.3	1.004	176.9	79 29.2	1.004	176.7	80 59.1	1.004	176.2	1
2	72 57.7	1.005	175.3	73 57.6	1.005	175.1	75 27.5	1.005	174.7	76 27.4	1.005	174.4	77 27.2	1.006	174.1	78 27.0	1.006	173.8	79 26.8	1.007	173.3	80 56.4	1.007	172.5	2
3	72 54.9	1.007	172.9	73 54.7	1.007	172.6	75 24.4	1.007	172.1	76 24.1	1.008	171.7	77 23.7	1.008	171.2	78 23.4	1.009	170.7	79 23.2	1.009	170.0	80 52.0	1.009	168.8	3
4	72 51.0	1.008	170.5	73 50.6	1.009	170.2	75 20.0	1.009	169.5	76 19.5	1.009	169.0	77 18.9	1.009	168.3	78 18.2	1.010	167.6	79 17.4	1.010	166.8	80 45.9	1.010	165.2	4
05	72 46.0	1.009	168.2	73 45.4	1.009	167.7	75 14.4	1.009	166.9	76 13.6	1.009	166.2	77 12.7	1.009	165.5	78 11.7	1.009	164.6	79 10.5	1.009	163.6	80 38.1	1.009	161.6	05
6	72 39.9	1.012	165.9	73 39.1	1.012	165.3	75 07.7	1.012	164.3	76 06.5	1.012	163.6	77 05.3	1.012	162.7	78 03.8	1.012	161.7	79 02.1	1.012	160.5	80 28.8	1.012	158.2	6
7	72 32.7	1.014	163.6	73 31.6	1.014	163.0	74 59.7	1.014	161.8	75 58.2	1.014	160.9	76 56.5	1.014	159.9	77 54.6	1.014	158.8	78 52.3	1.014	157.4	80 17.9	1.014	154.8	7
8	72 24.5	1.015	161.3	73 23.1	1.015	160.6	74 50.7	1.015	159.3	75 48.8	1.015	158.4	76 46.6	1.015	157.2	77 44.1	1.015	155.9	78 41.1	1.015	154.4	80 05.6	1.015	151.6	8
9	72 15.3	1.017	159.1	73 13.6	1.017	158.3	74 40.5	1.017	156.9	75 38.2	1.017	155.8	76 35.5	1.017	154.6	77 32.4	1.017	153.2	78 28.8	1.017	151.5	79 52.0	1.017	148.5	9
10	72 05.1	1.019	156.9	73 03.0	1.019	156.0	74 29.3	1.019	154.5	75 26.5	1.019	153.3	76 23.2	1.019	152.0	77 19.5	1.019	150.5	78 15.2	1.019	148.7	79 37.2	1.019	145.5	10
1	71 53.9	1.020	154.7	72 51.4	1.020	153.8	74 17.1	1.020	152.2	75 13.7	1.020	150.9	76 09.9	1.020	149.5	77 05.6	1.020	147.9	78 00.5	1.020	146.0	79 21.2	1.020	142.6	1
2	71 41.9	1.021	152.6	72 38.9	1.021	151.6	74 03.9	1.021	149.9	75 00.0	1.021	148.6	75 55.6	1.021	147.1	76 50.6	1.021	145.3	77 44.8	1.021	143.4	79 04.2	1.021	139.9	2
3	71 28.9	1.022	150.5	72 25.5	1.022	149.5	73 49.8	1.022	147.6	74 45.3	1.022	146.2	75 40.3	1.022	144.7	76 34.6	1.022	142.9	77 28.0	1.022	140.9	78 46.1	1.022	137.2	3
4	71 15.1	1.023	148.5	72 11.3	1.023	147.4	73 34.8	1.023	145.5	74 29.8	1.023	144.0	75 24.1	1.023	142.4	76 17.7	1.023	140.5	77 10.4	1.023	138.4	78 27.2	1.023	134.7	4
15	71 00.4	1.026	146.5	71 56.2	1.026	145.3	73 18.9	1.026	143.3	74 13.3	1.026	141.8	75 07.1	1.026	140.1	76 00.0	1.026	138.2	77 00.0	1.026	136.1	78 07.4	1.026	132.3	15
6	70 45.0	1.027	144.5	71 40.3	1.027	143.3	73 02.9	1.027	141.2	73 56.1	1.027	139.7	74 49.2	1.027	138.0	75 41.5	1.027	136.0	76 32.6	1.027	133.9	77 46.9	1.027	130.0	6
7	70 28.8	1.028	142.6	71 23.6	1.028	141.3	72 44.8	1.028	139.2	73 38.1	1.028	137.6	74 30.6	1.028	135.9	75 22.2	1.028	133.9	76 12.6	1.028	131.7	77 25.8	1.028	127.9	7
8	70 11.9	1.029	140.7	71 06.2	1.029	139.4	72 26.7	1.029	137.2	73 19.4	1.029	135.6	74 11.3	1.029	133.8	75 02.7	1.029	131.8	75 52.0	1.029	129.6	77 04.0	1.029	125.8	8
9	69 54.3	1.030	138.8	70 48.2	1.030	137.5	72 07.8	1.030	135.3	73 00.0	1.030	133.7	73 51.3	1.030	131.9	74 41.6	1.030	129.8	75 30.7	1.030	127.6	76 41.6	1.030	123.8	9
20	69 36.0	1.031	137.0	70 29.5	1.031	135.7	71 48.4	1.031	133.5	72 40.0	1.031	131.8	73 30.7	1.031	130.0	74 20.4	1.031	127.9	75 08.8	1.031	125.7	76 18.7	1.031	121.8	20
1	69 17.2	1.032	135.3	70 10.1	1.032	133.9	71 28.3	1.032	131.9	72 19.4	1.032	130.0	73 09.6	1.032	128.1	73 58.7	1.032	126.1	74 46.5	1.032	123.8	75 55.3	1.032	120.0	1
2	68 57.7	1.033	133.5	69 50.2	1.033	132.2	71 07.7	1.033	130.6	72 07.9	1.033	128.2	72 47.9	1.033	126.3	73 36.4	1.033	124.3	74 23.6	1.033	122.0	75 31.5	1.033	118.2	2
3	68 37.7	1.034	131.9	69 29.8	1.034	130.5	70 46.5	1.034	128.2	71 36.6	1.034	126.5	72 25.7	1.034	124.6	73 13.6	1.034	122.6	74 00.3	1.034	120.3	75 07.3	1.034	116.6	3
4	68 17.1	1.035	130.2	69 08.8	1.035	128.8	70 24.8	1.035	126.5	71 14.5	1.035	124.8	72 03.0	1.035	122.9	72 50.5	1.035	120.9	73 36.6	1.035	118.7	74 42.8	1.035	114.9	4
25	67 56.1	1.036	128.6	68 47.3	1.036	127.2	70 02.7	1.036	124.9	70 51.9	1.036	123.1	71 40.0	1.036	121.3	72 26.9	1.036	119.3	73 12.5	1.036	117.1	74 17.9	1.036	113.4	25
6	67 34.6	1.037	127.0	68 25.4	1.037	125.6	69 40.2	1.037	123.3	70 28.9	1.037	121.6	71 16.5	1.037	119.7	72 03.0	1.037	117.7	72 48.1	1.037	115.5	73 52.8	1.037	111.9	6
7	67 12.6	1.038	125.5	68 03.0	1.038	124.1	69 17.2	1.038	121.7	70 05.5	1.038	120.0	70 52.7	1.038	118.2	71 38.7	1.038	116.2	72 23.3	1.038	114.0	73 27.4	1.038	110.4	7
8	66 50.2	1.039	124.0	67 40.3	1.039	122.6	68 53.8	1.039	120.2	69 41.7	1.039	118.5	70 28.5	1.039	116.7	71 14.1	1.039	114.7	72 00.3	1.039	112.6	73 07.1	1.039	109.0	8
9	66 27.4	1.040	122.5	67 17.1	1.040	121.1	68 30.1	1.040	118.8	69 17.6	1.040	117.1	70 04.0	1.040	115.2	70 49.2	1.040	113.2	71 33.0	1.040	111.2	72 42.8	1.040	107.7	9
30	66 04.3	1.041	121.1	66 53.6	1.041	119.7	68 06.1	1.041	117.3	68 53.2	1.041	115.6	69 39.2	1.041	113.8	70 24.0	1.041	111.9	71 07.5	1.041	109.8	72 09.8	1.041	106.4	30
1	65 40.8	1.042	119.7	66 29.8	1.042	118.3	67 41.7	1.042	115.9	68 28.5	1.042	114.3	69 14.2	1.042	112.5	69 58.6	1.042	110.5	70 41.8	1.042	108.5	71 43.6	1.042	105.1	1
2	65 17.0	1.043	118.3	66 05.7	1.043	116.9	67 17.1	1.043	114.6	68 03.5	1.043	112.9	68 48.9	1.043	111.1	69 33.0	1.043	109.2	70 15.9	1.043	107.2	71 17.2	1.043	103.9	2
3	64 52.8	1.044	117.0	65 41.2	1.044	115.6	66 52.2	1.044	113.3	67 38.3	1.044	111.6	68 23.4	1.044	109.8	69 07.2	1.044	108.0	69 49.7	1.044	105.9	70 50.7	1.044	102.7	3
4	64 28.4	1.045	115.7	65 16.5	1.045	114.2	66 27.1	1.045	112.0	67 12.9	1.045	110.3	67 57.6	1.045	108.6	68 41.2	1.045	106.7	69 23.5	1.045	104.7	70 24.1	1.045	101.5	4
35	64 03.7	1.046	114.4	64 51.6	1.046	113.0	66 01.7	1.046	110.7	66 47.2	1.046	109.1	67 31.7	1.046	107.3	68 15.0	1.046	105.5	68 57.1	1.046	103.5	69 57.4	1.046	100.4	35
6	63 38.8	1.047	113.1	64 26.4	1.047	111.7	65 36.1	1.047	109.5	66 21.4	1.047	107.8	67 05.6	1.047	106.1	67 48.7	1.047	104.3	68 30.5	1.047	102.4	69 30.5	1.047	99.3	6
7	63 13.0	1.048	111.9	64 00.9	1.048	110.5	65 10.3	1.048	108.2	65 55.4	1.048	106.5	66 39.4	1.048	104.8	67 22.3	1.048	103.2	68 03.9	1.048	101.3	69 03.6	1.048	98.2	7
8	62 48.3	1.049	110.6	63 35.3	1.049	109.3	64 44.4	1.049	107.1	65 29.2	1.049	105.7	66 13.0	1.049	103.8	66 55.7	1.049	102.0	66 37.1	1.049	100.2	68 36.6	1.049	97.8	8
9	62 22.7	1.050	109.5	63 09.5	1.050	108.1	64 18.2	1.050	105.9	65 02.9	1.050	104.3	65 46.5	1.050	102.7	66 29.0	1.050	100.9	66 10.2	1.050					

DECLINATION SAME NAME AS LATITUDE

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 63° to 180°.

Lat. 63°

Lat. 64°

Lat. 65°

La 66

L 6

180

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30'		55° 00'		56° 00'		56° 30'		57° 00'		57° 30'		58° 00'		59° 30'		H.A.								
	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt	Alt.	Δd Δt									
00	81 30.0	1.0 02	180.0	82 00.0	1.0 02	180.0	83 00.0	1.0 02	180.0	83 30.0	1.0 02	180.0	84 00.0	1.0 02	180.0	84 30.0	1.0 02	180.0	86 00.0	1.0 03	180.0	86 30.0	1.0 03	180.0	00
1	81 29.1	1.0 05	176.1	81 59.0	1.0 05	175.9	82 58.9	1.0 05	175.4	83 28.8	1.0 06	175.1	83 58.8	1.0 06	174.8	84 28.7	1.0 07	174.4	85 58.3	09 09	172.7	86 28.0	09 10	171.7	1
2	81 26.3	09 08	172.2	81 56.1	09 08	171.8	82 55.7	09 09	170.9	83 25.4	09 10	170.3	83 55.1	09 10	169.7	84 24.7	09 11	168.9	85 54.1	08 14	165.5	86 22.2	07 16	163.8	2
3	81 21.7	09 11	168.3	81 51.3	09 11	167.8	82 50.3	09 12	166.4	83 19.7	09 13	165.6	83 49.0	09 14	164.7	84 18.2	09 15	163.5	85 44.7	06 19	158.7	86 12.9	05 21	156.3	3
4	81 15.3	08 14	164.5	81 44.6	08 14	163.8	82 42.9	07 16	162.1	83 11.9	06 16	161.0	83 40.7	06 17	159.8	84 09.3	05 18	158.4	85 33.4	01 23	152.4	86 00.5	02 25	149.4	4
05	81 07.2	07 16	160.9	81 36.1	06 17	160.0	82 33.6	05 19	157.9	83 02.0	05 20	156.6	83 30.3	04 21	155.2	83 58.2	03 22	153.5	85 19.6	07 27	146.6	85 45.4	08 29	143.3	05
6	80 57.4	06 19	157.3	81 26.0	06 20	156.3	82 22.4	05 21	153.9	82 50.3	05 22	152.4	83 17.9	05 24	150.8	83 45.1	04 25	148.9	85 03.5	03 30	141.3	85 28.0	02 32	137.8	6
7	80 46.2	04 21	153.8	81 14.2	03 22	152.7	82 09.6	01 24	150.0	82 36.9	02 25	148.4	83 03.8	02 26	146.7	83 30.2	01 27	144.6	84 45.6	00 32	136.6	85 08.9	00 34	133.0	7
8	80 33.4	02 23	150.5	81 01.0	01 24	149.3	81 55.3	00 26	146.4	82 21.9	01 27	144.7	82 48.0	00 28	142.8	83 13.6	00 29	140.6	84 26.2	00 34	132.3	84 48.3	00 36	128.7	8
9	80 19.4	01 26	147.3	80 46.4	00 26	146.0	81 39.5	00 28	142.9	82 05.4	00 29	141.1	82 30.0	00 31	139.2	82 55.7	00 32	136.9	84 05.4	00 38	128.5	84 26.5	00 38	124.9	9
10	80 04.0	00 27	144.2	80 30.6	00 28	142.8	81 22.5	00 30	139.7	81 47.7	00 31	137.8	82 12.4	00 33	135.8	82 36.5	00 34	133.5	83 43.6	00 38	125.1	84 03.7	00 39	121.6	10
1	79 47.5	00 29	141.3	80 13.5	00 30	139.9	81 04.3	00 32	136.6	81 28.9	00 33	134.7	81 52.9	00 34	132.6	82 16.2	00 35	130.3	83 20.9	00 39	122.0	83 40.1	00 40	118.6	1
2	79 30.0	00 31	138.5	79 55.5	00 32	137.0	80 45.0	00 34	133.7	81 09.0	00 35	131.8	81 32.4	00 36	129.6	81 55.0	00 37	127.4	82 57.4	00 40	119.2	83 15.9	00 41	115.9	2
3	79 11.5	00 34	135.8	79 36.4	00 35	134.3	80 24.9	00 37	130.9	80 48.3	00 38	129.0	81 11.0	00 39	126.9	81 33.0	00 40	124.7	82 33.3	00 41	116.6	82 51.2	00 42	113.4	3
4	78 52.1	00 36	133.3	79 16.5	00 37	131.8	80 03.9	00 39	128.4	80 26.7	00 40	126.4	80 48.9	00 41	124.4	81 10.3	00 42	122.1	82 08.7	00 42	114.2	82 26.0	00 43	111.2	4
15	78 31.9	01 35	130.9	78 55.8	01 36	129.4	79 42.2	01 37	125.9	80 04.5	01 38	124.0	80 26.1	01 39	122.0	80 46.9	01 40	119.8	81 43.7	01 42	112.1	82 00.4	01 43	109.2	15
6	78 10.9	01 36	128.6	78 34.4	01 37	127.1	79 19.8	01 38	123.6	79 41.6	01 39	121.8	80 02.7	01 40	119.7	80 23.0	01 41	117.6	81 18.3	01 43	110.1	81 34.5	01 44	107.3	6
7	77 49.3	01 37	126.4	78 12.4	01 38	124.9	78 56.9	01 39	121.5	79 18.2	01 40	119.6	79 38.8	01 41	117.6	79 58.6	01 41	115.5	80 52.6	01 43	108.3	81 08.4	01 44	105.5	7
8	77 27.1	01 38	124.3	77 49.8	01 39	122.8	78 33.4	01 40	119.4	78 54.3	01 41	117.6	79 14.4	01 42	115.6	79 33.8	01 42	113.6	80 26.6	01 44	106.6	80 42.0	01 44	103.9	8
9	77 04.3	01 39	122.3	77 26.6	01 39	120.8	78 09.4	01 41	117.5	78 29.9	01 41	115.7	78 49.7	01 42	113.8	79 08.7	01 42	111.7	80 00.3	01 44	104.9	80 15.5	01 44	102.4	9
20	76 41.1	02 40	120.4	77 03.0	02 40	118.9	77 45.1	02 41	115.6	78 05.2	02 42	113.9	78 24.6	02 42	112.0	78 43.2	02 43	110.0	79 33.9	02 44	103.4	79 48.8	02 45	101.0	20
1	76 17.4	02 41	118.6	76 38.9	02 41	117.1	77 20.3	02 42	113.9	77 40.1	02 42	112.2	77 59.2	02 43	110.3	78 17.5	02 43	108.4	79 07.4	02 45	102.7	79 22.0	02 45	99.7	1
2	75 53.3	02 41	116.9	76 14.5	02 41	115.4	75 55.3	02 42	112.2	77 14.7	02 43	110.5	77 33.5	02 43	108.7	77 51.6	02 44	106.9	78 40.7	02 45	100.7	78 55.1	02 45	98.4	2
3	75 28.8	02 41	115.2	75 49.7	02 42	113.7	76 29.9	02 43	110.6	76 49.1	02 43	109.0	77 07.6	02 44	107.2	77 25.4	02 44	105.4	78 13.8	02 45	99.4	78 28.2	02 45	97.2	3
4	75 04.0	02 42	113.6	75 24.6	02 42	112.2	76 04.3	02 43	109.1	76 23.2	02 43	107.5	76 41.5	02 44	105.8	76 59.0	02 44	104.0	77 46.9	02 45	98.2	77 46.9	02 45	96.1	4
25	74 38.9	02 42	112.0	74 59.3	02 43	110.6	75 38.5	02 43	107.6	75 57.2	02 44	106.1	76 15.2	02 44	104.4	76 32.5	02 44	102.7	77 19.9	02 45	97.0	77 34.0	02 45	95.0	25
6	74 13.5	02 43	110.6	74 33.7	02 43	109.2	75 12.4	02 44	106.2	75 30.9	02 44	104.7	75 48.7	02 44	103.1	76 05.9	02 45	101.4	76 52.8	02 45	95.9	77 06.8	02 45	93.9	6
7	73 47.8	02 43	109.1	74 07.8	02 43	107.8	74 46.2	02 44	104.9	75 04.5	02 44	103.4	75 22.1	02 45	101.8	75 39.1	02 45	100.1	76 25.7	02 45	94.8	76 39.6	02 45	92.9	7
8	73 22.0	02 43	107.7	73 41.8	02 44	106.4	74 19.8	02 44	103.6	74 37.9	02 44	102.1	74 55.4	02 45	100.6	75 12.3	02 45	99.0	75 58.6	02 45	93.8	76 12.4	02 45	92.0	8
9	72 56.0	02 44	106.4	73 15.6	02 44	105.1	73 53.2	02 44	102.4	74 11.2	02 45	100.9	74 28.6	02 45	99.4	74 45.3	02 45	97.8	75 31.4	02 45	92.8	75 45.2	02 45	91.0	9
30	72 29.8	02 44	105.1	72 49.2	02 44	103.8	73 26.6	02 45	101.2	73 44.4	02 45	99.7	74 01.7	02 45	98.3	74 18.3	02 45	96.7	75 04.2	02 45	91.8	75 18.0	02 45	90.1	30
1	72 03.4	02 44	103.9	72 22.7	02 44	102.6	72 59.8	02 45	100.0	73 17.5	02 45	98.6	73 34.7	02 45	97.2	73 51.2	02 45	95.7	74 36.9	02 45	90.9	74 50.7	02 45	89.2	1
2	71 36.9	02 44	102.7	71 56.0	02 45	101.4	72 32.9	02 45	98.9	72 50.6	02 45	97.5	73 07.6	02 45	96.1	73 24.1	02 45	94.6	74 09.7	02 45	90.0	74 23.5	02 45	88.4	2
3	71 10.2	02 45	101.5	71 29.3	02 45	100.3	72 05.9	02 45	97.8	72 23.5	02 45	96.4	72 40.5	02 45	95.1	72 56.9	02 45	93.6	73 42.4	02 45	89.1	73 56.3	02 45	87.5	3
4	70 43.5	02 45	100.4	71 02.4	02 45	99.2	71 38.9	02 45	96.7	71 56.4	02 45	95.4	72 13.4	02 45	94.0	72 29.7	02 45	92.7	73 15.2	02 45	88.3	73 29.1	02 45	86.7	4
35	70 16.7	02 45	99.2	70 35.5	02 45	98.1	71 11.8	02 45	95.7	71 29.3	02 45	94.4	71 46.2	02 45	93.1	72 02.5	02 45	91.7	72 48.0	02 45	87.4	73 01.9	02 45	85.9	35
6	69 49.7	02 45	98.2	70 08.5	02 45	97.0	70 44.7	02 45	94.6	71 02.1	02 45	93.4	71 19.0	02 45	92.1	71 35.3	02 45	90.8	72 20.8	02 45	86.6	72 34.7	02 45	85.1	6
7	69 22.7	02 45	97.1	69 41.4	02 45	96.0	70 17.5	02 45	93.7	70 34.9	02 45	92.4	70 51.7	02 45	91.2	71 08.0	02 45	89.9	71 53.5	02 45	85.8	72 07.6	02 45	84.4	7
8	68 55.7	02 45	96.1	69 14.3	02 45	95.0	69 50.4	02 45	92.7	70 07.7	02 45	91.5	70 24.5	02 45	90.3	70 40.8	02 45	89.0	71 26.6	02 45	85.0	71 40.5	02 45	83.6	8
9	68 28.6	02 45	95.1	68 47.2	02 45	94.0	69 23.1	02 45	91.8	69 40.4	02 45	90.6	69 57.3	02 45	89.4	70 13.6	02 45	88.2	70 59.3	02 45	84.3	71 13.5	02 45	82.9	

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30'		55° 00'		56° 00'		56° 30'		57° 00'		57° 30'		59° 00'		59° 30'		H.A.
	Alt.	Az.															
91	46 07.1	76 38	46 29.8	76 38	47 14.6	74 37	47 36.9	74 37	47 59.0	73 37	48 21.0	73 37	49 26.1	72 36	49 47.5	71 36	91
2	45 44.4	76 38	46 07.1	76 37	46 52.3	75 37	47 14.6	74 37	47 36.9	74 37	47 59.0	74 36	48 21.0	73 36	48 42.5	72 36	2
3	45 21.8	76 37	45 44.7	76 37	46 30.1	75 37	46 52.6	75 36	47 15.0	74 36	47 37.3	74 36	48 04.6	73 36	48 29.1	72 35	3
4	44 59.4	77 37	45 22.4	76 37	46 08.1	76 36	46 30.7	75 36	46 53.2	75 36	47 15.7	74 36	48 22.1	73 35	48 44.0	72 35	4
95	44 37.2	77 37	45 00.3	77 37	45 46.2	76 36	46 09.0	76 36	46 31.7	75 36	46 54.4	74 36	47 17.1	73 35	47 38.1	72 35	95
6	44 15.2	76 36	44 38.4	77 36	45 24.6	77 36	45 47.5	76 36	46 10.3	75 36	46 33.0	74 36	46 55.9	73 35	47 17.1	72 34	6
7	43 53.3	76 36	44 16.7	76 36	45 03.1	77 36	45 26.1	77 36	45 49.1	76 35	46 11.9	75 35	46 34.7	74 35	46 57.1	73 34	7
8	43 31.6	76 36	43 55.1	76 36	44 41.8	77 35	45 05.0	77 35	45 28.0	76 35	45 50.8	75 35	46 13.7	74 34	46 36.1	73 34	8
9	43 10.1	79 36	43 33.7	79 35	44 20.6	78 35	44 44.0	78 35	45 07.2	77 34	45 30.3	77 34	45 53.3	76 34	46 16.3	75 34	9
100	42 48.8	79 35	43 12.5	79 35	43 38.9	79 34	44 23.1	78 34	44 46.5	78 34	45 09.8	77 34	45 33.2	76 34	45 56.6	75 34	100
1	42 27.6	80 35	42 51.5	80 35	43 38.9	79 34	44 23.1	78 34	44 46.5	78 34	45 09.8	77 34	45 33.2	76 34	45 56.6	75 34	1
2	42 06.7	80 35	42 30.7	80 34	43 18.4	80 34	43 42.1	79 34	44 05.7	79 34	44 29.2	78 33	44 52.2	77 33	45 25.2	76 33	2
3	41 45.9	81 34	42 10.0	80 34	43 18.4	80 34	43 42.1	79 34	44 05.7	79 34	44 29.2	78 33	44 52.2	77 33	45 25.2	76 33	3
4	41 25.3	81 34	41 49.6	81 34	42 37.8	80 33	43 01.8	80 33	43 25.7	80 33	43 49.5	79 33	44 13.3	78 33	44 36.3	77 33	4
105	41 05.0	81 34	41 29.3	81 33	42 17.8	81 33	42 41.9	80 33	43 06.0	80 33	43 29.9	80 32	43 53.0	79 32	44 26.0	78 32	105
6	40 44.8	82 33	41 09.3	81 33	41 58.0	81 33	42 22.3	81 32	42 46.4	80 32	43 10.5	80 32	43 33.6	79 32	44 06.6	78 32	6
7	40 24.8	82 33	40 49.4	82 33	41 38.4	81 32	42 02.8	81 32	42 27.1	81 32	42 51.3	81 32	43 24.8	80 31	43 58.3	79 31	7
8	40 05.1	82 33	40 29.8	82 32	41 19.0	82 32	41 43.5	82 32	42 08.0	81 32	42 31.5	81 31	43 04.9	80 31	43 27.9	79 31	8
9	39 45.5	83 32	40 10.4	83 32	40 59.9	82 32	41 24.5	82 31	41 49.1	82 31	42 13.5	81 31	42 37.5	80 31	43 11.9	79 31	9
110	39 26.2	83 32	39 51.1	83 32	40 40.9	83 31	41 05.6	82 31	41 30.3	82 31	41 55.0	82 31	42 20.0	81 30	42 45.0	80 30	110
1	39 07.0	84 32	39 32.1	84 31	40 22.1	83 31	40 47.0	83 31	41 11.8	83 30	41 36.6	82 30	42 11.1	81 30	42 36.1	80 30	1
2	38 48.1	84 31	39 13.3	84 31	40 03.5	84 31	40 28.6	83 30	40 53.5	83 30	41 18.4	83 30	41 43.3	82 30	42 18.3	81 30	2
3	38 29.4	85 31	38 54.7	84 31	39 45.2	84 30	40 10.3	84 30	40 35.4	83 30	41 00.4	83 30	41 25.3	82 30	41 50.3	81 30	3
4	38 10.9	85 30	38 36.3	85 30	39 27.1	84 30	39 52.3	84 30	40 17.6	84 29	40 42.7	84 29	41 17.6	83 29	41 42.6	82 29	4
115	37 52.6	85 30	38 18.2	85 30	39 09.2	85 29	39 34.6	85 29	39 59.9	84 29	40 25.2	84 29	40 50.5	83 29	41 15.8	82 29	115
6	37 34.6	86 30	38 00.2	86 30	38 51.5	85 29	39 17.0	85 29	39 42.5	84 29	40 17.9	84 29	40 43.2	83 29	41 18.3	82 29	6
7	37 16.7	86 29	37 42.5	86 29	38 34.0	86 29	38 59.6	86 29	39 25.2	85 28	39 50.8	85 28	40 25.9	84 28	40 51.8	83 28	7
8	36 59.1	86 29	37 25.1	86 29	38 16.8	86 28	38 42.5	86 28	39 08.2	86 28	39 33.9	85 28	39 59.1	84 28	40 34.8	83 28	8
9	36 41.8	87 29	37 07.8	87 28	37 59.7	86 28	38 25.6	86 28	38 51.5	86 28	39 17.2	86 27	39 42.1	85 27	40 17.1	84 27	9
120	36 24.6	87 28	36 50.8	87 28	37 42.9	87 28	38 08.9	87 27	38 34.9	86 27	39 00.8	86 27	39 25.7	85 27	39 50.6	84 27	120
1	36 07.7	88 28	36 34.0	87 28	37 26.4	87 27	37 52.5	87 27	38 18.6	87 27	38 44.6	87 27	39 10.6	86 27	39 36.6	85 27	1
2	35 51.1	88 27	36 17.4	88 27	37 10.1	88 27	37 36.3	87 27	38 02.5	87 26	38 28.5	87 26	38 54.6	86 26	39 20.6	85 26	2
3	35 34.6	88 27	36 01.1	88 27	36 54.0	88 26	37 20.3	88 26	37 46.6	88 26	38 12.8	87 26	38 38.9	86 26	39 04.9	85 26	3
4	35 18.4	89 27	35 45.0	89 26	36 38.1	88 26	37 04.6	88 26	37 31.0	88 26	38 04.7	88 25	38 30.8	87 25	39 01.3	86 25	4
125	35 02.5	89 26	35 29.2	89 26	36 22.5	89 26	36 49.1	89 26	37 15.6	88 26	37 42.1	88 25	38 18.2	87 25	38 44.3	86 25	125
6	34 46.8	89 26	35 13.6	89 26	36 07.1	89 26	36 33.8	89 26	37 00.5	89 26	37 27.1	89 25	38 02.4	88 25	38 28.5	87 25	6
7	34 31.3	90 25	34 58.2	90 25	35 52.0	89 25	36 18.8	89 25	36 45.6	89 24	37 12.3	89 24	37 37.2	88 24	38 12.1	87 24	7
8	34 16.1	90 25	34 43.1	90 25	35 37.1	90 24	36 04.0	90 24	36 30.9	90 24	36 57.7	89 24	37 22.0	88 24	37 46.9	87 24	8
9	34 01.2	90 25	34 28.3	90 24	35 22.4	90 24	35 49.5	90 24	36 16.5	90 24	36 43.4	90 23	37 10.1	89 23	37 37.2	88 23	9
130	33 46.5	91 24	34 13.7	91 24	35 08.1	91 24	35 35.2	91 23	36 02.3	91 23	36 29.4	91 23	36 56.5	90 23	37 23.6	89 23	130
1	33 32.0	91 24	33 59.3	91 23	34 53.9	91 23	35 21.2	91 23	35 48.4	91 23	36 15.0	91 23	36 42.1	90 23	37 08.6	89 23	1
2	33 17.8	91 23	33 45.2	91 23	34 40.0	91 23	35 07.4	91 23	35 34.1	91 22	36 01.0	91 22	36 27.6	90 22	36 53.1	89 22	2
3	33 03.9	92 23	33 31.4	92 23	34 26.4	92 23	34 53.8	92 22	35 21.3	91 22	35 48.0	91 22	36 14.6	91 22	36 41.1	90 22	3
4	32 50.2	92 23	33 17.8	92 22	34 13.0	92 22	34 40.6	92 22	35 08.1	92 22	35 34.6	92 21	36 01.3	91 21	36 27.8	90 21	4
135	32 36.8	92 22	33 04.5	92 22	33 59.9	92 21	34 27.5	92 21	34 55.2	92 21	35 22.7	92 21	35 49.8	91 21	36 16.9	90 21	135
6	32 23.6	93 21	32 51.5	93 21	33 47.0	93 21	34 14.8	93 21	34 42.5	93 21	35 10.2	93 21	35 36.7	92 21	36 03.6	91 21	6
7	32 10.8	93 21	32 38.7	93 21	33 34.4	93 21	34 02.3	93 20	34 30.1	93 20	35 07.9	93 20	35 34.8	92 20	36 01.5	91 20	7
8	31 58.2	93 21	32 26.2	93 20	33 22.1	93 20	33 50.0	93 20	34 17.9	93 20	34 45.8	93 20	35 14.8	92 20	35 41.7	91 20	8
9	31 45.8	94 20	32 13.9	94 20	33 10.0	93 20	33 38.0	93 20	34 06.0	93 19	34 34.0	93 19	35 01.8	92 19	35 28.8	91 19	9
140	31 33.7	94 20	32 01.9	94 20	32 58.2	94 19	33 26.3	94 19	33 54.3	94 19	34 22.5	94 19	34 50.6	93 19	35 19.1	92 19	140
1	31 21.9	94 19	31 50.2	94 19	32 46.7	94 19	33 14.9	94 19	33 43.1	94 18	34 11.2	94 18	34 39.5	93 18	35 07.5	92 18	1
2	31 10.4	95 19	31 38.8	94 19	32 35.4	94 18	33 03.7	94 18	33 32.0	94 18	34 00.2	94 18	34 28.6	93 18	34 57.0	92 18	2
3	30 59.2	95 18	31 27.6	95 18	32 24.4	95 18	32 52.8	95 18	33 21.2	94 18	33 49.5	94 17	34 17.9	93 18	34 46.1	92 18	3
4	30 48.2	95 18	31 17.6	95 18	32 13.7	95 17	32 42.2	95 17	33 10.6	95 17	33 39.0	95 17	34 06.9	94 17	34 35.2	93 17	4
145	30 37.5	95 17	31 06.1	95 17	32 03.3	95 17	32 31.8	95 17	33 00.3	95 17	33 28.8	95 17	34 05.2	94 17	34 32.2	93 17	145
6	30 27.1	96 17	30 55.8	96 17	31 53.1	95 16	32 21.7	96 16	32 50.3	95 16	33 18.9	95 16	33 47.1	94 16	34 14.0	93 16	6
7	30																

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., latitude (60° 00' to 74° 30'), and declination (Alt., Az.). Each latitude/declination pair is associated with a set of four values (e.g., 87 00.0, 1.0, 0.04, 180.0).

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 60° 00' to 175° 00'.

Lat. 63°

Lat. 64

Lat. 65

Lat. 66

Lat. 67

Lat. 68

Lat. 69

Lat. 70

# STAR IDENTIFICATION TABLE

104

ALTITUDE

Lat.  
63°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.																					
00	31	180	35	180	39	180	43	180	47	180	51	180	55	180	59	180	63	180	67	180	71	180	00
4	31	175	35	175	39	175	43	175	47	174	51	174	55	174	59	173	63	173	67	172	71	171	4
8	31	171	35	170	39	170	43	170	47	169	51	168	55	168	59	167	63	166	67	164	70	163	8
12	30	166	34	166	38	165	42	164	46	164	50	163	54	162	58	161	62	159	66	157	70	154	12
16	30	162	34	161	38	160	42	159	46	158	50	157	53	156	57	154	61	152	65	150	69	147	16
20	29	157	33	156	37	155	41	154	45	153	49	152	53	150	57	148	60	146	64	143	68	139	20
24	28	153	32	152	36	150	40	149	44	148	48	146	52	145	55	143	59	140	63	137	67	133	24
28	28	148	31	147	35	146	39	144	43	143	47	141	51	139	54	137	58	134	62	131	65	127	28
32	27	144	30	143	34	141	38	140	42	138	46	136	49	134	53	132	57	129	60	125	64	121	32
36	25	140	29	138	33	137	37	135	41	133	44	131	48	129	52	127	55	124	59	120	62	116	36
40	24	135	28	134	32	132	35	131	39	129	43	127	46	124	50	122	54	119	57	115	60	111	40
44	23	131	27	130	30	128	34	126	38	124	41	122	45	120	49	117	52	114	55	111	59	106	44
48	21	127	25	126	29	124	33	122	36	120	40	118	43	116	47	113	50	110	54	106	57	102	48
52	20	123	24	122	27	120	31	118	35	116	38	114	42	111	45	109	49	106	52	102	55	98	52
56	18	119	22	118	26	116	29	114	33	112	36	110	40	107	43	105	47	101	50	98	53	94	56
60	17	116	20	114	24	112	28	110	31	108	35	106	38	103	42	101	45	98	48	94	51	90	60
64	15	112	19	110	22	108	26	106	29	104	33	102	36	99	40	97	43	94	46	91	50	87	64
68	13	108	17	106	21	104	24	102	28	100	31	98	35	96	38	93	41	90	45	87	48	84	68
72	12	104	15	103	19	101	22	99	26	97	29	94	33	92	36	89	40	87	43	84	46	80	72
76	10	101	13	99	17	97	21	95	24	93	28	91	31	88	34	86	38	83	41	80	44	77	76
80	08	97	12	95	15	93	19	91	22	89	26	87	29	85	33	83	36	80	39	77	43	74	80
84	06	94	10	92	13	90	17	88	20	86	24	84	27	82	31	79	34	77	38	74	41	71	84
88	04	90	08	88	12	86	15	84	19	82	22	80	26	78	29	76	32	73	36	71	39	68	88
92	03	86	06	85	10	83	13	81	17	79	20	77	24	75	27	73	31	70	34	68	37	65	92
96	01	83	04	81	08	79	12	77	15	75	19	73	22	71	26	69	29	67	32	65	36	62	96
100	01	79	03	77	06	76	10	74	13	72	17	70	20	68	24	66	27	64	31	61	34	59	100
104	03	76	01	74	04	72	08	70	12	69	15	67	19	65	22	63	26	61	29	58	33	56	104
108	04	72	01	70	03	69	06	67	10	65	14	63	17	61	21	60	24	58	28	55	31	53	108
112	06	68	03	67	01	65	05	63	08	62	12	60	16	58	19	56	23	54	26	52	30	50	112
116	08	64	04	63	01	62	03	60	07	58	10	57	14	55	18	53	21	51	25	49	28	47	116
120	09	61	06	60	02	58	02	56	05	55	09	53	13	52	16	50	20	48	24	46	27	44	120
124	11	57	07	56	04	54	00	53	04	51	07	50	11	48	15	47	19	45	22	43	26	42	124
128	13	54	09	52	05	51	01	49	02	48	06	46	10	45	14	43	17	42	21	40	25	39	128
132	14	50	10	48	06	47	03	46	01	44	05	43	09	42	12	40	16	39	20	37	24	36	132
136	15	46	12	45	08	43	04	42	00	41	04	39	07	38	11	37	15	36	19	34	23	33	136
140	17	42	13	41	09	40	05	38	01	37	03	36	06	35	10	34	14	32	18	31	22	30	140
144	18	38	14	37	10	36	06	35	02	34	02	32	05	31	09	30	13	29	17	28	21	27	144
148	19	34	15	33	11	32	07	31	03	30	01	29	04	28	08	27	12	26	16	25	20	24	148
152	20	30	16	29	12	28	08	27	04	26	00	25	04	25	08	24	12	23	15	22	19	21	152
156	21	26	17	25	13	24	09	23	05	23	01	22	03	21	07	20	11	20	15	19	19	18	156
160	21	21	17	21	13	20	09	19	06	19	02	18	02	18	06	17	10	16	14	16	18	15	160
164	22	17	18	17	14	16	10	16	06	15	02	15	02	14	06	14	10	13	14	13	18	12	164
168	22	13	18	13	14	12	10	12	06	11	02	11	02	11	05	10	09	10	13	09	17	09	168
172	23	09	19	08	15	08	11	08	07	08	03	07	01	07	05	07	09	07	13	06	17	06	172
176	23	04	19	04	15	04	11	04	07	04	03	04	01	04	05	03	09	03	13	03	17	03	176
180	23	00	19	00	15	00	11	00	07	00	03	00	01	00	05	00	09	00	13	00	17	00	180

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

# STAR IDENTIFICATION TABLE

## ALTITUDE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.																					
00	75	180	79	180	83	180	87	180	89	00	85	00	81	00	77	00	73	00	69	00	65	00	00
4	75	170	79	167	83	162	86	146	88	59	85	17	81	08	77	04	73	02	69	01	65	00	4
8	74	160	78	155	82	146	85	125	86	71	84	30	81	15	77	08	73	05	69	02	65	01	8
12	74	150	77	144	81	134	84	112	85	74	83	40	80	22	76	12	73	07	69	03	65	01	12
16	73	142	76	135	79	124	82	104	83	75	82	46	79	27	76	16	72	09	69	05	65	01	16
20	71	134	75	127	78	116	80	98	81	75	80	50	78	31	75	19	72	11	69	06	65	02	20
24	70	127	73	120	76	109	78	94	79	74	79	53	77	35	75	22	72	13	68	07	65	02	24
28	68	121	72	114	74	104	76	90	78	73	77	54	76	38	74	24	71	15	68	08	65	02	28
32	67	115	70	108	73	99	75	87	76	72	76	55	75	40	73	26	71	16	68	08	65	02	32
36	65	110	68	103	71	95	73	84	74	70	75	56	74	41	72	28	70	18	68	09	65	03	36
40	63	106	66	99	69	91	71	81	72	69	73	56	73	42	72	29	70	19	67	10	65	03	40
44	62	101	65	95	67	87	69	78	71	67	72	55	71	43	71	30	69	20	67	11	64	03	44
48	60	97	63	91	65	84	67	76	69	66	70	55	70	43	70	31	68	21	67	11	64	03	48
52	58	93	61	88	64	81	66	73	67	64	69	54	69	43	69	32	68	21	66	12	64	04	52
56	56	90	59	84	62	78	64	71	66	62	67	53	68	43	68	32	67	22	66	12	64	04	56
60	54	86	57	81	60	75	62	69	64	61	66	52	67	42	67	32	66	22	65	13	64	04	60
64	53	83	56	78	58	73	61	66	63	59	64	51	65	42	66	32	66	22	65	13	64	04	64
68	51	80	54	75	56	70	59	64	61	57	63	50	64	41	65	32	65	22	65	13	64	04	68
72	49	76	52	72	55	67	57	62	60	55	61	48	63	40	64	32	64	22	64	13	64	04	72
76	47	73	50	69	53	65	56	60	58	54	60	47	62	39	63	31	64	22	64	13	63	04	76
80	46	70	49	67	52	62	54	57	57	52	59	45	61	38	62	31	63	22	63	13	63	04	80
84	44	68	47	64	50	60	53	55	55	50	58	44	60	37	61	30	62	22	63	13	63	04	84
88	42	65	45	61	48	57	51	53	54	48	56	42	58	36	60	29	62	21	63	13	63	04	88
92	41	62	44	59	47	55	50	51	53	46	55	41	57	35	59	28	61	21	62	13	63	04	92
96	39	59	42	56	45	52	48	49	51	44	54	39	56	34	59	27	60	20	62	13	63	04	96
100	38	56	41	53	44	50	47	46	50	42	53	38	55	32	58	26	60	20	61	12	63	04	100
104	36	53	39	51	43	48	46	44	49	40	52	36	54	31	57	25	59	19	61	12	62	04	104
108	35	51	38	48	41	45	45	42	48	38	51	34	54	30	56	24	59	18	61	12	62	04	108
112	33	48	37	45	40	43	43	40	47	36	50	32	53	28	55	23	58	18	60	11	62	04	112
116	32	45	35	43	39	40	42	37	46	34	49	31	52	27	55	22	57	17	60	11	62	04	116
120	31	42	34	40	38	38	41	35	45	32	48	29	51	25	54	21	57	16	60	10	62	04	120
124	29	40	33	38	37	35	40	33	44	30	47	27	50	24	53	20	56	15	59	10	62	04	124
128	28	37	32	35	36	33	39	31	43	28	46	25	50	22	53	18	56	14	59	09	62	03	128
132	27	34	31	32	35	30	38	28	42	26	45	23	49	20	52	17	56	13	59	09	62	03	132
136	26	31	30	30	34	28	37	26	41	24	45	21	48	19	52	16	55	12	58	08	62	03	136
140	25	28	29	27	33	25	37	24	40	22	44	20	48	17	51	14	55	11	58	07	61	03	140
144	25	26	28	24	32	23	36	21	40	20	44	18	47	16	51	13	54	10	58	07	61	02	144
148	24	23	28	22	32	20	35	19	39	17	43	16	47	14	50	12	54	09	58	06	61	02	148
152	23	20	27	19	31	18	35	17	39	15	43	14	46	12	50	10	54	08	58	05	61	02	152
156	23	17	27	16	30	15	34	14	38	13	42	12	46	10	50	09	54	07	57	05	61	02	156
160	22	14	26	14	30	13	34	12	38	11	42	10	46	09	50	07	53	06	57	04	61	01	160
164	22	11	26	11	30	10	34	10	38	09	42	08	45	07	49	06	53	05	57	03	61	01	164
168	21	09	25	08	29	08	33	07	37	07	41	06	45	05	49	04	53	03	57	02	61	01	168
172	21	06	25	05	29	05	33	05	37	04	41	04	45	03	49	03	53	02	57	02	61	01	172
176	21	03	25	03	29	03	33	02	37	02	41	02	45	02	49	01	53	01	57	01	61	00	176
180	21	00	25	00	29	00	33	00	37	00	41	00	45	00	49	00	53	00	57	00	61	00	180

Lat.  
63°

Lat.  
64°

Lat.  
65°

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6

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

DECLINATION SAME NAME AS LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Az.															
00	26 00.0	1.00 180.0	26 30.0	1.00 180.0	27 00.0	1.00 180.0	27 30.0	1.00 180.0	28 00.0	1.00 180.0	28 30.0	1.00 180.0	29 00.0	1.00 180.0	29 30.0	1.00 180.0	00
1	25 59.7	1.01 178.9	26 29.7	1.01 178.9	26 59.7	1.01 178.9	27 29.7	1.01 178.9	27 59.7	1.01 178.9	28 29.7	1.01 178.9	28 59.7	1.01 178.9	29 29.7	1.01 178.9	1
2	25 59.0	1.02 177.8	26 29.0	1.02 177.8	26 59.0	1.02 177.8	27 29.0	1.02 177.8	27 59.0	1.02 177.8	28 29.0	1.02 177.8	28 59.0	1.02 177.8	29 29.0	1.02 177.8	2
3	25 57.7	1.03 176.7	26 27.7	1.03 176.7	26 57.7	1.03 176.7	27 27.7	1.03 176.7	27 57.7	1.03 176.7	28 27.7	1.03 176.7	28 57.7	1.03 176.7	29 27.7	1.03 176.7	3
4	25 55.9	1.04 175.6	26 25.9	1.04 175.6	26 55.9	1.04 175.6	27 25.9	1.04 175.6	27 55.9	1.04 175.6	28 25.9	1.04 175.6	28 55.9	1.04 175.6	29 25.9	1.04 175.6	4
05	25 53.6	1.05 174.4	26 23.6	1.05 174.4	26 53.6	1.05 174.4	27 23.6	1.05 174.4	27 53.6	1.05 174.4	28 23.6	1.05 174.4	28 53.6	1.05 174.4	29 23.6	1.05 174.4	05
6	25 50.8	1.06 173.3	26 20.8	1.06 173.3	26 50.7	1.06 173.3	27 20.7	1.06 173.3	27 50.7	1.06 173.3	28 20.6	1.06 173.3	28 50.6	1.06 173.3	29 20.5	1.06 173.3	6
7	25 47.5	1.06 172.2	26 17.5	1.06 172.2	26 47.4	1.06 172.2	27 17.4	1.06 172.2	27 47.3	1.06 172.2	28 17.2	1.06 172.2	28 47.2	1.06 172.2	29 17.1	1.06 172.2	7
8	25 43.7	1.07 171.1	26 13.6	1.07 171.1	26 43.6	1.07 171.1	27 13.5	1.07 171.1	27 43.4	1.07 171.1	28 13.3	1.07 171.1	28 43.3	1.07 171.1	29 13.2	1.07 171.1	8
9	25 39.4	1.08 170.0	26 09.3	1.08 170.0	26 39.2	1.08 169.9	27 09.1	1.08 169.9	27 39.0	1.08 169.8	28 08.9	1.08 169.8	28 38.9	1.08 169.7	29 08.8	1.08 169.7	9
10	25 34.6	1.09 168.9	26 04.5	1.09 168.9	26 34.4	1.09 168.8	27 04.2	1.09 168.8	27 34.1	1.09 168.7	28 04.0	1.09 168.7	28 33.9	1.09 168.6	29 03.8	1.09 168.6	10
1	25 29.3	1.10 167.8	25 59.1	1.10 167.7	26 29.0	1.10 167.7	26 58.9	1.10 167.6	27 28.7	1.10 167.6	27 58.6	1.10 167.5	28 28.5	1.10 167.5	28 58.3	1.10 167.4	1
2	25 23.5	1.11 166.7	25 53.3	1.11 166.6	26 23.1	1.11 166.6	26 53.0	1.11 166.5	27 22.8	1.11 166.5	27 52.7	1.11 166.4	28 22.5	1.11 166.4	28 52.3	1.11 166.3	2
3	25 17.2	1.11 165.6	25 47.0	1.11 165.5	26 16.8	1.11 165.5	26 46.6	1.11 165.4	27 16.4	1.11 165.3	27 46.2	1.11 165.3	28 16.1	1.11 165.2	28 45.9	1.11 165.2	3
4	25 10.4	1.12 164.5	25 40.2	1.12 164.4	26 10.0	1.12 164.4	26 39.7	1.12 164.3	27 09.5	1.12 164.2	27 39.3	1.12 164.2	28 09.1	1.12 164.1	28 38.9	1.12 164.0	4
15	25 03.1	1.13 163.4	25 32.9	1.13 163.3	26 02.6	1.13 163.3	26 32.4	1.13 163.2	27 02.1	1.13 163.1	27 31.9	1.13 163.0	28 01.6	1.13 163.0	28 31.4	1.13 162.9	15
6	24 55.3	1.14 162.3	25 25.1	1.14 162.2	25 54.8	1.14 162.2	26 24.5	1.14 162.1	26 54.3	1.14 162.0	27 24.0	1.14 161.9	27 53.7	1.14 161.9	28 23.4	1.14 161.8	6
7	24 47.1	1.14 161.2	25 16.8	1.14 161.1	25 46.5	1.14 161.1	26 16.2	1.14 161.0	26 45.9	1.14 160.9	27 15.6	1.14 160.8	27 45.3	1.14 160.7	28 14.9	1.14 160.7	7
8	24 38.4	1.15 160.1	25 08.1	1.15 160.0	25 37.7	1.15 160.0	26 07.4	1.15 159.9	26 37.0	1.15 159.8	27 06.7	1.15 159.7	27 36.3	1.15 159.6	28 06.0	1.15 159.5	8
9	24 29.2	1.15 159.0	24 58.9	1.15 158.9	25 28.5	1.15 158.8	25 58.1	1.15 158.8	26 27.7	1.15 158.7	26 57.3	1.15 158.6	27 26.9	1.15 158.5	27 56.5	1.15 158.4	9
20	24 19.6	1.16 158.0	24 49.2	1.16 157.9	25 18.8	1.16 157.8	25 48.3	1.16 157.7	26 17.9	1.16 157.6	26 47.5	1.16 157.5	27 17.1	1.16 157.4	27 46.6	1.16 157.3	20
1	24 09.5	1.16 156.9	24 39.0	1.16 156.8	25 08.6	1.16 156.7	25 38.1	1.16 156.6	26 07.7	1.16 156.5	26 37.2	1.16 156.4	27 06.7	1.16 156.3	27 36.3	1.16 156.2	1
2	23 58.9	1.16 155.8	24 28.4	1.16 155.7	24 57.9	1.16 155.6	25 27.4	1.16 155.5	25 56.9	1.16 155.4	26 26.4	1.16 155.3	26 55.9	1.16 155.2	27 25.4	1.16 155.1	2
3	23 47.9	1.16 154.7	24 17.4	1.16 154.6	24 46.8	1.16 154.5	25 16.3	1.16 154.4	25 45.8	1.16 154.3	26 15.2	1.16 154.2	26 44.7	1.16 154.1	27 14.1	1.16 154.0	3
4	23 36.5	1.17 153.6	24 05.9	1.17 153.5	24 35.3	1.17 153.4	25 04.7	1.17 153.3	25 34.1	1.17 153.2	26 03.5	1.17 153.1	26 32.9	1.17 153.0	27 02.3	1.17 152.9	4
25	23 24.6	1.17 152.6	23 53.9	1.17 152.5	24 23.3	1.17 152.4	24 52.7	1.17 152.3	25 22.1	1.17 152.2	25 51.4	1.17 152.1	26 20.8	1.17 152.0	26 50.1	1.17 151.8	25
6	23 12.2	1.18 151.5	23 41.6	1.18 151.4	24 10.9	1.18 151.3	24 40.2	1.18 151.2	25 09.5	1.18 151.1	25 38.9	1.18 151.0	26 08.2	1.18 150.9	26 37.5	1.18 150.7	6
7	22 59.5	1.18 150.5	23 28.8	1.18 150.3	23 58.0	1.18 150.2	24 27.3	1.18 150.1	24 56.6	1.18 150.0	25 25.9	1.18 149.9	25 55.1	1.18 149.7	26 24.4	1.18 149.6	7
8	22 46.3	1.18 149.4	23 15.5	1.18 149.3	23 44.8	1.18 149.1	24 14.0	1.18 149.0	24 43.2	1.18 148.9	25 12.4	1.18 148.8	25 41.7	1.18 148.6	26 10.9	1.18 148.5	8
9	22 32.7	1.18 148.3	23 01.9	1.18 148.2	23 31.1	1.18 148.1	24 00.3	1.18 148.0	24 29.4	1.18 147.8	24 58.6	1.18 147.7	25 27.8	1.18 147.6	25 56.9	1.18 147.4	9
30	22 18.7	1.19 147.3	22 47.8	1.19 147.2	23 17.0	1.19 147.1	23 46.1	1.19 146.9	24 15.2	1.19 146.8	24 44.3	1.19 146.6	25 13.4	1.19 146.5	25 42.5	1.19 146.4	30
1	22 04.3	1.19 146.2	22 33.4	1.19 146.1	23 02.4	1.19 146.0	23 31.5	1.19 145.8	24 00.6	1.19 145.7	24 29.7	1.19 145.6	24 58.7	1.19 145.4	25 27.8	1.19 145.3	1
2	21 49.5	1.19 145.2	22 18.5	1.19 145.1	22 47.5	1.19 144.9	23 16.6	1.19 144.8	23 45.6	1.19 144.6	24 14.6	1.19 144.5	24 43.6	1.19 144.4	25 12.6	1.19 144.2	2
3	21 34.2	1.19 144.2	22 03.2	1.19 144.0	22 32.2	1.19 143.8	23 01.2	1.19 143.7	23 30.2	1.19 143.6	23 59.1	1.19 143.4	24 28.1	1.19 143.3	24 57.0	1.19 143.2	3
4	21 18.6	1.19 143.1	21 47.6	1.19 143.0	22 16.5	1.19 142.8	22 45.4	1.19 142.7	23 14.4	1.19 142.5	23 43.3	1.19 142.4	24 12.2	1.19 142.2	24 41.1	1.19 142.1	4
35	21 02.7	1.19 142.1	21 31.6	1.19 141.9	22 00.4	1.19 141.8	22 29.3	1.19 141.6	22 58.2	1.19 141.5	23 27.0	1.19 141.3	23 55.9	1.19 141.2	24 24.7	1.19 141.0	35
6	20 46.3	1.19 141.0	21 15.2	1.19 140.9	21 44.0	1.19 140.8	22 12.8	1.19 140.6	22 41.6	1.19 140.5	23 10.4	1.19 140.3	23 39.2	1.19 140.1	24 08.0	1.19 140.0	6
7	20 29.6	1.19 140.0	20 58.4	1.19 139.9	21 27.2	1.19 139.7	21 55.9	1.19 139.6	22 24.7	1.19 139.4	22 53.4	1.19 139.3	23 22.2	1.19 139.1	23 50.9	1.19 138.9	7
8	20 12.5	1.19 139.0	20 41.3	1.19 138.8	21 10.0	1.19 138.7	21 38.7	1.19 138.5	22 07.4	1.19 138.4	22 36.1	1.19 138.2	23 04.8	1.19 138.1	23 33.4	1.19 137.9	8
9	19 55.1	1.19 138.0	20 23.8	1.19 137.8	20 52.4	1.19 137.7	21 21.1	1.19 137.5	21 49.7	1.19 137.4	22 18.4	1.19 137.2	22 47.0	1.19 137.0	23 15.6	1.19 136.9	9
40	19 37.3	1.19 137.0	20 05.9	1.19 136.8	20 34.6	1.19 136.6	21 03.2	1.19 136.5	21 31.8	1.19 136.3	22 00.3	1.19 136.2	22 28.9	1.19 136.0	22 57.5	1.19 135.8	40
1	19 19.2	1.19 136.0	19 47.8	1.19 135.8	20 16.3	1.19 135.6	20 44.9	1.19 135.5	21 13.4	1.19 135.3	21 41.9	1.19 135.1	22 10.5	1.19 135.0	22 39.0	1.19 134.8	1
2	19 00.7	1.19 135.0	19 29.3	1.19 134.8	19 57.8	1.19 134.6	20 26.3	1.19 134.5	20 54.8	1.19 134.3	21 23.2	1.19 134.1	21 51.7	1.19 133.9	22 20.2	1.19 133.8	2
3	18 42.0	1.19 133.9	19 10.4	1.19 133.8	19 38.9	1.19 133.6	20 07.3	1.19 133.4	20 35.8	1.19 133.3	21 04.2	1.19 133.1	21 32.6	1.19 132.9	22 01.0	1.19 132.8	3
4	18 22.9	1.19 132.9	18 51.3	1.19 132.8	19 19.7	1.19 132.6	19 48.1	1.19 132.4	20 16.5	1.19 132.3	20 44.8	1.19 132.1	21 13.2	1.19 131.9	21 41.5	1.19 131.7	4
45	18 03.5	1.19 131.9	18 31.8	1.19 131.8	19 00.2	1.19 131.6	19 28.5	1.19 131.4	19 56.8	1.19 131.3	20 25.1	1.19 131.1	20 53.5	1.19 130.9	21 21.8	1.19 130.7	45
6	17 43.8	1.19 131.0	18 12.1	1.19 130.8	18 40.3	1.19 130.6	19 08.6	1.19 130.4	19 36.9	1.19 130.3	20 05.2	1.19 130.1	20 33.4	1.19 129.9	21 01.7	1.19 129.7	6
7	17 23.7	1.19 130.0	17 52.0	1.19 129.8	18 20.2	1.19 129.											

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.	Lat. 64°
	Alt.	Ad At.																
00	20 00.0	1.00 180.0	25 30.6	1.00 180.0	25 00.0	1.00 180.0	24 30.0	1.00 180.0	24 00.0	1.00 180.0	23 30.0	1.00 180.0	23 00.0	1.00 180.0	22 30.0	1.00 180.0	00	
1	25 59.7	1.00 178.9	25 29.7	1.00 178.9	24 59.7	1.00 178.9	24 29.7	1.00 178.9	23 59.7	1.00 178.9	23 29.7	1.00 178.9	22 59.7	1.00 178.9	22 29.7	1.00 178.9	1	
2	25 59.0	1.00 177.8	25 29.0	1.00 177.8	24 59.0	1.00 177.8	24 29.0	1.00 177.8	23 59.0	1.00 177.8	23 29.0	1.00 177.8	22 59.0	1.00 177.8	22 29.0	1.00 177.8	2	
3	25 57.7	1.00 176.7	25 27.7	1.00 176.7	24 57.7	1.00 176.7	24 27.7	1.00 176.7	23 57.7	1.00 176.7	23 27.7	1.00 176.7	22 57.7	1.00 176.7	22 27.7	1.00 176.7	3	
4	25 55.9	1.00 175.6	25 25.9	1.00 175.6	24 55.9	1.00 175.6	24 25.9	1.00 175.6	23 55.9	1.00 175.6	23 25.9	1.00 175.6	22 55.9	1.00 175.6	22 25.9	1.00 175.6	4	
05	25 53.6	1.00 174.4	25 23.6	1.00 174.4	24 53.7	1.00 174.5	24 23.7	1.00 174.5	23 53.7	1.00 174.5	23 23.8	1.00 174.6	22 53.8	1.00 174.6	22 23.8	1.00 174.6	05	
6	25 50.8	1.00 173.3	25 20.9	1.00 173.4	24 50.9	1.00 173.4	24 20.9	1.00 173.4	23 51.0	1.00 173.4	23 21.0	1.00 173.5	22 51.0	1.00 173.5	22 21.1	1.00 173.5	6	
7	25 47.5	1.00 172.2	25 17.6	1.00 172.3	24 47.6	1.00 172.3	24 17.7	1.00 172.3	23 47.7	1.00 172.4	23 17.8	1.00 172.4	22 47.8	1.00 172.4	22 17.9	1.00 172.4	7	
8	25 43.7	1.00 171.1	25 13.8	1.00 171.2	24 43.8	1.00 171.2	24 13.9	1.00 171.2	23 44.0	1.00 171.3	23 14.0	1.00 171.3	22 44.1	1.00 171.3	22 14.2	1.00 171.3	8	
9	25 39.4	1.00 170.0	25 09.5	1.00 170.0	24 39.6	1.00 170.1	24 09.6	1.00 170.1	23 39.7	1.00 170.2	23 09.8	1.00 170.2	22 39.9	1.00 170.3	22 10.0	1.00 170.3	9	
10	25 34.6	1.00 168.9	25 04.7	1.00 168.9	24 34.8	1.00 169.0	24 04.9	1.00 169.0	23 35.0	1.00 169.1	23 05.1	1.00 169.1	22 35.2	1.00 169.2	22 05.3	1.00 169.2	10	
1	25 29.3	1.00 167.8	24 59.4	1.00 167.8	24 29.5	1.00 167.9	23 59.6	1.00 167.9	23 29.8	1.00 168.0	22 59.9	1.00 168.1	22 30.0	1.00 168.1	22 00.1	1.00 168.1	1	
2	25 23.5	1.00 166.7	24 53.6	1.00 166.8	24 23.8	1.00 166.8	23 53.9	1.00 166.9	23 24.1	1.00 167.0	22 54.2	1.00 167.0	22 24.4	1.00 167.0	21 54.5	1.00 167.1	2	
3	25 17.2	1.00 165.6	24 47.3	1.00 165.7	24 17.5	1.00 165.7	23 47.7	1.00 165.8	23 17.9	1.00 165.8	22 48.0	1.00 165.9	22 18.2	1.00 165.9	21 48.4	1.00 166.0	3	
4	25 10.4	1.00 164.5	24 40.6	1.00 164.6	24 10.8	1.00 164.6	23 41.0	1.00 164.7	23 11.2	1.00 164.8	22 41.4	1.00 164.8	22 11.6	1.00 164.9	21 41.8	1.00 164.9	4	
15	25 03.1	1.00 163.4	24 33.3	1.00 163.5	24 03.6	1.00 163.5	23 33.8	1.00 163.6	23 04.0	1.00 163.7	22 34.3	1.00 163.7	22 04.5	1.00 163.8	21 34.7	1.00 163.9	15	
6	24 55.3	1.00 162.3	24 25.6	1.00 162.4	23 55.9	1.00 162.5	23 26.1	1.00 162.5	22 56.4	1.00 162.6	22 26.7	1.00 162.7	21 56.9	1.00 162.7	21 27.2	1.00 162.8	6	
7	24 47.1	1.00 161.2	24 17.4	1.00 161.3	23 47.7	1.00 161.4	23 18.0	1.00 161.4	22 48.3	1.00 161.5	22 18.6	1.00 161.6	21 48.9	1.00 161.7	21 19.2	1.00 161.7	7	
8	24 38.4	1.00 160.1	24 08.7	1.00 160.2	23 39.1	1.00 160.3	23 09.4	1.00 160.4	22 39.7	1.00 160.5	22 10.0	1.00 160.6	21 40.4	1.00 160.7	21 10.7	1.00 160.7	8	
9	24 29.2	1.00 159.0	23 59.6	1.00 159.1	23 30.0	1.00 159.2	23 00.3	1.00 159.3	22 30.7	1.00 159.4	22 01.0	1.00 159.5	21 31.4	1.00 159.5	21 01.8	1.00 159.6	9	
20	24 19.6	1.00 158.0	23 50.0	1.00 158.0	23 20.4	1.00 158.1	22 50.8	1.00 158.2	22 21.2	1.00 158.3	21 51.6	1.00 158.4	21 22.0	1.00 158.5	20 52.4	1.00 158.6	20	
1	24 09.5	1.00 156.9	23 39.9	1.00 157.0	23 10.4	1.00 157.1	22 40.8	1.00 157.2	22 11.2	1.00 157.3	21 41.7	1.00 157.4	21 12.1	1.00 157.5	20 42.5	1.00 157.6	1	
2	23 58.9	1.00 155.8	23 29.4	1.00 155.9	22 59.9	1.00 156.0	22 30.4	1.00 156.1	22 00.8	1.00 156.2	21 31.3	1.00 156.3	21 01.8	1.00 156.4	20 32.3	1.00 156.5	2	
3	23 47.9	1.00 154.7	23 18.4	1.00 154.8	22 49.0	1.00 154.9	22 19.5	1.00 155.0	21 50.0	1.00 155.1	21 20.5	1.00 155.2	20 51.0	1.00 155.3	20 21.5	1.00 155.4	3	
4	23 36.5	1.00 153.6	23 07.0	1.00 153.8	22 37.6	1.00 153.9	22 08.2	1.00 154.0	21 38.7	1.00 154.1	21 09.3	1.00 154.2	20 39.8	1.00 154.3	20 10.4	1.00 154.4	4	
25	23 24.6	1.00 152.6	22 55.2	1.00 152.7	22 25.8	1.00 152.8	21 56.4	1.00 152.9	21 27.0	1.00 153.0	20 57.6	1.00 153.1	20 28.2	1.00 153.2	19 58.8	1.00 153.3	25	
6	23 12.2	1.00 151.5	22 42.9	1.00 151.6	22 13.6	1.00 151.7	21 44.2	1.00 151.9	21 14.9	1.00 152.0	20 45.5	1.00 152.1	20 16.1	1.00 152.2	19 46.8	1.00 152.3	6	
7	22 59.5	1.00 150.5	22 30.2	1.00 150.6	22 00.9	1.00 150.7	21 31.6	1.00 150.8	21 02.3	1.00 150.9	20 33.0	1.00 151.0	20 03.6	1.00 151.1	19 34.3	1.00 151.3	7	
8	22 46.3	1.00 149.4	22 17.0	1.00 149.5	21 47.8	1.00 149.6	21 18.5	1.00 149.8	20 49.3	1.00 149.9	20 20.0	1.00 150.0	19 50.7	1.00 150.1	19 21.5	1.00 150.2	8	
9	22 32.7	1.00 148.3	22 03.5	1.00 148.5	21 34.3	1.00 148.6	21 05.1	1.00 148.7	20 35.9	1.00 148.8	20 06.7	1.00 148.9	19 37.4	1.00 149.0	19 08.2	1.00 149.2	9	
30	22 18.7	1.00 147.3	21 49.5	1.00 147.4	21 20.4	1.00 147.5	20 51.2	1.00 147.7	20 22.1	1.00 147.8	19 52.9	1.00 147.9	19 23.7	1.00 148.0	18 54.5	1.00 148.2	30	
1	22 04.3	1.00 146.2	21 35.2	1.00 146.4	21 06.1	1.00 146.5	20 37.0	1.00 146.6	20 07.8	1.00 146.8	19 38.7	1.00 146.9	19 09.6	1.00 147.0	18 40.5	1.00 147.1	1	
2	21 49.5	1.00 145.2	21 20.4	1.00 145.3	20 51.3	1.00 145.5	20 22.3	1.00 145.6	19 53.2	1.00 145.7	19 24.1	1.00 145.9	18 55.1	1.00 146.0	18 26.0	1.00 146.1	2	
3	21 34.2	1.00 144.2	21 05.2	1.00 144.3	20 36.2	1.00 144.4	20 07.2	1.00 144.6	19 38.2	1.00 144.7	19 09.2	1.00 144.8	18 40.2	1.00 144.9	18 11.1	1.00 145.1	3	
4	21 18.6	1.00 143.1	20 49.7	1.00 143.3	20 20.7	1.00 143.4	19 51.8	1.00 143.5	19 22.8	1.00 143.7	18 53.8	1.00 143.8	18 24.9	1.00 143.9	17 55.9	1.00 144.1	4	
35	21 02.7	1.00 142.1	20 33.8	1.00 142.2	20 04.9	1.00 142.4	19 36.0	1.00 142.5	19 07.0	1.00 142.6	18 38.1	1.00 142.8	18 09.2	1.00 142.9	17 40.3	1.00 143.1	35	
6	20 46.3	1.00 141.0	20 17.5	1.00 141.2	19 48.6	1.00 141.3	19 19.8	1.00 141.5	18 50.9	1.00 141.6	18 22.0	1.00 141.8	17 53.2	1.00 141.9	17 24.3	1.00 142.1	6	
7	20 29.6	1.00 140.0	20 00.8	1.00 140.2	19 32.0	1.00 140.3	19 03.2	1.00 140.5	18 34.4	1.00 140.6	18 05.6	1.00 140.8	17 36.8	1.00 140.9	17 07.9	1.00 141.1	7	
8	20 12.5	1.00 139.0	19 43.8	1.00 139.2	19 15.0	1.00 139.3	18 46.3	1.00 139.5	18 17.5	1.00 139.6	17 48.8	1.00 139.8	17 20.0	1.00 139.9	16 51.2	1.00 140.1	8	
9	19 55.1	1.00 138.0	19 26.4	1.00 138.1	18 57.7	1.00 138.3	18 29.0	1.00 138.4	18 00.3	1.00 138.6	17 31.6	1.00 138.8	17 02.9	1.00 138.9	16 34.2	1.00 139.1	9	
40	19 37.3	1.00 137.0	19 08.7	1.00 137.1	18 40.6	1.00 137.3	18 11.4	1.00 137.4	17 42.7	1.00 137.6	17 14.1	1.00 137.7	16 45.4	1.00 137.9	16 16.7	1.00 138.1	40	
1	19 19.2	1.00 136.0	18 50.6	1.00 136.1	18 22.0	1.00 136.3	17 53.4	1.00 136.4	17 24.8	1.00 136.6	16 56.2	1.00 136.8	16 27.6	1.00 136.9	15 59.0	1.00 137.1	1	
2	19 00.7	1.00 135.0	18 32.2	1.00 135.1	18 03.7	1.00 135.3	17 35.1	1.00 135.4	17 06.6	1.00 135.6	16 38.0	1.00 135.8	16 09.5	1.00 135.9	15 40.9	1.00 136.1	2	
3	18 42.0	1.00 133.9	18 13.5	1.00 134.1	17 45.0	1.00 134.3	17 16.5	1.00 134.4	16 48.0	1.00 134.6	16 19.5	1.00 134.8	15 51.0	1.00 134.9	15 22.5	1.00 135.1	3	
4	18 22.9	1.00 132.9	17 54.5	1.00 133.1	17 26.0	1.00 133.3	16 57.6	1.00 133.4	16 29.2	1.00 133.6	16 00.7	1.00 133.8	15 32.2	1.00 133.9	15 03.8	1.00 134.1	4	
45	18 03.5	1.00 131.9	17 35.1	1.00 132.1	17 06.7	1.00 132.3	16 38.3	1.00 132.5	16 10.0	1.00 132.6	15 41.6	1.00 132.8	15 13.1	1.00 132.9	14 44.7	1.00 133.1	45	
6	17 43.8	1.00 131.0	17 15.4	1.00 131.1	16 47.1													

Lat. 64°

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
00	30 00.0	1.00 180.0	30 30.0	1.00 180.0	31 00.0	1.00 180.0	31 30.0	1.00 180.0	32 00.0	1.00 180.0	32 30.0	1.00 180.0	33 00.0	1.00 180.0	33 30.0	1.00 180.0	00
1	29 59.7	1.00 178.8	30 29.7	1.00 178.8	30 59.7	1.00 178.8	31 29.7	1.00 178.8	31 59.7	1.00 178.8	32 29.7	1.00 178.8	32 59.7	1.00 178.8	33 29.7	1.00 178.8	1
2	29 58.9	1.00 177.7	30 28.9	1.00 177.7	30 58.9	1.00 177.7	31 28.9	1.00 177.7	31 58.9	1.00 177.7	32 28.9	1.00 177.7	32 58.9	1.00 177.7	33 28.9	1.00 177.7	2
3	29 57.6	1.00 176.5	30 27.6	1.00 176.5	30 57.6	1.00 176.5	31 27.6	1.00 176.5	31 57.6	1.00 176.5	32 27.6	1.00 176.5	32 57.6	1.00 176.5	33 27.6	1.00 176.5	3
4	29 55.8	1.00 175.4	30 25.8	1.00 175.4	30 55.7	1.00 175.4	31 25.7	1.00 175.4	31 55.7	1.00 175.4	32 25.7	1.00 175.4	32 55.7	1.00 175.4	33 25.7	1.00 175.4	4
05	29 53.4	1.00 174.2	30 23.4	1.00 174.2	30 53.3	1.00 174.2	31 23.3	1.00 174.2	31 53.3	1.00 174.2	32 23.3	1.00 174.2	32 53.2	1.00 174.2	33 23.2	1.00 174.2	05
6	29 50.5	1.00 173.1	30 20.5	1.00 173.1	30 50.4	1.00 173.0	31 20.4	1.00 173.0	31 50.3	1.00 173.0	32 20.3	1.00 173.0	32 50.2	1.00 173.0	33 20.2	1.00 173.0	6
7	29 47.1	1.00 171.9	30 17.0	1.00 171.9	30 47.0	1.00 171.9	31 16.9	1.00 171.9	31 46.8	1.00 171.8	32 16.8	1.00 171.8	32 46.7	1.00 171.8	33 16.7	1.00 171.8	7
8	29 43.1	1.00 170.8	30 13.1	1.00 170.8	30 43.0	1.00 170.7	31 12.9	1.00 170.7	31 42.8	1.00 170.6	32 12.7	1.00 170.6	32 42.7	1.00 170.6	33 12.6	1.00 170.6	8
9	29 38.7	1.00 169.7	30 08.6	1.00 169.6	30 38.5	1.00 169.6	31 08.4	1.00 169.5	31 38.3	1.00 169.5	32 08.2	1.00 169.4	32 38.1	1.00 169.4	33 08.0	1.00 169.3	9
10	29 33.7	1.00 168.5	30 03.6	1.00 168.5	30 33.5	1.00 168.4	31 03.3	1.00 168.4	31 33.2	1.00 168.3	32 03.1	1.00 168.3	32 33.0	1.00 168.2	33 02.8	1.00 168.1	10
1	29 28.2	1.00 167.4	29 58.1	1.00 167.3	30 27.9	1.00 167.3	30 57.8	1.00 167.2	31 27.6	1.00 167.1	31 57.5	1.00 167.1	32 27.3	1.00 167.0	32 57.2	1.00 167.0	1
2	29 22.2	09 11 166.2	29 52.0	09 11 166.2	30 21.9	09 11 166.1	30 51.7	09 11 166.0	31 21.5	09 11 165.9	31 51.3	09 11 165.9	32 21.2	09 11 165.9	32 51.0	09 11 165.8	2
3	29 15.7	09 12 165.1	29 45.5	09 12 165.0	30 15.3	09 12 165.0	30 45.1	09 12 164.9	31 14.9	09 12 164.8	31 44.7	09 12 164.8	32 14.5	09 12 164.7	32 44.3	09 12 164.6	3
4	29 08.7	09 13 164.0	29 38.4	09 13 163.9	30 08.2	09 13 163.8	30 38.0	09 13 163.7	31 07.8	09 13 163.7	31 37.5	09 13 163.6	32 07.3	09 13 163.5	32 37.0	09 13 163.4	4
15	29 01.1	09 13 162.8	29 30.9	09 13 162.8	30 00.6	09 13 162.7	30 30.4	09 14 162.6	31 00.1	09 14 162.5	31 29.8	09 14 162.4	31 59.6	09 14 162.3	32 29.3	09 14 162.3	15
6	28 53.1	09 14 161.7	29 22.8	09 14 161.6	29 52.5	09 14 161.5	30 22.3	09 14 161.5	30 52.0	09 14 161.4	31 21.7	09 14 161.3	31 51.4	09 15 161.2	32 21.0	09 15 161.1	6
7	28 44.6	09 15 160.6	29 14.3	09 15 160.5	29 44.0	09 15 160.4	30 13.6	09 15 160.3	30 43.3	09 15 160.2	31 13.0	09 15 160.1	31 42.6	09 15 160.1	32 12.3	09 15 160.0	7
8	28 35.6	09 16 159.4	29 05.3	09 16 159.3	29 34.9	09 16 159.3	30 04.5	09 16 159.2	30 34.2	09 16 159.1	31 03.8	09 16 159.0	31 33.4	09 16 158.9	32 03.0	09 16 158.8	8
9	28 26.2	09 17 158.3	28 55.8	09 17 158.2	29 25.4	09 17 158.1	29 54.9	09 17 158.0	30 24.5	09 17 157.9	30 54.1	09 17 157.9	31 23.7	09 17 157.8	31 53.3	09 17 157.7	9
20	28 16.2	09 17 157.2	28 45.8	09 17 157.1	29 15.3	09 18 157.0	29 44.9	09 18 156.9	30 14.4	09 18 156.8	30 44.0	09 18 156.7	31 13.5	09 18 156.6	31 43.0	09 18 156.5	20
1	28 05.8	09 18 156.1	28 35.3	09 18 156.0	29 04.8	09 18 155.9	29 34.3	09 18 155.8	30 03.8	09 18 155.7	30 33.3	09 18 155.6	31 02.8	09 18 155.5	31 32.3	09 18 155.4	1
2	27 54.9	09 19 155.0	28 24.4	09 19 154.9	28 53.8	09 19 154.8	29 23.3	09 19 154.7	29 52.8	09 19 154.6	30 22.2	09 19 154.4	30 51.7	09 19 154.3	31 21.1	09 19 154.2	2
3	27 43.7	09 20 153.9	28 13.0	09 20 153.8	28 42.4	09 20 153.7	29 11.8	09 20 153.5	29 41.2	09 20 153.4	30 10.6	09 20 153.3	30 40.0	09 20 153.2	31 09.4	09 20 153.1	3
4	27 31.7	09 20 152.8	28 01.1	09 20 152.7	28 30.5	09 21 152.5	29 00.9	09 21 152.4	29 29.2	09 21 152.3	29 58.6	09 21 152.2	30 27.9	09 21 152.1	30 57.3	09 21 152.0	4
25	27 19.5	09 21 151.7	27 48.8	09 21 151.6	28 18.1	09 21 151.4	28 47.5	09 21 151.3	29 16.8	09 22 151.2	29 46.1	09 22 151.1	30 15.4	09 22 150.9	30 44.7	09 22 150.8	25
6	27 06.8	09 22 150.6	27 36.1	09 22 150.5	28 05.3	09 22 150.3	28 34.6	09 22 150.2	29 03.9	09 22 150.1	29 33.1	09 22 150.0	30 02.4	09 22 149.8	30 31.6	09 22 149.7	6
7	26 53.6	09 23 149.5	27 22.9	09 23 149.4	27 52.1	09 23 149.2	28 21.3	09 23 149.1	28 50.5	09 23 149.0	29 19.8	09 23 148.8	29 49.0	09 23 148.7	30 18.2	09 23 148.6	7
8	26 40.1	09 23 148.4	27 09.2	09 23 148.3	27 38.4	09 23 148.1	28 07.6	09 23 148.0	28 36.8	09 23 147.9	29 05.9	09 23 147.7	29 35.1	09 23 147.6	30 04.2	09 23 147.5	8
9	26 26.1	09 24 147.3	26 55.2	09 24 147.2	27 24.3	09 24 147.0	27 53.4	09 24 146.9	28 22.6	09 24 146.8	28 51.7	09 24 146.6	29 20.8	09 24 146.5	29 49.9	09 24 146.4	9
30	26 11.6	09 25 146.2	26 40.7	09 25 146.1	27 09.8	09 25 146.0	27 38.9	09 25 145.8	28 07.9	09 25 145.7	28 37.0	09 25 145.5	29 06.0	09 25 145.4	29 35.1	09 25 145.2	30
1	25 56.8	09 25 145.1	26 25.9	09 25 145.0	26 54.9	09 25 144.9	27 23.9	09 25 144.7	27 52.9	09 25 144.6	28 21.9	09 25 144.4	28 50.9	09 25 144.3	29 19.9	09 25 144.1	1
2	25 41.6	09 26 144.1	26 10.6	09 26 143.9	26 39.5	09 26 143.8	27 08.5	09 26 143.6	27 37.5	09 26 143.5	28 06.4	09 26 143.3	28 35.3	09 26 143.2	29 04.3	09 26 143.0	2
3	25 26.0	09 27 143.0	25 54.9	09 27 142.9	26 23.8	09 27 142.7	26 52.7	09 27 142.6	27 21.6	09 27 142.4	27 50.5	09 27 142.3	28 19.4	09 27 142.1	28 48.3	09 27 142.0	3
4	25 09.9	09 27 142.0	25 38.8	09 27 141.8	26 07.7	09 28 141.6	26 36.5	09 28 141.5	27 05.4	09 28 141.3	27 34.2	09 28 141.2	28 03.0	09 28 141.0	28 31.9	09 28 140.9	4
35	24 53.5	09 28 140.9	25 22.4	09 28 140.7	25 51.2	09 28 140.6	26 20.0	09 28 140.4	26 48.8	09 28 140.3	27 17.5	09 28 140.1	27 46.3	09 28 140.0	28 15.1	09 28 139.8	35
6	24 36.8	09 29 139.8	25 05.5	09 29 139.7	25 34.3	09 29 139.5	26 03.0	09 29 139.4	26 31.8	09 29 139.2	27 00.5	09 29 139.0	27 29.2	09 29 138.9	27 57.9	09 29 138.7	6
7	24 19.6	09 29 138.8	24 48.3	09 29 138.6	25 17.0	09 29 138.5	25 45.7	09 29 138.3	26 14.4	09 30 138.1	26 43.1	09 30 138.0	27 11.7	09 30 137.8	27 40.4	09 30 137.6	7
8	24 02.1	09 30 137.7	24 30.8	09 30 137.6	24 59.4	09 30 137.4	25 28.0	09 30 137.3	25 56.7	09 30 137.1	26 25.3	09 30 136.9	26 53.9	09 30 136.7	27 22.5	09 30 136.6	8
9	23 44.2	09 30 136.7	24 12.8	09 30 136.5	24 41.4	09 31 136.4	25 10.0	09 31 136.2	25 38.6	09 31 136.0	26 07.1	09 31 135.9	26 35.7	09 31 135.7	27 04.2	09 31 135.5	9
40	23 26.0	09 31 135.7	23 54.6	09 31 135.5	24 23.1	09 31 135.3	24 51.6	09 31 135.2	25 20.1	09 31 135.0	25 48.6	09 31 134.8	26 17.1	09 31 134.6	26 45.6	09 32 134.5	40
1	23 07.5	09 31 134.6	23 36.0	09 32 134.5	24 04.4	09 32 134.3	24 32.9	09 32 134.1	25 01.4	09 32 133.9	25 29.8	09 32 133.8	25 58.2	09 32 133.6	26 26.7	09 32 133.4	1
2	22 48.6	09 32 133.6	23 17.0	09 32 133.4	23 45.5	09 32 133.3	24 13.9	09 32 133.1	24 42.3	09 32 132.9	25 10.7	09 32 132.7	25 39.0	09 32 132.5	26 07.4	09 32 132.4	2
3	22 29.4	09 33 132.6	22 57.1	09 33 132.4	23 26.1	09 33 132.2	23 54.5	09 33 132.0	24 22.8	09 33 131.9	24 51.2	09 33 131.7	25 19.5	09 33 131.5	25 47.8	09 33 131.3	3
4	22 09.9	09 33 131.6	22 38.2	09 33 131.4	23 06.5	09 33 131.2	23 34.8	09 33 131.0	24 03.1	09 33 130.8	24 31.4	09 33 130.7	24 59.6	09 33 130.5	25 27.9	09 33 130.3	4
45	21 50.0	09 34 130.5	22 18.3	09 34 130.4	22 46.6	09 34 130.2	23 14.8	09 34 130.0	23 43.0	09 34 129.8	24 11.3	09 34 129.6	24 39.5	09 34 129.4	25 07.7	09 34 129.3	45
1	21 29.9	09 34 129.5</															

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	22 00.0	1.000	180.0	21 30.0	1.000	180.0	21 00.0	1.000	180.0	20 30.0	1.000	180.0	20 00.0	1.000	180.0	19 30.0	1.000	180.0	00
1	21 59.8	1.001	178.9	21 29.8	1.001	178.9	20 59.8	1.001	178.9	20 29.8	1.001	178.9	19 59.8	1.001	178.9	19 29.8	1.001	178.9	1
2	21 59.0	1.002	177.8	21 29.0	1.002	177.8	20 59.0	1.002	177.9	20 29.0	1.002	177.9	19 59.0	1.002	177.9	19 29.0	1.002	177.9	2
3	21 57.8	1.003	176.8	21 27.8	1.003	176.8	20 57.8	1.003	176.8	20 27.8	1.003	176.8	19 57.8	1.003	176.8	19 27.8	1.003	176.8	3
4	21 56.1	1.004	175.7	21 26.1	1.004	175.7	20 56.1	1.004	175.7	20 26.1	1.004	175.8	19 56.1	1.004	175.8	19 26.1	1.004	175.8	4
5	21 53.8	1.005	174.6	21 23.9	1.004	174.6	20 53.9	1.004	174.7	20 23.9	1.004	174.7	19 53.9	1.004	174.7	19 24.0	1.004	174.7	5
6	21 51.1	1.005	173.5	21 21.2	1.005	173.6	20 51.2	1.005	173.6	20 21.2	1.005	173.6	19 51.3	1.005	173.7	19 21.3	1.005	173.7	6
7	21 47.9	1.006	172.5	21 18.0	1.006	172.5	20 48.0	1.006	172.5	20 18.1	1.006	172.6	19 48.1	1.006	172.6	19 21.3	1.006	172.6	7
8	21 44.2	1.007	171.4	21 14.3	1.007	171.4	20 44.4	1.007	171.5	20 14.4	1.007	171.5	19 44.5	1.007	171.5	19 18.2	1.006	172.6	8
9	21 40.1	1.008	170.3	21 10.1	1.008	170.4	20 40.2	1.008	170.4	20 10.3	1.008	170.5	19 40.4	1.008	170.5	19 10.5	1.008	170.5	9
10	21 35.4	1.009	169.3	21 05.5	1.009	169.3	20 35.6	1.008	169.4	20 05.7	1.008	169.4	19 35.8	1.008	169.4	19 05.9	1.008	169.5	10
1	21 30.3	1.009	168.2	21 00.4	1.009	168.2	20 30.5	1.009	168.3	20 00.6	1.009	168.3	19 30.7	1.009	168.4	19 00.9	1.009	168.4	1
2	21 24.6	1.010	167.1	20 54.8	1.010	167.2	20 24.9	1.010	167.2	19 55.1	1.010	167.3	19 25.2	1.010	167.3	18 55.3	1.010	167.4	2
3	21 18.5	99 11	166.1	20 48.7	99 11	166.1	20 18.9	99 11	166.2	19 49.0	99 11	166.3	19 19.2	99 11	166.3	18 49.4	99 11	166.3	3
4	21 12.0	99 12	165.0	20 42.2	99 12	165.1	20 12.4	99 12	165.1	19 42.5	99 12	165.2	19 12.7	99 12	165.2	18 42.9	99 12	165.3	4
5	21 04.9	99 13	163.9	20 35.1	99 12	164.0	20 05.4	99 12	164.1	19 35.6	99 12	164.1	19 05.8	99 12	164.2	18 36.0	99 12	164.3	5
6	20 57.4	99 13	162.9	20 27.7	99 13	162.9	19 57.9	99 13	163.0	19 28.2	99 13	163.1	18 58.4	99 13	163.1	18 28.7	99 13	163.2	6
7	20 49.4	99 14	161.8	20 19.7	99 14	161.9	19 50.0	99 14	162.0	19 20.3	99 14	162.0	18 50.6	99 14	162.1	18 28.7	99 14	162.2	7
8	20 41.0	99 15	160.8	20 11.3	99 15	160.8	19 41.6	99 15	160.9	19 11.9	99 15	161.0	18 42.3	99 15	161.1	18 28.0	99 14	162.2	8
9	20 32.1	99 16	159.7	20 02.5	99 16	159.8	19 32.8	99 15	159.9	19 03.2	99 15	159.9	18 33.5	99 15	160.0	18 12.6	99 15	161.1	9
10	20 22.8	99 16	158.7	19 53.1	99 16	158.7	19 23.5	99 16	158.8	18 53.9	99 16	158.9	18 24.3	99 16	159.0	18 03.8	99 15	160.1	10
1	20 13.0	99 17	157.6	19 43.4	99 17	157.7	19 13.8	99 17	157.8	18 44.2	99 17	157.9	18 14.6	99 17	158.0	17 54.7	99 16	159.1	1
2	20 02.7	98 18	156.6	19 33.2	98 18	156.7	19 03.6	98 18	156.7	18 34.1	98 18	156.8	18 04.5	98 18	156.9	17 45.0	99 17	158.0	2
3	19 52.0	98 19	155.5	19 22.5	98 18	155.6	18 53.0	98 18	155.7	18 23.5	98 18	155.8	17 54.0	98 18	155.9	17 35.0	99 17	157.0	3
4	19 40.9	98 19	154.5	19 11.5	98 19	154.6	18 42.0	98 19	154.7	18 12.5	98 19	154.8	17 43.1	98 19	154.9	17 13.6	98 19	155.0	4
5	19 29.4	98 20	153.4	19 00.0	98 20	153.5	18 30.5	98 20	153.6	18 01.1	98 20	153.7	17 31.7	98 20	153.8	17 02.3	98 20	153.9	5
6	19 17.4	98 21	152.4	18 48.0	98 21	152.5	18 18.6	98 21	152.6	17 49.3	98 20	152.7	17 19.9	98 20	152.8	16 50.5	98 20	152.9	6
7	19 05.0	98 21	151.4	18 35.7	98 21	151.5	18 06.3	98 21	151.6	17 37.0	98 21	151.7	17 07.7	98 21	151.8	16 38.3	98 21	151.9	7
8	18 52.2	98 22	150.3	18 22.9	98 22	150.4	17 53.6	98 22	150.6	17 24.3	98 22	150.7	16 55.0	98 22	150.8	16 28.7	98 21	151.9	8
9	18 39.0	97 23	149.3	18 09.7	97 23	149.4	17 40.5	97 23	149.5	17 11.2	97 22	149.7	16 42.0	98 22	149.8	16 12.7	98 22	150.9	9
10	18 25.3	97 23	148.3	17 56.1	97 23	148.4	17 27.0	97 23	148.5	16 57.8	97 23	148.6	16 28.6	97 23	148.8	16 12.7	98 22	150.9	10
1	18 11.3	97 24	147.3	17 42.2	97 24	147.4	17 13.0	97 24	147.5	16 43.9	97 24	147.6	16 14.7	97 24	147.8	15 59.3	97 23	148.9	1
2	17 56.9	97 25	146.2	17 27.8	97 25	146.4	16 58.7	97 25	146.5	16 29.6	97 24	146.6	16 00.5	97 24	146.8	15 45.6	97 24	147.9	2
3	17 42.1	97 25	145.2	17 13.0	97 25	145.4	16 44.0	97 25	145.5	16 14.9	97 25	145.6	16 00.5	97 25	145.7	15 31.4	97 24	146.9	3
4	17 26.9	97 26	144.2	16 57.9	97 26	144.4	16 28.9	97 26	144.5	15 59.9	97 26	144.6	15 30.9	97 26	144.7	15 16.8	97 25	145.9	4
5	17 11.3	96 27	143.2	16 42.4	96 27	143.3	16 13.4	96 27	143.5	15 44.5	96 27	143.6	15 15.5	96 27	143.8	14 46.6	97 26	144.9	5
6	16 55.4	96 27	142.2	16 26.5	96 27	142.3	15 57.6	96 27	142.5	15 28.7	96 27	142.6	15 01.9	96 27	142.8	14 30.9	96 27	142.9	6
7	16 39.1	96 28	141.2	16 10.2	96 28	141.3	15 41.4	96 28	141.5	15 12.5	96 28	141.6	14 53.7	96 27	141.8	14 14.8	96 27	141.9	7
8	16 22.4	96 28	140.2	15 53.6	96 28	140.3	15 24.8	96 28	140.5	14 56.0	96 28	140.6	14 27.2	96 28	140.8	13 58.4	96 28	140.9	8
9	16 05.4	96 29	139.2	15 36.7	96 29	139.4	15 07.9	96 29	139.5	14 39.2	96 29	139.6	14 10.4	96 29	139.8	13 41.7	96 28	139.9	9
10	15 48.1	96 30	138.2	15 19.4	96 29	138.4	14 50.7	96 29	138.5	14 22.0	96 29	138.7	13 53.3	96 29	138.8	13 24.6	96 29	139.0	10
1	15 30.4	96 30	137.2	15 01.7	96 30	137.4	14 33.1	96 30	137.5	14 04.4	96 30	137.7	13 35.8	96 30	137.8	13 07.1	96 30	138.0	1
2	15 12.3	96 31	136.2	14 43.8	96 30	136.4	14 15.2	96 30	136.5	13 46.6	96 30	136.7	13 18.0	96 30	136.9	12 49.4	96 30	137.0	2
3	14 54.0	96 31	135.3	14 25.4	96 31	135.4	13 56.9	96 31	135.6	13 28.4	96 31	135.7	12 59.8	96 31	135.9	12 31.3	96 31	136.0	3
4	14 35.3	96 32	134.3	14 06.8	96 32	134.4	13 38.3	96 31	134.6	13 09.8	96 31	134.8	12 41.3	96 31	134.9	12 12.8	96 31	135.1	4
5	14 16.3	95 32	133.3	13 47.9	95 32	133.5	13 19.5	95 32	133.6	12 51.0	95 32	133.8	12 22.6	95 32	133.9	11 54.1	95 32	134.1	5
6	13 57.0	95 33	132.3	13 28.6	95 33	132.5	13 00.3	95 32	132.7	12 31.9	95 32	132.8	12 03.5	95 32	133.0	11 35.1	95 32	133.2	6
7	13 37.4	94 33	131.3	13 09.1	94 33	131.5	12 40.8	94 33	131.7	12 12.4	94 33	131.9	11 44.1	94 33	132.0	11 15.7	95 33	132.2	7
8	13 17.5	94 34	130.4	12 49.3	94 34	130.6	12 21.0	94 33	130.7	12 02.7	94 33	130.9	11 24.4	94 33	131.1	10 56.1	94 33	131.2	8
9	12 57.4	94 34	129.4	12 29.1	94 34	129.6	12 00.9	94 34	129.8	11 32.7	94 34	129.9	11 04.4	94 34	130.1	10 36.2	94 34	130.3	9
10	12 36.9	94 35	128.5	12 08.7	94 34	128.6	11 40.5	94 34	128.8	11 12.4	94 34	129.0	10 44.2	94 34	129.2	10 16.0	94 34	129.3	10
1	12 16.2	94 35	127.5	11 48.0	94 35	127.7	11 19.9	94 35	127.9	10 51.8	94 35	128.0	10 23.6	94 35	128.2	9 55.5	94		

Lat. 64°

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	As.															
00	34 00.0	1.00 180.0	34 30.0	1.00 180.0	35 00.0	1.00 180.0	35 30.0	1.00 180.0	36 00.0	1.00 180.0	36 30.0	1.00 180.0	37 00.0	1.00 180.0	37 30.0	1.00 180.0	00
1	33 59.7	1.001 178.8	34 29.7	1.001 178.8	34 59.7	1.001 178.8	35 29.7	1.001 178.8	35 59.7	1.001 178.8	36 29.7	1.001 178.8	36 59.7	1.001 178.8	37 29.7	1.001 178.8	1
2	33 58.9	1.002 177.6	34 28.9	1.002 177.6	34 58.9	1.002 177.6	35 28.9	1.002 177.6	35 58.9	1.002 177.6	36 28.9	1.002 177.6	36 58.9	1.002 177.6	37 28.9	1.002 177.6	2
3	33 57.5	1.003 176.4	34 27.5	1.003 176.4	34 57.5	1.003 176.4	35 27.5	1.003 176.4	35 57.5	1.003 176.4	36 27.5	1.003 176.4	36 57.5	1.003 176.4	37 27.5	1.003 176.4	3
4	33 55.6	1.004 175.2	34 25.6	1.004 175.2	34 55.6	1.004 175.2	35 25.6	1.004 175.2	35 55.6	1.004 175.2	36 25.6	1.004 175.2	36 55.6	1.004 175.2	37 25.6	1.004 175.2	4
05	33 53.2	1.005 174.0	34 23.1	1.005 174.0	34 53.1	1.005 174.0	35 23.1	1.005 173.9	35 53.0	1.005 173.9	36 23.0	1.005 173.9	36 53.0	1.005 173.9	37 22.9	1.005 173.8	05
6	33 50.1	1.006 172.8	34 20.1	1.006 172.8	34 50.1	1.006 172.8	35 20.1	1.006 172.7	35 50.0	1.006 172.7	36 19.9	1.006 172.7	36 49.9	1.006 172.6	37 19.8	1.006 172.6	6
7	33 46.1	1.007 171.7	34 16.5	1.007 171.6	34 46.5	1.007 171.6	35 16.4	1.007 171.5	35 46.3	1.007 171.5	36 16.3	1.007 171.5	36 46.3	1.007 171.4	37 16.1	1.007 171.4	7
8	33 42.5	1.008 170.5	34 12.4	1.008 170.4	34 42.3	1.008 170.4	35 12.3	1.008 170.3	35 42.2	1.008 170.3	36 12.1	1.008 170.2	36 42.0	1.008 170.2	37 11.9	1.008 170.1	8
9	33 37.9	1.009 169.3	34 07.8	1.009 169.2	34 37.7	1.009 169.2	35 07.6	1.009 169.1	35 37.5	1.009 169.1	36 07.4	1.009 169.0	36 37.3	1.009 168.9	37 07.1	1.009 168.9	9
10	33 32.7	1.009 168.1	34 02.6	1.010 168.0	34 32.5	1.010 168.0	35 02.3	1.010 167.9	35 32.2	1.010 167.9	36 02.1	1.010 167.8	36 31.9	1.010 167.8	37 01.8	1.010 167.7	10
1	33 27.0	09 10 166.9	33 56.9	09 10 166.9	34 26.7	09 10 166.8	34 56.6	09 10 166.7	35 26.4	09 11 166.7	35 56.3	09 11 166.6	36 26.1	09 11 166.5	36 55.9	09 11 166.5	1
2	33 20.8	09 11 165.7	33 50.6	09 11 165.7	34 20.5	09 11 165.6	34 50.3	09 11 165.5	35 20.1	09 11 165.5	35 49.9	09 12 165.4	36 19.7	09 12 165.3	36 49.5	09 12 165.3	2
3	33 14.1	09 12 164.6	33 43.9	09 12 164.5	34 13.6	09 12 164.4	34 43.4	09 12 164.3	35 13.2	09 12 164.3	35 43.0	09 12 164.2	36 12.8	09 12 164.1	36 42.5	09 12 164.0	3
4	33 06.8	09 13 163.4	33 36.6	09 13 163.3	34 06.3	09 13 163.2	34 36.1	09 13 163.1	35 05.8	09 13 163.1	35 35.6	09 13 163.0	36 05.3	09 13 162.9	36 35.0	09 13 162.8	4
15	32 59.0	09 14 162.2	33 28.7	09 14 162.1	33 58.5	09 14 162.0	34 28.2	09 14 162.0	34 57.9	09 14 161.9	35 27.6	09 14 161.8	35 57.3	09 14 161.7	36 27.0	09 14 161.6	15
6	32 50.7	09 15 161.0	33 20.4	09 15 161.0	33 50.1	09 15 160.9	34 19.8	09 15 160.8	34 49.5	09 15 160.7	35 19.1	09 15 160.6	35 48.8	09 15 160.5	36 18.5	09 15 160.4	6
7	32 41.9	09 16 159.9	33 11.6	09 16 159.8	33 41.2	09 16 159.7	34 10.9	09 16 159.6	34 40.5	09 16 159.5	35 10.1	09 16 159.4	35 39.8	09 16 159.3	36 09.4	09 16 159.2	7
8	32 32.6	09 16 158.7	33 02.2	09 16 158.6	33 31.8	09 16 158.5	34 01.4	09 17 158.4	34 31.0	09 17 158.3	35 00.6	09 17 158.2	35 30.2	09 17 158.1	35 59.8	09 17 158.0	8
9	32 22.8	09 17 157.6	32 52.4	09 17 157.5	33 22.0	09 17 157.4	33 51.5	09 17 157.3	34 21.1	09 17 157.2	34 50.6	09 18 157.0	35 20.2	09 18 156.9	35 49.7	09 18 156.8	9
20	32 12.6	09 18 156.4	32 42.1	09 18 156.3	33 11.6	09 18 156.2	33 41.1	09 18 156.1	34 10.6	09 18 156.0	34 40.1	09 18 155.9	35 09.6	09 18 155.8	35 39.1	09 18 155.6	20
1	32 01.8	09 19 155.3	32 31.3	09 19 155.1	33 00.7	09 19 155.0	33 30.2	09 19 154.9	33 59.7	09 19 154.8	34 29.1	09 19 154.7	34 58.6	09 19 154.6	35 28.0	09 19 154.5	1
2	31 50.5	09 20 154.1	32 20.0	09 20 154.0	32 49.4	09 20 153.9	33 18.8	09 20 153.8	33 48.2	09 20 153.8	34 17.6	09 20 153.5	34 47.0	09 20 153.4	35 16.4	09 20 153.3	2
3	31 38.8	09 20 153.0	32 08.0	09 20 152.8	32 37.6	09 20 152.7	33 06.9	09 21 152.6	33 36.3	09 21 152.5	34 05.7	09 21 152.4	34 34.5	09 21 152.2	35 04.4	09 21 152.1	3
4	31 26.6	09 21 151.8	31 56.0	09 21 151.7	32 25.3	09 21 151.6	32 54.6	09 21 151.5	33 23.9	09 21 151.3	33 53.2	09 22 151.2	34 22.5	09 22 151.1	34 51.8	09 22 150.9	4
25	31 14.0	09 22 150.7	31 43.3	09 22 150.6	32 12.5	09 22 150.5	32 41.8	09 22 150.3	33 11.1	09 22 150.2	33 40.3	09 22 150.0	34 09.6	09 22 149.8	34 38.8	09 22 149.8	25
6	31 00.9	09 23 149.6	31 30.1	09 23 149.4	31 59.3	09 23 149.3	32 28.6	09 23 149.2	32 57.8	09 23 149.0	33 27.0	09 23 148.9	33 56.2	09 23 148.8	34 25.3	09 23 148.6	6
7	30 47.3	09 23 148.4	31 16.5	09 23 148.3	31 45.7	09 24 148.2	32 14.9	09 24 148.0	32 44.0	09 24 147.9	33 13.2	09 24 147.8	33 42.3	09 24 147.6	34 11.4	09 24 147.5	7
8	30 33.4	09 24 147.3	31 02.5	09 24 147.2	31 31.6	09 24 147.0	32 00.7	09 24 146.9	32 29.8	09 24 146.8	32 58.9	09 24 146.6	33 28.0	09 24 146.5	33 57.0	09 24 146.3	8
9	30 18.9	09 25 146.2	30 48.2	09 25 146.1	31 17.1	09 25 145.9	31 46.1	09 25 145.8	32 15.9	09 25 145.6	32 44.2	09 25 145.5	33 12.3	09 25 145.3	33 42.2	09 25 145.2	9
30	30 04.1	09 25 145.1	30 33.1	09 25 145.0	31 02.1	09 25 144.8	31 31.1	09 25 144.7	32 00.1	09 25 144.5	32 29.1	09 25 144.4	32 58.0	09 25 144.2	33 27.0	09 25 144.0	30
1	29 48.9	09 26 144.0	30 17.8	09 26 143.8	30 46.8	09 26 143.7	31 15.7	09 26 143.5	31 44.6	09 26 143.4	32 13.6	09 27 143.2	32 42.5	09 27 143.1	33 11.3	09 27 142.9	1
2	29 33.2	09 27 142.9	30 02.1	09 27 142.7	30 31.0	09 27 142.6	30 59.9	09 27 142.3	31 28.7	09 27 142.3	31 57.6	09 27 142.1	32 26.4	09 27 141.9	32 55.3	09 27 141.8	2
3	29 17.1	09 27 141.8	29 46.0	09 28 141.6	30 14.8	09 28 141.5	30 43.6	09 28 141.3	31 12.4	09 28 141.2	31 41.2	09 28 141.0	32 10.0	09 28 140.8	32 38.8	09 28 140.7	3
4	29 00.7	09 28 140.7	29 29.5	09 28 140.6	29 58.2	09 28 140.4	30 27.0	09 28 140.2	30 55.8	09 28 140.1	31 24.5	09 29 139.9	31 53.2	09 29 139.7	32 21.9	09 29 139.6	4
35	28 43.8	09 29 139.6	29 12.5	09 29 139.5	29 41.3	09 29 139.3	30 10.0	09 29 139.0	30 38.7	09 29 138.9	31 07.4	09 29 138.8	31 36.0	09 29 138.6	32 04.7	09 29 138.4	35
6	28 26.6	09 30 138.5	28 55.5	09 30 138.4	29 23.9	09 30 138.2	29 52.6	09 30 138.0	30 21.2	09 30 137.9	30 49.8	09 30 137.7	31 18.5	09 30 137.5	31 47.0	09 30 137.3	6
7	28 09.0	09 30 137.5	28 37.6	09 30 137.3	29 06.2	09 30 137.1	29 34.8	09 30 136.9	30 03.4	09 30 136.8	30 32.0	09 30 136.6	31 00.5	09 30 136.4	31 29.0	09 30 136.2	7
8	27 51.0	09 31 136.4	28 19.6	09 31 136.2	28 48.1	09 31 136.1	29 16.7	09 31 135.9	29 45.2	09 31 135.7	30 13.7	09 31 135.5	30 42.2	09 31 135.3	31 10.7	09 31 135.2	8
9	27 32.7	09 31 135.3	28 02.2	09 31 135.2	28 29.7	09 31 135.0	28 58.2	09 31 134.8	29 26.7	09 31 134.6	29 55.1	09 32 134.4	30 23.5	09 32 134.3	30 52.0	09 32 134.1	9
40	27 14.1	09 32 134.3	27 42.5	09 32 134.1	28 10.9	09 32 133.9	28 39.4	09 32 133.7	29 07.8	09 32 133.6	29 36.2	09 32 133.4	30 04.5	09 32 133.2	30 32.9	09 32 133.0	40
1	26 55.1	09 32 133.2	27 23.5	09 32 133.0	27 51.8	09 32 132.9	28 20.2	09 32 132.7	28 48.5	09 32 132.5	29 16.9	09 32 132.3	29 45.2	09 32 132.1	30 13.5	09 32 131.9	1
2	26 35.7	09 33 132.2	27 04.1	09 33 132.0	27 32.4	09 33 131.8	28 00.7	09 33 131.6	28 29.0	09 33 131.4	28 57.3	09 33 131.2	29 25.6	09 33 131.0	29 53.7	09 33 130.9	2
3	26 16.1	09 33 131.1	26 44.4	09 33 131.0	27 12.6	09 33 130.8	27 40.9	09 33 130.6	28 09.1	09 33 130.4	28 37.3	09 33 130.2	29 05.5	09 33 130.0	29 33.7	09 33 129.8	3
4	25 56.1	09 34 130.1	26 24.3	09 34 129.9	26 52.5	09 34 129.7	27 20.7	09 34 129.5	27 48.9	09 34 129.3	28 17.1	09 34 129.1	28 45.2	09 34 128.9	29 13.3	09 34 128.7	4
45	25 35.9	09 34 129.1	26 04.0	09 34 128.9	26 32.2	09 34 128.7	27 00.3	09 34 128.5	27 28.4	09 34 128.3	27 56.5	09 34 128.1	28 24.6	09			

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
00	1800.0	180.0	1730.0	180.0	1700.0	180.0	1630.0	180.0	1600.0	180.0	1530.0	180.0	1500.0	180.0	1430.0	180.0	00
1	1759.8	179.0	1729.8	179.0	1659.8	179.0	1629.8	179.0	1559.8	179.0	1529.8	179.0	1459.8	179.0	1429.8	179.0	1
2	1759.0	177.9	1729.0	177.9	1659.0	177.9	1629.0	177.9	1559.0	177.9	1529.0	177.9	1459.0	177.9	1429.0	177.9	2
3	1757.8	176.9	1727.8	176.9	1657.8	176.9	1627.8	176.9	1557.8	176.9	1527.8	176.9	1457.8	176.9	1427.8	176.9	3
4	1756.2	175.8	1726.2	175.8	1656.2	175.8	1626.2	175.8	1556.2	175.8	1526.2	175.8	1456.2	175.8	1426.2	175.8	4
05	1754.0	174.8	1724.1	174.8	1654.1	174.8	1624.1	174.8	1554.1	174.8	1524.1	174.8	1454.2	174.9	1424.2	174.9	05
6	1751.4	173.8	1721.4	173.8	1651.5	173.8	1621.5	173.8	1551.5	173.8	1521.6	173.9	1451.6	173.9	1421.6	173.9	6
7	1748.3	172.7	1718.4	172.7	1648.4	172.7	1618.5	172.8	1548.5	172.8	1518.5	172.9	1448.6	172.9	1418.6	172.9	7
8	1744.7	171.7	1714.8	171.7	1644.9	171.7	1614.9	171.8	1545.0	171.8	1515.0	171.8	1445.1	171.9	1415.2	171.9	8
9	1740.7	170.6	1710.8	170.7	1640.9	170.7	1610.9	170.8	1541.0	170.8	1511.1	170.8	1441.2	170.9	1411.2	170.9	9
10	1736.2	169.6	1706.3	169.6	1636.4	169.7	1606.5	169.7	1536.6	169.8	1506.7	169.8	1436.8	169.9	1406.8	169.9	10
1	1731.2	168.6	1701.3	168.6	1631.4	168.7	1601.5	168.7	1531.6	168.8	1501.7	168.8	1431.8	168.9	1401.8	168.9	1
2	1725.8	167.5	1695.9	167.6	1626.0	167.6	1596.1	167.7	1526.2	167.7	1496.3	167.8	1426.4	167.8	1396.5	167.9	2
3	1719.9	166.5	1690.0	166.6	1620.1	166.6	1590.2	166.7	1520.3	166.7	1490.4	166.8	1420.5	166.8	1390.6	166.9	3
4	1713.5	165.5	1683.7	165.5	1613.8	165.6	1583.9	165.6	1514.0	165.7	1484.1	165.8	1414.2	165.8	1384.3	165.9	4
15	1706.7	164.4	1676.9	164.5	1607.1	164.5	1577.2	164.6	1507.3	164.6	1477.4	164.7	1407.5	164.8	1377.6	164.9	15
6	1699.4	163.4	1669.6	163.5	1600.0	163.5	1570.1	163.6	1500.2	163.7	1470.3	163.7	1400.4	163.8	1370.5	163.9	6
7	1691.7	162.4	1661.9	162.5	1592.5	162.5	1562.6	162.6	1492.7	162.7	1462.8	162.7	1392.9	162.8	1363.0	162.9	7
8	1683.5	161.4	1653.8	161.5	1584.4	161.5	1554.5	161.6	1484.6	161.7	1454.7	161.7	1384.8	161.8	1354.9	161.9	8
9	1674.8	160.3	1645.1	160.4	1575.9	160.4	1546.0	160.5	1476.1	160.6	1446.2	160.7	1376.3	160.8	1346.4	160.9	9
20	1665.8	159.3	1636.2	159.4	1567.1	159.4	1537.2	159.5	1467.3	159.6	1437.4	159.7	1367.5	159.8	1337.6	159.9	20
1	1656.3	158.3	1626.7	158.4	1557.6	158.4	1527.7	158.5	1457.8	158.6	1427.9	158.7	1358.0	158.8	1328.1	158.9	1
2	1646.3	157.3	1616.7	157.4	1547.6	157.4	1517.7	157.5	1447.8	157.6	1417.9	157.7	1348.0	157.8	1318.1	157.9	2
3	1635.8	156.3	1606.2	156.4	1537.5	156.4	1507.6	156.5	1437.7	156.6	1407.8	156.7	1337.9	156.8	1308.0	156.9	3
4	1624.8	155.3	1595.7	155.4	1527.0	155.4	1497.1	155.5	1427.2	155.6	1397.3	155.7	1327.4	155.8	1297.5	155.9	4
25	1613.3	154.3	1584.2	154.3	1515.5	154.4	1485.6	154.5	1415.7	154.6	1385.8	154.7	1315.9	154.8	1286.0	154.9	25
6	1601.8	153.3	1572.7	153.3	1504.0	153.4	1474.1	153.5	1404.2	153.6	1374.3	153.7	1304.4	153.8	1274.5	153.9	6
7	1590.3	152.2	1561.2	152.3	1492.5	152.3	1462.6	152.4	1392.7	152.5	1362.8	152.6	1292.9	152.7	1263.0	152.8	7
8	1577.8	151.2	1548.7	151.3	1480.0	151.3	1450.1	151.4	1380.2	151.5	1350.3	151.6	1280.4	151.7	1250.5	151.8	8
9	1564.3	150.2	1535.2	150.3	1466.5	150.3	1436.6	150.4	1366.7	150.5	1336.8	150.6	1266.9	150.7	1237.0	150.8	9
30	1550.8	149.2	1521.7	149.3	1453.0	149.3	1423.1	149.4	1353.2	149.5	1323.3	149.6	1253.4	149.7	1223.5	149.8	30
1	1537.3	148.2	1508.2	148.3	1440.0	148.3	1410.1	148.4	1340.2	148.5	1310.3	148.6	1240.4	148.7	1210.5	148.8	1
2	1523.8	147.2	1494.7	147.3	1426.5	147.3	1396.6	147.4	1326.7	147.5	1296.8	147.6	1226.9	147.7	1197.0	147.8	2
3	1510.3	146.2	1481.2	146.3	1413.0	146.3	1383.1	146.4	1313.2	146.5	1283.3	146.6	1213.4	146.7	1183.5	146.8	3
4	1496.8	145.2	1467.7	145.3	1400.0	145.3	1370.1	145.4	1300.2	145.5	1270.3	145.6	1200.4	145.7	1170.5	145.8	4
35	1482.3	144.3	1454.2	144.3	1387.0	144.4	1357.1	144.5	1287.2	144.6	1257.3	144.7	1187.4	144.8	1157.5	144.9	35
6	1467.8	143.3	1440.7	143.4	1373.5	143.4	1343.6	143.5	1273.7	143.6	1243.8	143.7	1173.9	143.8	1144.0	143.9	6
7	1453.3	142.3	1427.2	142.4	1360.0	142.4	1330.1	142.5	1260.2	142.6	1230.3	142.7	1160.4	142.8	1130.5	142.9	7
8	1438.8	141.4	1413.7	141.5	1346.5	141.5	1316.6	141.6	1246.7	141.7	1216.8	141.8	1146.9	141.9	1117.0	142.0	8
9	1424.3	140.4	1400.2	140.5	1333.0	140.5	1303.1	140.6	1233.2	140.7	1203.3	140.8	1133.4	140.9	1103.5	141.0	9
40	1409.8	139.4	1385.7	139.5	1320.0	139.5	1290.1	139.6	1220.2	139.7	1190.3	139.8	1120.4	139.9	1090.5	140.0	40
1	1395.3	138.4	1371.2	138.5	1306.5	138.5	1276.6	138.6	1206.7	138.7	1176.8	138.8	1106.9	138.9	1077.0	139.0	1
2	1380.8	137.4	1356.7	137.5	1292.0	137.5	1262.1	137.6	1192.2	137.7	1162.3	137.8	1092.4	137.9	1062.5	138.0	2
3	1366.3	136.4	1342.2	136.5	1278.5	136.5	1248.6	136.6	1178.7	136.7	1148.8	136.8	1078.9	136.9	1049.0	137.0	3
4	1351.8	135.4	1327.7	135.5	1264.0	135.5	1234.1	135.6	1164.2	135.7	1134.3	135.8	1064.4	135.9	1034.5	136.0	4
45	1337.3	134.4	1313.2	134.5	1250.0	134.5	1220.1	134.6	1150.2	134.7	1120.3	134.8	1050.4	134.9	1020.5	135.0	45
6	1322.8	133.4	1298.7	133.5	1236.0	133.5	1206.1	133.6	1136.2	133.7	1106.3	133.8	1036.4	133.9	1006.5	134.0	6
7	1308.3	132.4	1284.2	132.5	1222.0	132.5	1192.1	132.6	1122.2	132.7	1092.3	132.8	1022.4	132.9	992.5	133.0	7
8	1293.8	131.4	1269.7	131.5	1208.0	131.5	1178.1	131.6	1108.2	131.7	1078.3	131.8	1008.4	131.9	978.5	132.0	8
9	1279.3	130.4	1255.2	130.5	1194.0	130.5	1164.1	130.6	1094.2	130.7	1064.3	130.8	994.4	130.9	964.5	131.0	9
50	1264.8	129.4	1240.7	129.5	1180.0	129.5	1150.1	129.6	1080.2	129.7	1050.3	129.8	980.4	129.9	950.5	130.0	50
1	1250.3	128.4	1226.2	128.5	1166.0	128.5	1136.1	128.6	1066.2	128.7	1036.3	128.8	966.4	128.9	936.5	129.0	1
2	1235.8	127.4	1211.7	127.5	1151.5	127.5	1121.6	127.6	1051.7	127.7	1021.8	127.8	951.9	127.9	922.0	128.0	2
3	1221.3	126.4	1197.2	126.5	1137.0	126.5	1107.1	126.6	1037.2	126.7	1007.3	126.8	937.4	126.9	907.5	127.0	3
4	1206.8	125.4	1182.7	125.5	1122.5	125.5	1092.6	125.6	1022.7	125.7	992.8	125.8	922.9	125.9	893.0	126.0	4
55	1192.3	124.4	1168.2	124.5	1108.0	124.5	1078.1	124.6	1008.2	124.7	978.3	124.8	908.4	124.9	878.5	125.0	55
6	1177.8	123.4	1153.7	123.5	1093.5	123.5	1063.6	123.6	993.7	123.7	963.8	123.8	893.9	123.9	864.0	124.0	6
7	1163.3	122.4	1139.2	122.5	1079.0	122.5	1049.1	122.6	979.2	122.7	949.3	122.8	879.4	122.9	849.5	123.0	7
8	1148.8	121.4	1124.7	121.5	1064.5	121.5	1034.6	121.6									

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.
	Alt.	Az.															
00	38 00.0	1.00 180.0	38 30.0	1.00 180.0	39 00.0	1.00 180.0	39 30.0	1.00 180.0	40 00.0	1.00 180.0	40 30.0	1.00 180.0	41 00.0	1.00 180.0	41 30.0	1.00 180.0	00
1	37 59.7	1.001 178.8	38 29.7	1.001 178.8	38 59.7	1.001 178.7	39 29.7	1.001 178.7	39 59.7	1.001 178.7	40 29.7	1.001 178.7	40 59.7	1.001 178.7	41 29.7	1.001 178.7	1
2	37 58.9	1.002 177.5	38 28.9	1.002 177.5	38 58.8	1.002 177.5	39 28.8	1.002 177.5	39 58.8	1.002 177.5	40 28.8	1.002 177.5	40 58.8	1.002 177.4	41 28.8	1.002 177.4	2
3	37 57.4	1.003 176.3	38 27.4	1.003 176.3	38 57.4	1.003 176.2	39 27.4	1.003 176.2	39 57.4	1.003 176.2	40 27.4	1.003 176.2	40 57.4	1.003 176.2	41 27.4	1.003 176.1	3
4	37 55.4	1.004 175.0	38 25.4	1.004 175.0	38 55.4	1.004 175.0	39 25.4	1.004 175.0	39 55.4	1.004 174.9	40 25.3	1.004 174.9	40 55.3	1.004 174.9	41 25.3	1.004 174.9	4
05	37 52.9	1.005 173.8	38 22.9	1.005 173.8	38 52.8	1.005 173.7	39 22.8	1.005 173.7	39 52.7	1.005 173.7	40 22.7	1.005 173.6	40 52.7	1.005 173.6	41 22.6	1.005 173.6	05
6	37 49.8	1.006 172.6	38 19.8	1.006 172.5	38 49.7	1.006 172.5	39 19.6	1.006 172.4	39 49.6	1.006 172.4	40 19.5	1.006 172.4	40 49.4	1.006 172.3	41 19.4	1.006 172.3	6
7	37 46.1	1.007 171.3	38 16.0	1.007 171.3	38 45.9	1.007 171.2	39 15.9	1.007 171.2	39 45.8	1.007 171.2	40 15.7	1.007 171.1	40 45.6	1.007 171.1	41 15.6	1.007 171.0	7
8	37 41.8	1.008 170.0	38 11.7	1.008 170.0	38 41.7	1.008 170.0	39 11.6	1.008 169.9	39 41.5	1.008 169.9	40 11.4	1.008 169.8	40 41.3	1.008 169.8	41 11.2	1.008 169.7	8
9	37 37.0	1.009 168.9	38 06.9	1.009 168.8	38 36.8	1.009 168.8	39 06.7	1.009 168.7	39 36.6	1.009 168.6	40 06.4	1.009 168.5	40 36.3	1.009 168.5	41 06.2	1.009 168.5	9
10	37 31.7	1.010 167.6	38 01.5	1.010 167.6	38 31.4	1.010 167.5	39 01.2	1.010 167.4	39 31.1	1.010 167.4	40 01.0	1.010 167.3	40 30.8	1.010 167.3	41 00.7	1.010 167.2	10
1	37 25.8	1.011 166.4	37 55.6	1.011 166.3	38 25.4	1.011 166.3	38 55.3	1.011 166.2	39 25.1	1.011 166.1	39 54.9	1.011 166.1	40 24.7	1.011 166.0	40 54.5	1.011 165.9	1
2	37 19.3	1.012 165.2	37 49.1	1.012 165.1	38 19.0	1.012 165.0	38 48.7	1.012 165.0	39 18.5	1.012 164.9	39 48.3	1.012 164.8	40 18.1	1.012 164.7	40 47.9	1.012 164.7	2
3	37 12.3	1.013 164.0	37 42.1	1.013 163.9	38 11.8	1.013 163.8	38 41.6	1.013 163.7	39 11.4	1.013 163.6	39 41.1	1.013 163.6	40 10.9	1.013 163.5	40 40.6	1.013 163.4	3
4	37 04.8	1.014 162.7	37 34.5	1.014 162.6	38 04.2	1.014 162.6	38 34.0	1.014 162.5	39 03.7	1.014 162.4	39 33.4	1.014 162.3	40 03.1	1.014 162.2	40 32.8	1.014 162.1	4
15	36 56.7	1.015 161.5	37 26.4	1.015 161.4	37 56.1	1.015 161.3	38 25.8	1.015 161.2	38 55.5	1.015 161.2	39 25.1	1.015 161.1	39 54.8	1.015 161.0	40 24.5	1.015 160.9	15
6	36 48.1	1.016 160.3	37 17.8	1.016 160.2	37 47.4	1.016 160.1	38 17.1	1.016 160.0	38 46.7	1.016 159.9	39 16.3	1.016 159.8	39 46.0	1.016 159.7	40 15.6	1.016 159.6	6
7	36 39.0	1.017 159.1	37 08.6	1.017 159.0	37 38.2	1.017 158.9	38 07.8	1.017 158.8	38 37.4	1.017 158.7	39 07.0	1.017 158.6	39 36.6	1.017 158.5	40 06.2	1.017 158.4	7
8	36 29.4	1.018 157.9	36 58.9	1.018 157.8	37 28.5	1.018 157.7	37 58.1	1.018 157.6	38 27.6	1.018 157.5	38 57.2	1.018 157.4	39 26.7	1.018 157.3	39 56.2	1.018 157.1	8
9	36 19.2	1.019 156.7	36 48.7	1.019 156.6	37 18.3	1.019 156.5	37 47.8	1.019 156.4	38 17.3	1.019 156.3	38 46.8	1.019 156.2	39 16.3	1.019 156.0	39 45.7	1.019 155.9	9
20	36 08.6	1.020 155.5	36 38.1	1.020 155.4	37 07.5	1.020 155.3	37 37.0	1.020 155.2	38 06.4	1.020 155.1	38 35.9	1.020 154.9	39 05.3	1.020 154.8	39 34.8	1.020 154.7	20
1	35 57.4	1.021 154.3	36 26.9	1.021 154.2	36 56.3	1.021 154.1	37 25.7	1.021 154.0	37 55.1	1.021 153.8	38 24.5	1.021 153.7	38 53.9	1.021 153.6	39 23.3	1.021 153.5	1
2	35 45.8	1.022 153.2	36 15.2	1.022 153.0	36 44.5	1.022 152.9	37 13.9	1.022 152.8	37 43.3	1.022 152.6	38 12.6	1.022 152.5	38 41.9	1.022 152.4	39 11.3	1.022 152.2	2
3	35 33.7	1.023 152.0	36 03.0	1.023 151.8	36 32.3	1.023 151.7	37 01.6	1.023 151.6	37 30.9	1.023 151.4	38 00.2	1.023 151.3	38 29.5	1.023 151.2	38 58.8	1.023 151.0	3
4	35 21.1	1.024 150.8	35 50.4	1.024 150.7	36 19.6	1.024 150.5	36 48.9	1.024 150.4	37 18.1	1.024 150.3	37 47.3	1.024 150.1	38 16.6	1.024 150.0	38 45.8	1.024 149.8	4
25	35 08.0	1.025 149.6	35 37.2	1.025 149.5	36 06.4	1.025 149.4	36 35.6	1.025 149.2	37 04.8	1.025 149.1	37 34.0	1.025 148.9	38 03.2	1.025 148.8	38 32.3	1.025 148.6	25
6	34 54.5	1.026 148.5	35 23.7	1.026 148.3	35 52.8	1.026 148.2	36 21.9	1.026 148.0	36 51.1	1.026 147.9	37 20.2	1.026 147.7	37 49.3	1.026 147.6	38 18.4	1.026 147.4	6
7	34 40.5	1.027 147.3	35 09.6	1.027 147.2	35 38.7	1.027 147.0	36 07.8	1.027 146.9	36 36.9	1.027 146.7	37 05.9	1.027 146.6	37 35.0	1.027 146.4	38 04.0	1.027 146.2	7
8	34 26.1	1.028 146.2	34 55.1	1.028 146.0	35 24.2	1.028 145.9	35 53.2	1.028 145.7	36 22.2	1.028 145.5	36 51.2	1.028 145.4	37 20.2	1.028 145.2	37 49.2	1.028 145.1	8
9	34 11.2	1.029 145.0	34 40.2	1.029 144.9	35 09.2	1.029 144.7	35 38.2	1.029 144.5	36 07.1	1.029 144.4	36 36.0	1.029 144.2	37 05.0	1.029 144.1	37 33.9	1.029 143.9	9
30	33 55.9	1.030 143.9	34 24.9	1.030 143.7	34 53.8	1.030 143.6	35 22.7	1.030 143.4	35 51.6	1.030 143.2	36 20.5	1.030 143.1	36 49.3	1.030 142.9	37 18.2	1.030 142.7	30
1	33 40.2	1.031 142.7	34 09.1	1.031 142.6	34 38.0	1.031 142.4	35 06.8	1.031 142.2	35 35.6	1.031 142.1	36 04.4	1.031 141.9	36 33.2	1.031 141.7	37 02.0	1.031 141.6	1
2	33 24.1	1.032 141.6	33 52.9	1.032 141.5	34 21.7	1.032 141.3	34 50.5	1.032 141.1	35 19.3	1.032 140.9	35 48.0	1.032 140.8	36 16.7	1.032 140.6	36 45.5	1.032 140.4	2
3	33 07.6	1.033 140.5	33 36.3	1.033 140.3	34 05.1	1.033 140.2	34 33.8	1.033 140.0	35 02.5	1.033 139.8	35 31.2	1.033 139.6	35 59.8	1.033 139.4	36 28.5	1.033 139.3	3
4	32 50.6	1.034 139.4	33 19.3	1.034 139.2	33 48.0	1.034 139.0	34 16.7	1.034 138.8	34 45.3	1.034 138.7	35 13.9	1.034 138.5	35 42.5	1.034 138.3	36 11.1	1.034 138.1	4
35	32 33.3	1.035 138.3	33 02.0	1.035 138.1	33 30.6	1.035 137.9	33 59.2	1.035 137.7	34 27.7	1.035 137.5	34 56.3	1.035 137.4	35 24.8	1.035 137.2	35 53.4	1.035 137.0	35
6	32 15.6	1.036 137.2	32 44.2	1.036 137.0	33 12.7	1.036 136.8	33 41.3	1.036 136.6	34 09.8	1.036 136.4	34 38.3	1.036 136.2	35 06.8	1.036 136.0	35 35.2	1.036 135.9	6
7	31 57.6	1.037 136.1	32 26.1	1.037 135.9	32 54.6	1.037 135.7	33 23.0	1.037 135.5	33 51.5	1.037 135.3	34 19.9	1.037 135.1	34 48.3	1.037 134.9	35 16.7	1.037 134.7	7
8	31 39.1	1.038 135.0	32 07.6	1.038 134.8	32 36.0	1.038 134.6	33 04.4	1.038 134.4	33 32.8	1.038 134.2	34 01.2	1.038 134.0	34 29.5	1.038 133.8	34 57.9	1.038 133.6	8
9	31 20.4	1.039 133.9	31 48.7	1.039 133.7	32 17.1	1.039 133.5	32 45.5	1.039 133.3	33 13.8	1.039 133.1	33 42.1	1.039 132.9	34 10.4	1.039 132.7	34 38.7	1.039 132.5	9
40	31 01.2	1.040 132.8	31 29.5	1.040 132.6	31 57.9	1.040 132.4	32 26.1	1.040 132.2	32 54.4	1.040 132.0	33 22.7	1.040 131.8	33 50.9	1.040 131.6	34 19.1	1.040 131.4	40
1	30 41.8	1.041 131.7	31 10.0	1.041 131.5	31 38.3	1.041 131.3	32 06.5	1.041 131.1	32 34.7	1.041 130.9	33 02.9	1.041 130.7	33 31.1	1.041 130.5	33 59.2	1.041 130.3	1
2	30 22.6	1.042 130.7	30 50.2	1.042 130.5	31 18.4	1.042 130.3	31 46.5	1.042 130.1	32 14.7	1.042 129.9	32 42.8	1.042 129.7	33 10.9	1.042 129.4	33 39.0	1.042 129.2	2
3	30 01.9	1.043 129.6	30 30.0	1.043 129.4	30 58.1	1.043 129.2	31 26.2	1.043 129.0	31 54.3	1.043 128.8	32 22.4	1.043 128.6	32 50.4	1.043 128.4	33 18.5	1.043 128.2	3
4	29 41.4	1.044 128.5	30 09.5	1.044 128.3	30 37.6	1.044 128.1	31 05.6	1.044 127.9	31 33.7	1.044 127.7	32 01.7	1.044 127.5	32 29.7	1.044 127.3	32 57.6	1.044 127.1	4
45	29 20.7	1.045 127.5	29 48.7	1.045 127.3	30 16.8	1.045 127.1	30 44.7	1.045 126.9	31 12.7	1.045 126.7	31 40.7	1.045 126.5	32 08.6	1.045 126.2	32 36.5	1.04	

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	14 00.0	1.000	180.0	13 30.0	1.000	180.0	13 00.0	1.000	180.0	12 30.0	1.000	180.0	12 00.0	1.000	180.0	11 30.0	1.000	180.0	00
1	13 59.8	1.001	179.0	13 29.8	1.001	179.0	12 59.8	1.001	179.0	12 29.8	1.001	179.0	11 59.8	1.001	179.0	11 29.8	1.001	179.0	1
2	13 59.1	1.002	178.0	13 29.1	1.002	178.0	12 59.1	1.002	178.0	12 29.1	1.002	178.0	11 59.1	1.002	178.0	11 29.1	1.002	178.0	2
3	13 57.9	1.003	177.0	13 27.9	1.003	177.0	12 57.9	1.003	177.0	12 27.9	1.003	177.0	11 58.0	1.003	177.0	11 28.0	1.003	177.0	3
4	13 56.3	1.003	176.0	13 26.3	1.003	176.0	12 56.3	1.003	176.0	12 26.3	1.003	176.0	11 56.4	1.003	176.0	11 26.4	1.003	176.0	4
05	13 54.2	1.004	175.0	13 24.2	1.004	175.0	12 54.3	1.004	175.0	12 24.3	1.004	175.0	11 54.3	1.004	175.0	11 24.3	1.004	175.0	05
6	13 51.7	1.005	174.0	13 21.7	1.005	174.0	12 51.7	1.005	174.0	12 21.8	1.005	174.0	11 51.8	1.005	174.0	11 21.8	1.005	174.0	6
7	13 48.7	1.006	173.0	13 18.7	1.006	173.0	12 48.8	1.006	173.0	12 18.8	1.006	173.0	11 48.9	1.006	173.0	11 18.9	1.006	173.0	7
8	13 45.2	1.006	171.9	13 15.3	1.006	172.0	12 45.3	1.006	172.0	12 15.4	1.006	172.0	11 45.5	1.006	172.0	11 15.5	1.006	172.0	8
9	13 41.3	1.007	170.9	13 11.4	1.007	171.0	12 41.5	1.007	171.0	12 11.5	1.007	171.0	11 41.6	1.007	171.0	11 11.7	1.007	171.0	9
10	13 36.9	1.008	169.9	13 07.0	1.008	170.0	12 37.1	1.008	170.0	12 07.2	1.008	170.0	11 37.3	1.008	170.0	11 07.4	1.008	170.0	10
1	13 32.1	1.009	168.9	13 02.2	1.009	169.0	12 32.3	1.009	169.0	12 02.4	1.009	169.0	11 32.6	1.009	169.0	11 02.7	1.009	169.0	1
2	13 26.8	1.010	167.9	12 57.0	1.010	168.0	12 27.1	1.009	168.0	11 57.2	1.009	168.0	11 27.4	1.009	168.0	11 07.5	1.009	168.0	2
3	13 21.1	09 10	166.9	12 51.3	09 10	167.0	12 21.4	09 10	167.0	11 51.6	09 10	167.0	11 21.7	09 10	167.0	11 07.6	09 10	167.0	3
4	13 14.9	09 11	165.9	12 45.1	09 11	166.0	12 15.3	09 11	166.0	11 45.5	09 11	166.0	11 15.7	09 11	166.0	11 07.7	09 11	166.0	4
15	13 08.3	09 12	164.9	12 38.5	09 12	165.0	12 08.7	09 12	165.0	11 38.9	09 12	165.0	11 09.1	09 12	165.0	11 07.8	09 12	165.0	15
6	13 01.3	09 12	163.9	12 31.5	09 12	164.0	12 01.7	09 12	164.0	11 32.0	09 12	164.0	11 02.2	09 12	164.0	11 07.9	09 12	164.0	6
7	12 53.8	09 13	162.9	12 24.0	09 13	163.0	11 54.3	09 13	163.0	11 24.5	09 13	163.0	11 04.8	09 13	163.0	11 07.9	09 13	163.0	7
8	12 45.8	09 14	161.9	12 16.1	09 14	162.0	11 46.4	09 14	162.0	11 16.7	09 14	162.0	11 07.0	09 14	162.0	11 07.9	09 14	162.0	8
9	12 37.5	09 15	161.0	12 07.8	09 15	161.0	11 38.1	09 15	161.0	11 08.4	09 15	161.0	11 07.9	09 15	161.0	11 07.9	09 15	161.0	9
20	12 28.7	09 15	160.0	11 59.0	09 15	160.0	11 29.4	09 15	160.0	11 09.7	09 15	160.0	11 00.4	09 15	160.0	11 07.9	09 15	160.0	20
1	12 19.4	09 16	159.0	11 49.8	09 16	159.0	11 20.2	09 16	159.0	11 00.6	09 16	159.0	10 51.4	09 16	159.0	11 07.9	09 16	159.0	1
2	12 09.8	09 17	158.0	11 40.2	09 17	158.0	11 10.6	09 17	158.0	10 41.1	09 17	158.0	10 31.9	09 17	158.0	11 07.9	09 17	158.0	2
3	11 59.7	09 17	157.0	11 30.2	09 17	157.0	11 00.7	09 17	157.0	10 31.1	09 17	157.0	10 21.6	09 17	157.0	11 07.9	09 17	157.0	3
4	11 49.2	09 18	156.0	11 19.7	09 18	156.0	10 50.2	09 18	156.0	10 20.7	09 18	156.0	10 11.2	09 18	156.0	11 07.9	09 18	156.0	4
25	11 38.3	09 19	155.0	11 08.9	09 19	155.0	10 39.4	09 19	155.0	10 10.0	09 19	155.0	9 40.5	09 19	155.0	11 07.9	09 19	155.0	25
6	11 27.0	09 20	154.1	10 57.6	09 20	154.2	10 28.2	09 20	154.3	9 58.8	09 20	154.4	9 29.4	09 20	154.5	11 07.9	09 20	154.5	6
7	11 15.3	09 20	153.1	10 46.0	09 20	153.2	10 16.6	09 20	153.3	9 47.2	09 20	153.4	9 17.8	09 20	153.5	11 07.9	09 20	153.5	7
8	11 03.2	09 21	152.1	10 33.9	09 21	152.2	10 04.6	09 21	152.3	9 35.2	09 21	152.4	9 05.9	09 21	152.5	11 07.9	09 21	152.5	8
9	10 50.7	09 21	151.1	10 21.4	09 21	151.2	9 52.1	09 21	151.3	9 22.8	09 21	151.5	8 53.5	09 21	151.6	11 07.9	09 21	151.6	9
30	10 37.8	09 22	150.2	10 08.6	09 22	150.3	9 39.3	09 22	150.4	9 10.1	09 22	150.5	8 40.8	09 22	150.6	11 07.9	09 22	150.6	30
1	10 24.6	09 23	149.2	9 55.4	09 23	149.3	9 26.1	09 23	149.4	8 56.9	09 23	149.5	8 27.7	09 23	149.7	11 07.9	09 23	149.7	1
2	10 10.9	09 23	148.2	9 41.7	09 23	148.3	9 12.6	09 23	148.5	8 43.4	09 23	148.6	8 14.3	09 23	148.7	11 07.9	09 23	148.7	2
3	9 56.8	09 24	147.3	9 27.7	09 24	147.4	8 58.6	09 24	147.5	8 29.5	09 24	147.6	8 00.4	09 24	147.7	11 07.9	09 24	147.7	3
4	9 42.4	09 25	146.3	9 13.4	09 25	146.4	8 44.3	09 25	146.5	8 15.3	09 25	146.7	7 46.2	09 25	146.8	11 07.9	09 25	146.8	4
35	9 27.7	09 25	145.3	8 58.6	09 25	145.5	8 29.6	09 25	145.6	8 00.6	09 25	145.7	7 31.6	09 25	145.8	11 07.9	09 25	145.8	35
6	9 12.5	09 26	144.4	8 43.6	09 26	144.5	8 14.6	09 26	144.6	7 45.6	09 26	144.8	7 16.7	09 26	144.9	11 07.9	09 26	144.9	6
7	8 57.0	09 26	143.4	8 28.1	09 26	143.6	7 59.2	09 26	143.7	7 30.3	09 26	143.8	7 01.4	09 26	144.0	11 07.9	09 26	144.0	7
8	8 41.2	09 27	142.5	8 12.3	09 27	142.6	7 43.4	09 27	142.7	7 14.6	09 27	142.9	6 45.7	09 27	143.0	11 07.9	09 27	143.0	8
9	8 25.0	09 28	141.5	7 56.2	09 27	141.7	7 27.4	09 27	141.8	6 58.5	09 27	141.9	6 29.7	09 27	142.1	11 07.9	09 27	142.1	9
40	8 08.4	09 28	140.6	7 39.7	09 28	140.7	7 10.9	09 28	140.9	6 42.2	09 28	141.0	6 13.4	09 28	141.1	11 07.9	09 28	141.1	40
1	7 51.6	09 29	139.6	7 22.9	09 29	139.8	6 54.1	09 29	139.9	6 25.4	09 29	140.1	5 56.7	09 29	140.2	11 07.9	09 29	140.2	1
2	7 34.4	09 29	138.7	7 05.7	09 29	138.8	6 37.0	09 29	139.0	6 06.4	09 29	139.1	5 39.7	09 29	139.3	11 07.9	09 29	139.3	2
3	7 16.8	09 30	137.7	6 48.2	09 30	137.9	6 19.6	09 30	138.0	5 51.0	09 30	138.2	5 22.4	09 30	138.3	11 07.9	09 30	138.3	3
4	6 59.0	09 30	136.8	6 30.4	09 30	137.0	6 01.9	09 30	137.1	5 33.3	09 30	137.3	5 04.8	09 30	137.4	11 07.9	09 30	137.4	4
45	6 40.8	09 31	135.9	6 12.3	09 31	136.0	5 43.8	09 31	136.2	5 15.3	09 31	136.3				11 07.9	09 31	136.3	45
6	6 22.4	09 31	134.9	5 53.9	09 31	135.1	5 25.5	09 31	135.2							11 07.9	09 31	135.2	6
7	6 03.6	09 32	134.0	5 35.2	09 32	134.2	5 06.8	09 32	134.3							11 07.9	09 32	134.3	7
8	5 44.5	09 32	133.1	5 16.2	09 32	133.2										11 07.9	09 32	133.2	8
9	5 25.2	09 33	132.1													11 07.9	09 33	132.1	9
50	5 05.5	09 33	131.2													11 07.9	09 33	131.2	50

Lat. 64°

L. G.

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
91	10 20.0	90 44	83.8	10 46.9	89 44	83.6	11 13.7	89 44	83.3	11 40.6	89 43	82.9					

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.		
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.			
00	42 00.0	1.000	180.0	42 30.0	1.000	180.0	43 00.0	1.000	180.0	43 30.0	1.000	180.0	44 00.0	1.000	180.0	44 30.0	1.000	180.0	00
1	41 59.7	1.001	178.7	42 29.7	1.002	178.7	42 59.7	1.002	178.7	43 29.7	1.002	178.7	43 59.7	1.002	178.7	44 29.7	1.002	178.7	1
2	41 58.8	1.002	177.4	42 28.8	1.002	177.4	42 58.8	1.002	177.4	43 28.8	1.003	177.4	43 58.8	1.003	177.3	44 28.8	1.003	177.3	2
3	41 57.3	1.003	176.1	42 27.3	1.003	176.1	42 57.3	1.004	176.1	43 27.3	1.004	176.1	43 57.3	1.004	176.0	44 27.3	1.004	176.0	3
4	41 55.3	1.004	174.8	42 25.2	1.004	174.8	42 55.2	1.004	174.8	43 25.2	1.005	174.7	43 55.2	1.005	174.7	44 25.1	1.005	174.7	4
05	41 52.6	1.005	173.5	42 22.6	1.005	173.5	42 52.5	1.006	173.5	43 22.5	1.006	173.4	43 52.4	1.006	173.4	44 22.4	1.006	173.3	05
6	41 49.3	1.006	172.2	42 19.3	1.006	172.2	42 49.2	1.006	172.1	43 19.2	1.007	172.1	43 49.1	1.007	172.0	44 19.0	1.007	172.0	6
7	41 45.5	1.007	171.0	42 15.4	1.007	170.9	42 45.3	1.007	170.9	43 15.3	1.008	170.8	43 45.2	1.008	170.7	44 15.1	1.008	170.7	7
8	41 41.1	1.008	169.7	42 11.0	1.008	169.6	42 40.9	1.008	169.6	43 10.8	1.008	169.5	43 40.7	1.009	169.4	44 10.6	1.009	169.3	8
9	41 36.1	1.009	168.4	42 05.9	1.009	168.3	42 35.8	1.009	168.3	43 05.7	1.009	168.2	43 35.6	1.010	168.1	44 05.4	1.010	168.1	9
10	41 30.5	0.910	167.1	42 00.3	0.910	167.1	42 30.2	0.910	167.0	43 00.0	0.910	166.9	43 29.9	0.910	166.8	44 29.5	0.910	166.7	10
1	41 24.4	0.911	165.8	41 54.2	0.911	165.8	42 24.0	0.911	165.7	42 53.8	0.911	165.6	43 23.6	0.911	165.5	44 23.2	0.911	165.4	1
2	41 17.6	0.912	164.6	41 47.4	0.912	164.5	42 17.2	0.912	164.4	42 47.0	0.912	164.3	43 16.7	0.912	164.2	44 16.2	0.912	164.1	2
3	41 10.4	0.913	163.3	41 40.1	0.913	163.2	42 09.8	0.913	163.1	42 39.6	0.913	163.0	43 09.3	0.913	162.9	44 08.7	0.913	162.8	3
4	41 02.5	0.914	162.0	41 32.2	0.914	161.9	42 01.9	0.914	161.8	42 31.6	0.914	161.7	43 01.3	0.914	161.6	44 00.7	0.914	161.5	4
15	40 54.1	0.915	160.8	41 23.8	0.915	160.7	41 53.5	0.915	160.6	42 23.1	0.915	160.5	42 52.7	0.915	160.4	43 22.4	0.915	160.3	15
6	40 45.2	0.916	159.5	41 14.8	0.916	159.4	41 44.4	0.916	159.3	42 14.0	0.916	159.2	42 43.6	0.916	159.1	43 13.2	0.916	159.0	6
7	40 35.7	0.917	158.3	41 05.3	0.917	158.2	41 34.9	0.917	158.1	42 04.4	0.917	158.0	42 34.0	0.917	157.9	43 03.5	0.917	157.8	7
8	40 25.7	0.918	157.0	40 55.3	0.918	156.9	41 24.8	0.918	156.8	41 54.3	0.918	156.7	42 23.8	0.918	156.6	42 53.3	0.918	156.5	8
9	40 15.2	0.918	155.7	40 44.7	0.918	155.6	41 14.1	0.918	155.5	41 43.6	0.918	155.4	42 13.0	0.918	155.3	42 42.5	0.918	155.2	9
20	40 04.2	0.919	154.6	40 33.6	0.919	154.4	41 03.0	0.919	154.3	41 32.4	0.919	154.2	42 01.8	0.919	154.0	42 31.2	0.919	153.9	20
1	39 52.6	0.920	153.3	40 22.0	0.920	153.2	40 51.3	0.920	153.1	41 20.7	0.920	152.9	41 50.0	0.920	152.8	42 19.3	0.920	152.7	1
2	39 40.6	0.921	152.1	40 09.9	0.921	152.0	40 39.2	0.921	151.8	41 08.4	0.921	151.7	41 37.7	0.921	151.5	42 07.0	0.921	151.4	2
3	39 28.0	0.922	150.9	39 57.3	0.922	150.7	40 26.5	0.922	150.6	40 55.7	0.922	150.4	41 24.9	0.922	150.3	41 54.1	0.922	150.1	3
4	39 15.0	0.923	149.7	39 44.2	0.923	149.5	40 13.3	0.923	149.4	40 42.5	0.923	149.2	41 11.7	0.923	149.1	41 40.8	0.923	148.9	4
25	39 01.5	0.924	148.5	39 30.6	0.924	148.2	39 59.7	0.924	148.0	40 28.8	0.924	147.8	40 57.9	0.924	147.7	41 27.0	0.924	147.5	25
6	38 47.5	0.924	147.3	39 16.5	0.924	147.1	39 45.6	0.924	147.0	40 14.6	0.924	146.8	40 43.7	0.924	146.6	41 12.7	0.924	146.5	6
7	38 33.0	0.925	146.1	39 02.0	0.925	145.9	39 31.0	0.925	145.8	40 00.0	0.925	145.6	40 29.0	0.925	145.4	40 57.9	0.925	145.2	7
8	38 18.1	0.926	144.9	38 47.1	0.926	144.7	39 16.0	0.926	144.6	39 44.9	0.926	144.4	40 13.8	0.926	144.2	40 42.7	0.926	144.0	8
9	38 02.8	0.926	143.7	38 31.7	0.926	143.5	39 00.5	0.926	143.4	39 29.4	0.926	143.2	39 58.2	0.926	143.0	40 27.0	0.926	142.8	9
30	37 47.0	0.927	142.5	38 15.8	0.927	142.4	38 44.6	0.927	142.2	39 13.4	0.927	142.0	39 42.2	0.927	141.8	40 10.9	0.927	141.6	30
1	37 30.8	0.928	141.4	37 59.5	0.928	141.2	38 28.3	0.928	141.0	38 57.0	0.928	140.8	39 25.7	0.928	140.6	39 54.4	0.928	140.5	1
2	37 14.2	0.928	140.2	37 42.8	0.928	140.0	38 11.5	0.928	139.8	38 40.2	0.928	139.7	39 08.8	0.928	139.5	39 37.4	0.928	139.3	2
3	36 57.1	0.929	139.1	37 25.8	0.929	138.9	37 54.4	0.929	138.7	38 22.9	0.929	138.5	38 51.5	0.929	138.3	39 20.0	0.929	138.1	3
4	36 39.7	0.929	137.9	37 08.3	0.929	137.7	37 36.8	0.929	137.5	38 05.3	0.929	137.3	38 33.8	0.929	137.1	39 02.3	0.929	136.9	4
35	36 21.9	0.930	136.8	36 50.4	0.930	136.6	37 18.8	0.930	136.4	37 47.3	0.930	136.2	38 15.7	0.930	136.0	38 44.1	0.930	135.8	35
6	36 03.7	0.931	135.7	36 32.1	0.931	135.5	37 00.5	0.931	135.3	37 28.3	0.931	135.1	37 57.3	0.931	134.9	38 25.6	0.931	134.7	6
7	35 45.1	0.932	134.5	36 13.5	0.932	134.3	36 41.8	0.932	134.1	37 10.1	0.932	133.9	37 38.4	0.932	133.7	38 06.7	0.932	133.5	7
8	35 26.2	0.932	133.4	35 54.5	0.932	133.2	36 22.8	0.932	133.0	36 51.0	0.932	132.8	37 19.2	0.932	132.6	37 47.5	0.932	132.4	8
9	35 06.9	0.933	132.3	35 35.1	0.933	132.1	36 03.4	0.933	131.9	36 31.5	0.933	131.7	36 59.7	0.933	131.5	37 27.8	0.933	131.3	9
40	34 47.3	0.933	131.2	35 15.5	0.933	131.0	35 43.6	0.933	130.8	36 11.7	0.933	130.6	36 39.8	0.933	130.3	37 07.9	0.933	130.1	40
1	34 27.3	0.934	130.1	34 55.4	0.934	129.9	35 23.5	0.934	129.7	35 51.6	0.934	129.5	36 19.6	0.934	129.2	36 47.6	0.934	129.0	1
2	34 07.1	0.934	129.0	34 35.1	0.934	128.8	35 03.1	0.934	128.6	35 31.1	0.934	128.4	35 59.1	0.934	128.1	36 27.0	0.934	127.9	2
3	33 46.5	0.935	127.9	34 14.5	0.935	127.7	34 42.4	0.935	127.5	35 10.3	0.935	127.3	35 38.3	0.935	127.0	36 06.1	0.935	126.8	3
4	33 25.6	0.935	126.9	33 53.5	0.935	126.6	34 21.4	0.935	126.4	34 49.3	0.935	126.2	35 17.2	0.935	126.0	35 44.9	0.935	125.7	4
45	33 04.4	0.936	125.8	33 32.2	0.936	125.6	34 00.1	0.936	125.3	34 28.0	0.936	125.1	34 55.7	0.936	124.9	35 23.4	0.936	124.7	45
6	32 42.9	0.936	124.7	33 10.7	0.936	124.5	33 38.5	0.936	124.3	34 06.2	0.936	124.1	34 34.0	0.936	123.8	35 01.7	0.936	123.6	6
7	32 21.2	0.937	123.7	32 48.9	0.937	123.4	33 16.6	0.937	123.2	33 44.3	0.937	123.0	34 12.0	0.937	122.8	34 39.6	0.937	122.5	7
8	31 59.1	0.937	122.6	32 26.8	0.937	122.4	32 54.5	0.937	122.2	33 22.1	0.937	121.9	33 49.7	0.937	121.7	34 17.3	0.937	121.5	8
9	31 36.9	0.938	121.6	32 04.5	0.938	121.4	32 32.1	0.938	121.1	32 59.7	0.938	120.9	33 27.2	0.938	120.7	33 54.8	0.938	120.4	9
50	31 14.3	0.938	120.5	31 41.9	0.938	120.3	32 09.5	0.938	120.1	32 37.0	0.938	119.8	33 04.5	0.938	119.6	33 31.9	0.938	119.4	50
1	30 51.6	0.939	119.5	31 19.1	0.939	119.3	31 46.6	0.939	119.0	32 14.0	0.939	118.8	32 41.5	0.939	118.5				

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.																																														
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.																																															
00	10 00.0	1.00	180.0	9 30.0	1.00	180.0	9 00.0	1.00	180.0	8 30.0	1.00	180.0	8 00.0	1.00	180.0	7 30.0	1.00	180.0	7 00.0	1.00	180.0	6 30.0	1.00	180.0	6 00.0	1.00	180.0	5 30.0	1.00	180.0	5 00.0	1.00	180.0	4 30.0	1.00	180.0	4 00.0	1.00	180.0	3 30.0	1.00	180.0	3 00.0	1.00	180.0	2 30.0	1.00	180.0	2 00.0	1.00	180.0	1 30.0	1.00	180.0	1 00.0	1.00	180.0	0 30.0	1.00	180.0	0 00.0	1.00	180.0
1	9 59.8	1.00	179.0	9 29.8	1.00	179.0	8 59.8	1.00	179.0	8 29.8	1.00	179.0	7 59.8	1.00	179.0	7 29.8	1.00	179.0	6 59.8	1.00	179.0	6 29.8	1.00	179.0	5 59.8	1.00	179.0	5 29.8	1.00	179.0	4 59.8	1.00	179.0	4 29.8	1.00	179.0	3 59.8	1.00	179.0	3 29.8	1.00	179.0	2 59.8	1.00	179.0	2 29.8	1.00	179.0	1 59.8	1.00	179.0	1 29.8	1.00	179.0	0 59.8	1.00	179.0	0 29.8	1.00	179.0			
2	9 59.1	1.00	178.0	9 29.1	1.00	178.1	8 59.1	1.00	178.1	8 29.1	1.00	178.1	7 59.1	1.00	178.1	7 29.1	1.00	178.1	6 59.1	1.00	178.1	6 29.1	1.00	178.1	5 59.1	1.00	178.1	5 29.1	1.00	178.1	4 59.1	1.00	178.1	4 29.1	1.00	178.1	3 59.1	1.00	178.1	3 29.1	1.00	178.1	2 59.1	1.00	178.1	2 29.1	1.00	178.1	1 59.1	1.00	178.1	1 29.1	1.00	178.1	0 59.1	1.00	178.1	0 29.1	1.00	178.1			
3	9 58.0	1.00	177.1	9 28.0	1.00	177.1	8 58.0	1.00	177.1	8 28.0	1.00	177.1	7 58.0	1.00	177.1	7 28.0	1.00	177.1	6 58.0	1.00	177.1	6 28.0	1.00	177.1	5 58.0	1.00	177.1	5 28.0	1.00	177.1	4 58.0	1.00	177.1	4 28.0	1.00	177.1	3 58.0	1.00	177.1	3 28.0	1.00	177.1	2 58.0	1.00	177.1	2 28.0	1.00	177.1	1 58.0	1.00	177.1	1 28.0	1.00	177.1	0 58.0	1.00	177.1	0 28.0	1.00	177.1			
4	9 56.4	1.00	176.1	9 26.4	1.00	176.1	8 56.4	1.00	176.1	8 26.5	1.00	176.1	7 56.5	1.00	176.2	7 26.5	1.00	176.2	6 56.5	1.00	176.2	6 26.5	1.00	176.2	5 56.5	1.00	176.2	5 26.5	1.00	176.2	4 56.5	1.00	176.2	4 26.5	1.00	176.2	3 56.5	1.00	176.2	3 26.5	1.00	176.2	2 56.5	1.00	176.2	2 26.5	1.00	176.2	1 56.5	1.00	176.2	1 26.5	1.00	176.2	0 56.5	1.00	176.2	0 26.5	1.00	176.2			
05	9 54.4	1.00	175.1	9 24.4	1.00	175.1	8 54.4	1.00	175.2	8 24.5	1.00	175.2	7 54.5	1.00	175.2	7 24.5	1.00	175.2	6 54.5	1.00	175.2	6 24.6	1.00	175.3	5 54.5	1.00	175.2	5 24.6	1.00	175.3	4 54.5	1.00	175.2	4 24.6	1.00	175.3	3 54.5	1.00	175.2	3 24.6	1.00	175.3	2 54.5	1.00	175.2	2 24.6	1.00	175.3	1 54.5	1.00	175.2	1 24.6	1.00	175.3	0 54.5	1.00	175.2	0 24.6	1.00	175.3			
6	9 51.9	1.00	174.1	9 22.0	1.00	174.2	8 52.0	1.00	174.2	8 22.0	1.00	174.2	7 52.1	1.00	174.2	7 22.1	1.00	174.3	6 52.1	1.00	174.3	6 22.1	1.00	174.3	5 52.1	1.00	174.3	5 22.1	1.00	174.3	4 52.1	1.00	174.3	4 22.1	1.00	174.3	3 52.1	1.00	174.3	3 22.1	1.00	174.3	2 52.1	1.00	174.3	2 22.1	1.00	174.3	1 52.1	1.00	174.3	1 22.1	1.00	174.3	0 52.1	1.00	174.3	0 22.1	1.00	174.3			
7	9 49.0	1.00	173.2	9 19.1	1.00	173.2	8 49.1	1.00	173.2	8 19.2	1.00	173.3	7 49.2	1.00	173.3	7 19.3	1.00	173.3	6 49.3	1.00	173.3	6 19.3	1.00	173.3	5 49.3	1.00	173.3	5 19.3	1.00	173.3	4 49.3	1.00	173.3	4 19.3	1.00	173.3	3 49.3	1.00	173.3	3 19.3	1.00	173.3	2 49.3	1.00	173.3	2 19.3	1.00	173.3	1 49.3	1.00	173.3	1 19.3	1.00	173.3	0 49.3	1.00	173.3	0 19.3	1.00	173.3			
8	9 45.7	1.00	172.2	9 15.7	1.00	172.2	8 45.8	1.00	172.3	8 15.9	1.00	172.3	7 45.9	1.00	172.3	7 16.0	1.00	172.4	6 46.0	1.00	172.4	6 16.1	1.00	172.4	5 46.0	1.00	172.4	5 16.1	1.00	172.4	4 46.0	1.00	172.4	4 16.1	1.00	172.4	3 46.0	1.00	172.4	3 16.1	1.00	172.4	2 46.0	1.00	172.4	2 16.1	1.00	172.4	1 46.0	1.00	172.4	1 16.1	1.00	172.4	0 46.0	1.00	172.4	0 16.1	1.00	172.4			
9	9 41.9	1.00	171.2	9 12.0	1.00	171.3	8 42.0	1.00	171.3	8 12.1	1.00	171.3	7 42.2	1.00	171.4	7 12.3	1.00	171.4	6 42.3	1.00	171.4	6 12.4	1.00	171.5	5 42.3	1.00	171.4	5 12.4	1.00	171.5	4 42.3	1.00	171.4	4 12.4	1.00	171.5	3 42.3	1.00	171.4	3 12.4	1.00	171.5	2 42.3	1.00	171.4	2 12.4	1.00	171.5	1 42.3	1.00	171.4	1 12.4	1.00	171.5	0 42.3	1.00	171.4	0 12.4	1.00	171.5			
10	9 37.7	1.00	170.3	9 07.8	1.00	170.3	8 37.8	1.00	170.3	8 07.9	1.00	170.4	7 38.0	1.00	170.4	7 08.1	1.00	170.4	6 38.2	1.00	170.5	6 08.3	1.00	170.5	5 38.2	1.00	170.5	5 08.3	1.00	170.5	4 38.2	1.00	170.5	4 08.3	1.00	170.5	3 38.2	1.00	170.5	3 08.3	1.00	170.5	2 38.2	1.00	170.5	2 08.3	1.00	170.5	1 38.2	1.00	170.5	1 08.3	1.00	170.5	0 38.2	1.00	170.5	0 08.3	1.00	170.5			
1	9 33.0	1.00	169.3	9 03.1	1.00	169.3	8 33.2	1.00	169.4	8 03.3	1.00	169.4	7 33.4	1.00	169.5	7 03.5	1.00	169.5	6 33.6	1.00	169.5	6 03.7	1.00	169.6	5 33.6	1.00	169.5	5 03.7	1.00	169.6	4 33.6	1.00	169.6	4 03.7	1.00	169.6	3 33.6	1.00	169.6	3 03.7	1.00	169.6	2 33.6	1.00	169.6	2 03.7	1.00	169.6	1 33.6	1.00	169.6	1 03.7	1.00	169.6	0 33.6	1.00	169.6	0 03.7	1.00	169.6			
2	9 27.9	1.00	168.3	8 58.0	1.00	168.4	8 28.1	1.00	168.4	8 03.3	1.00	168.5	7 28.4	1.00	168.5	7 03.5	1.00	168.5	6 28.6	1.00	168.6	6 03.7	1.00	168.6	5 28.6	1.00	168.6	5 03.7	1.00	168.6	4 28.6	1.00	168.6	4 03.7	1.00	168.6	3 28.6	1.00	168.6	3 03.7	1.00	168.6	2 28.6	1.00	168.6	2 03.7	1.00	168.6	1 28.6	1.00	168.6	1 03.7	1.00	168.6	0 28.6	1.00	168.6	0 03.7	1.00	168.6			
3	9 22.3	1.00	167.3	8 52.5	1.00	167.4	8 22.6	1.00	167.4	8 02.6	1.00	167.5	7 22.9	1.00	167.5	7 03.1	1.00	167.6	6 23.2	1.00	167.6	6 03.1	1.00	167.6	5 23.2	1.00	167.6	5 03.1	1.00	167.6	4 23.2	1.00	167.6	4 03.1	1.00	167.6	3 23.2	1.00	167.6	3 03.1	1.00	167.6	2 23.2	1.00	167.6	2 03.1	1.00	167.6	1 23.2	1.00	167.6	1 03.1	1.00	167.6	0 23.2	1.00	167.6	0 03.1	1.00	167.6			
4	9 16.4	1.00	166.4	8 46.5	1.00	166.4	8 16.7	1.00	166.5	7 46.9	1.00	166.5	7 17.0	1.00	166.6	6 47.2	1.00	166.6	6 17.4	1.00	166.7	5 47.6	1.00	166.7	5 17.4	1.00	166.6	5 03.1	1.00	166.7	4 17.4	1.00	166.7	4 03.1	1.00	166.7	3 17.4	1.00	166.7	3 03.1	1.00	166.7	2 17.4	1.00	166.7	2 03.1	1.00	166.7	1 17.4	1.00	166.7	1 03.1	1.00	166.7	0 17.4	1.00	166.7	0 03.1	1.00	166.7			
15	9 09.9	1.00	165.4	8 40.1	1.00	165.5	8 10.3	1.00	165.5	7 40.5	1.00	165.6	7 10.7	1.00	165.6	6 40.9	1.00	165.7	6 11.1	1.00	165.7	5 41.3	1.00	165.8	5 11.1	1.00	165.7	5 03.1	1.00	165.8	4 11.1	1.00	165.7	4 03.1	1.00	165.8	3 11.1	1.00	165.7	3 03.1	1.00	165.8	2 11.1	1.00	165.7	2 03.1	1.00	165.8	1 11.1	1.00	165.7	1 03.1	1.00	165.8	0 11.1	1.00	165.7	0 03.1	1.00	165.8			
6	9 03.1	1.00	164.4	8 33.3	1.00	164.5	8 03.5	1.00	164.6	7 33.8	1.00	164.6	7 04.0	1.00	164.7	6 34.2	1.00	164.7	6 04.4	1.00	164.8	5 34.7	1.00	164.8	5 04.4	1.00	164.7	5 03.1	1.00	164.8	4 04.4	1.00	164.7	4 03.1	1.00	164.8	3 04.4	1.00	164.7	3 03.1	1.00	164.8	2 04.4	1.00	164.7	2 03.1	1.00	164.8	1 04.4	1.00	164.7	1 03.1	1.00	164.8	0 04.4	1.00	164.7	0 03.1	1.00	164.8			
7	8 55.8	1.00	163.5	8 26.1	1.00	163.5	7 56.3	1.00	163.6	7 26.6	1.00	163.7	6 56.8	1.00	163.7	6 27.1	1.00	163.8	5 57.3	1.00	163.8	5 27.6	1.00	163.9	5 03.1	1.00	163.8	5 03.1	1.00	163.9	4 03.1	1.00	163.9	4 03.1	1.00	163.9	3 03.1	1.00	163.9	3 03.1	1.00	163.9	2 03.1	1.																			

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	46 00.0	1.001	180.0	46 30.0	1.001	180.0	47 00.0	1.001	180.0	47 30.0	1.001	180.0	48 00.0	1.001	180.0	48 30.0	1.001	180.0	00
1	45 59.7	1.002	178.6	46 29.7	1.002	178.6	46 59.7	1.002	178.6	47 29.7	1.002	178.6	47 59.7	1.002	178.6	48 29.7	1.002	178.6	1
2	45 58.8	1.003	177.3	46 28.8	1.003	177.3	46 58.8	1.003	177.3	47 28.8	1.003	177.2	47 58.8	1.003	177.2	48 28.8	1.003	177.2	2
3	45 57.2	1.004	175.9	46 27.2	1.004	175.9	46 57.2	1.004	175.9	47 27.2	1.004	175.9	47 57.1	1.004	175.8	48 27.1	1.004	175.8	3
4	45 55.0	1.005	174.6	46 25.0	1.005	174.6	46 55.0	1.005	174.5	47 24.9	1.005	174.5	47 54.9	1.005	174.5	48 24.9	1.005	174.4	4
05	45 52.3	1.006	173.2	46 22.3	1.006	173.2	46 52.2	1.006	173.2	47 22.1	1.006	173.1	47 52.1	1.006	173.1	48 22.0	1.006	173.0	05
6	45 48.9	1.007	171.9	46 18.8	1.007	171.9	46 48.7	1.007	171.8	47 18.7	1.007	171.8	47 48.6	1.007	171.7	48 18.5	1.007	171.7	6
7	45 44.8	1.008	170.6	46 14.8	1.008	170.6	46 44.7	1.008	170.4	47 14.6	1.008	170.4	47 44.5	1.008	170.3	48 14.4	1.008	170.2	7
8	45 40.2	1.009	169.2	46 10.1	1.009	169.2	46 40.0	1.009	169.1	47 09.9	1.009	169.0	47 39.7	1.009	168.9	48 09.6	1.009	168.8	8
9	45 35.0	1.010	167.9	46 04.9	1.010	167.8	46 34.7	1.010	167.7	47 04.6	1.010	167.7	47 34.4	1.010	167.6	48 04.2	1.010	167.5	9
10	45 29.2	1.011	166.5	45 59.0	1.011	166.5	46 28.8	1.011	166.4	46 58.6	1.011	166.3	47 28.4	1.011	166.2	47 58.2	1.011	166.1	10
1	45 28.2	1.012	165.1	45 58.0	1.012	165.1	46 27.8	1.012	165.0	46 57.6	1.012	164.9	47 27.4	1.012	164.8	47 57.2	1.012	164.7	1
2	45 25.7	1.013	163.9	45 55.5	1.013	163.8	46 25.3	1.013	163.7	46 55.0	1.013	163.6	47 24.9	1.013	163.5	47 54.4	1.013	163.4	2
3	45 08.2	1.014	162.6	45 37.9	1.014	162.5	46 07.3	1.014	162.4	46 37.2	1.014	162.3	47 06.9	1.014	162.2	47 36.6	1.014	162.1	3
4	45 00.0	1.015	161.2	45 29.6	1.015	161.1	45 59.3	1.015	161.0	46 28.9	1.015	160.9	46 58.6	1.015	160.8	47 28.2	1.015	160.7	4
15	44 51.2	1.016	159.9	45 20.9	1.016	159.8	45 50.5	1.016	159.7	46 20.9	1.016	159.6	46 49.6	1.016	159.5	47 19.2	1.016	159.3	15
6	44 41.9	1.017	158.6	45 11.5	1.017	158.5	45 41.0	1.017	158.4	46 10.6	1.017	158.3	46 40.1	1.017	158.1	47 09.7	1.017	158.0	6
7	44 32.1	1.018	157.3	45 01.6	1.018	157.2	45 31.1	1.018	157.1	46 00.6	1.018	156.9	46 30.3	1.018	156.8	46 59.5	1.018	156.7	7
8	44 21.7	1.019	156.0	44 51.1	1.019	155.9	45 20.6	1.019	155.8	45 50.0	1.019	155.6	46 19.4	1.019	155.5	46 48.8	1.019	155.4	8
9	44 10.7	1.020	154.7	44 40.1	1.020	154.6	45 09.5	1.020	154.5	45 38.9	1.020	154.3	46 08.2	1.020	154.2	46 37.6	1.020	154.0	9
20	43 59.2	1.021	153.5	44 28.6	1.021	153.4	44 57.9	1.021	153.3	45 27.2	1.021	153.0	45 56.5	1.021	152.9	46 25.8	1.021	152.7	20
1	43 47.2	1.022	152.2	44 16.5	1.022	152.0	44 45.8	1.022	151.9	45 15.0	1.022	151.7	45 44.2	1.022	151.6	46 13.7	1.022	151.4	1
2	43 34.7	1.023	150.9	44 03.9	1.023	150.8	44 33.1	1.023	150.6	45 02.3	1.023	150.4	45 31.5	1.023	150.3	46 00.6	1.023	150.1	2
3	43 21.7	1.024	149.7	43 50.8	1.024	149.5	44 19.9	1.024	149.3	44 49.1	1.024	149.2	45 18.2	1.024	149.0	45 47.3	1.024	148.8	3
4	43 08.1	1.025	148.4	43 37.2	1.025	148.2	44 06.3	1.025	148.1	44 35.3	1.025	147.9	45 04.1	1.025	147.7	45 33.4	1.025	147.4	4
25	42 54.1	1.026	147.2	43 23.1	1.026	147.0	43 52.1	1.026	146.8	44 21.1	1.026	146.6	44 50.1	1.026	146.5	45 19.0	1.026	146.3	25
6	42 39.6	1.027	145.9	43 08.6	1.027	145.8	43 37.5	1.027	145.6	44 06.4	1.027	145.4	44 35.3	1.027	145.2	45 04.2	1.027	145.0	6
7	42 24.6	1.028	144.7	42 53.5	1.028	144.5	43 22.4	1.028	144.3	43 51.2	1.028	144.1	44 20.1	1.028	144.0	44 48.9	1.028	143.8	7
8	42 09.2	1.029	143.5	42 38.0	1.029	143.3	43 06.8	1.029	143.1	43 35.6	1.029	142.9	44 04.4	1.029	142.7	44 33.1	1.029	142.5	8
9	41 53.3	1.030	142.3	42 22.1	1.030	142.1	42 50.8	1.030	141.9	43 19.5	1.030	141.7	43 48.2	1.030	141.5	44 16.9	1.030	141.3	9
30	41 37.0	1.031	141.1	42 05.7	1.031	140.9	42 34.4	1.031	140.7	43 03.0	1.031	140.5	43 31.6	1.031	140.3	44 00.2	1.031	140.0	30
1	41 20.3	1.032	139.9	41 48.9	1.032	139.7	42 17.5	1.032	139.5	42 46.0	1.032	139.2	43 14.6	1.032	139.0	43 43.1	1.032	138.8	1
2	41 03.1	1.033	138.7	41 31.7	1.033	138.5	42 00.2	1.033	138.3	42 28.7	1.033	138.0	42 57.1	1.033	137.8	43 25.6	1.033	137.6	2
3	40 45.6	1.034	137.5	41 14.0	1.034	137.3	41 42.5	1.034	137.1	42 10.9	1.034	136.9	42 39.3	1.034	136.6	43 07.6	1.034	136.4	3
4	40 27.6	1.035	136.3	40 56.0	1.035	136.1	41 24.3	1.035	135.9	41 52.7	1.035	135.7	42 21.0	1.035	135.4	42 49.3	1.035	135.2	4
35	40 09.2	1.036	135.2	40 37.6	1.036	134.9	41 05.8	1.036	134.7	41 34.1	1.036	134.5	42 02.4	1.036	134.3	42 30.6	1.036	134.0	35
6	39 50.5	1.037	134.0	40 18.7	1.037	133.8	40 47.0	1.037	133.6	41 15.2	1.037	133.3	41 43.3	1.037	133.1	42 11.5	1.037	132.9	6
7	39 31.4	1.038	132.9	39 59.6	1.038	132.6	40 27.7	1.038	132.4	40 55.8	1.038	132.2	41 23.9	1.038	131.9	41 52.0	1.038	131.7	7
8	39 11.9	1.039	131.7	39 40.0	1.039	131.5	40 08.1	1.039	131.3	40 36.2	1.039	131.0	41 04.2	1.039	130.8	41 32.2	1.039	130.5	8
9	38 52.1	1.040	130.6	39 20.2	1.040	130.3	39 48.2	1.040	130.1	40 16.2	1.040	129.9	40 44.1	1.040	129.6	41 12.0	1.040	129.4	9
40	38 32.0	1.041	129.5	39 00.0	1.041	129.2	39 27.9	1.041	129.0	39 55.8	1.041	128.7	40 23.7	1.041	128.5	40 51.6	1.041	128.3	40
1	38 11.5	1.042	128.3	38 39.4	1.042	128.1	39 07.3	1.042	127.9	39 35.1	1.042	127.6	40 03.0	1.042	127.4	40 30.7	1.042	127.1	1
2	37 50.7	1.043	127.2	38 18.6	1.043	127.0	38 46.4	1.043	126.8	39 14.2	1.043	126.5	39 41.9	1.043	126.3	40 09.6	1.043	126.0	2
3	37 29.6	1.044	126.1	37 57.4	1.044	125.9	38 25.1	1.044	125.6	38 52.9	1.044	125.4	39 20.5	1.044	125.2	39 48.2	1.044	124.9	3
4	37 08.2	1.045	125.0	37 35.9	1.045	124.8	38 03.5	1.045	124.5	38 31.3	1.045	124.3	38 58.9	1.045	124.0	39 26.5	1.045	123.8	4
45	36 46.6	1.046	123.9	37 14.2	1.046	123.7	37 41.8	1.046	123.5	38 09.4	1.046	123.2	38 37.0	1.046	123.0	39 04.5	1.046	122.7	45
6	36 24.6	1.047	122.9	36 52.2	1.047	122.6	37 19.7	1.047	122.4	37 47.3	1.047	122.1	38 14.8	1.047	121.9	38 42.2	1.047	121.6	6
7	36 02.4	1.048	121.8	36 29.9	1.048	121.6	36 57.4	1.048	121.3	37 24.9	1.048	121.0	37 52.3	1.048	120.8	38 19.7	1.048	120.5	7
8	35 39.9	1.049	120.7	36 07.4	1.049	120.5	36 34.8	1.049	120.2	37 02.2	1.049	119.9	37 29.6	1.049	119.7	37 56.9	1.049	119.4	8
9	35 17.2	1.050	119.7	35 44.6	1.050	119.4	36 12.0	1.050	119.2	36 39.3	1.050	118.9	37 06.6	1.050	118.7	37 33.9	1.050	118.4	9
50	34 54.2	1.051	118.6	35 21.5	1.051	118.4	35 48.9	1.051	118.1	36 16.2	1.051	117.9	36 43.4	1.051	117.6	37 10.6	1.051	117.3	50
1	34 31.0	1.052	117.6	34 58.3	1.052	117.3	35 25.6	1.052	117.1	35 52.8	1.052	116.8	36 20.0	1.052	116.6	36 47			

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
00	600.0	1.000	180.0	530.0	1.000	180.0	500.0	1.000	180.0								00
1	559.8	1.001	179.1	529.8	1.001	179.1											1
2	559.1	1.002	178.1	529.1	1.002	178.1											2
3	558.0	1.003	177.2	528.1	1.002	177.2											3
4	556.5	1.003	176.2	526.5	1.003	176.2											4
05	554.6	1.004	175.3	524.6	1.004	175.3											05
6	552.2	1.005	174.3	522.2	1.005	174.4											6
7	549.4	1.006	173.4	519.4	1.006	173.4											7
8	546.1	1.006	172.4	516.2	1.006	172.5											8
9	542.5	1.007	171.5	512.5	1.007	171.5											9
10	538.4	1.008	170.6	508.5	1.008	170.6											10
1	533.8	1.008	169.6	504.0	1.008	169.7											1
2	528.9	1.009	168.7														2
3	523.5	1.010	167.7														3
4	517.7	0010	166.8														4
15	511.5	0011	165.9														15
6	504.9	0012	164.9														6

Lat. 64°

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
91	1728.2	89 43	80.1	1754.9	89 43	79.8	1821.5	89 43	79.3	1848.1	89 43	79.3	1914.7	89 43	78.8	2007.8	88 43	78.6	2034.3	88 43	78.3	91			
2	1702.4	89 43	79.2	1729.0	89 43	78.9	1755.7	89 43	78.7	1822.3	89 43	78.5	1848.9	89 43	78.2	1915.5	89 43	78.0	1942.0	89 43	77.7	2008.6	88 43	77.5	2
3	1636.6	89 43	78.3	1703.2	89 43	78.1	1729.9	89 43	77.8	1756.6	89 43	77.6	1823.2	89 43	77.3	1849.8	89 43	77.1	1916.4	89 43	76.9	1942.9	89 43	76.6	3
4	1610.9	89 43	77.4	1637.6	89 43	77.2	1704.2	89 43	77.0	1730.9	89 43	76.7	1757.6	89 43	76.5	1824.2	89 42	76.2	1850.8	89 42	76.0	1917.4	89 42	75.8	4
95	1545.2	89 43	76.6	1612.0	89 43	76.3	1638.7	89 42	76.1	1705.4	89 42	75.9	1732.0	89 42	75.6	1758.7	89 42	75.4	1825.3	89 42	75.1	1852.0	89 42	74.9	95
6	1519.7	89 42	75.7	1546.4	89 42	75.5	1613.2	89 42	75.2	1639.9	89 42	75.0	1706.6	89 42	74.8	1733.3	89 42	74.5	1800.0	89 42	74.3	1826.6	89 42	74.0	6
7	1454.3	89 42	74.8	1521.0	89 42	74.6	1547.8	89 42	74.4	1614.5	89 42	74.1	1641.3	89 42	73.9	1708.0	89 42	73.7	1734.7	89 42	73.4	1801.4	89 42	73.2	7
8	1428.9	89 42	74.0	1455.7	89 42	73.7	1522.5	89 42	73.5	1549.3	89 42	73.3	1616.1	89 42	73.0	1642.8	89 42	72.8	1709.5	89 42	72.6	1736.3	89 42	72.3	8
9	1403.7	89 42	73.1	1430.5	89 42	72.9	1457.4	89 42	72.6	1524.2	89 42	72.4	1551.0	89 42	72.2	1617.8	89 42	71.9	1644.5	89 42	71.7	1711.3	89 41	71.5	9
100	1338.6	90 42	72.2	1405.5	90 42	72.0	1432.3	90 42	71.8	1459.2	90 41	71.5	1526.0	90 41	71.3	1552.8	90 41	71.1	1619.6	90 41	70.8	1646.4	90 41	70.6	100
1	1313.6	90 41	71.4	1340.5	90 41	71.1	1407.4	90 41	70.9	1434.3	90 41	70.7	1501.1	90 41	70.4	1528.0	90 41	70.2	1554.8	90 41	70.0	1621.7	89 41	69.8	1
2	1248.7	90 41	70.5	1315.7	90 41	70.3	1342.6	90 41	70.0	1409.5	90 41	69.8	1436.4	90 41	69.6	1503.3	90 41	69.4	1530.2	90 41	69.1	1557.0	90 41	68.9	2
3	1224.0	90 41	69.6	1251.0	90 41	69.4	1318.0	90 41	69.2	1344.9	90 41	69.0	1411.8	90 41	68.7	1438.8	90 41	68.5	1505.7	90 41	68.3	1532.6	90 41	68.0	3
4	1159.4	90 41	68.8	1226.4	90 41	68.5	1253.4	90 41	68.3	1320.4	90 41	68.1	1347.4	90 40	67.9	1414.4	90 40	67.6	1441.3	90 40	67.4	1506.3	90 40	67.2	4
105	1135.0	90 40	67.9	1202.0	90 40	67.7	1229.1	90 40	67.5	1256.1	90 40	67.2	1323.1	90 40	67.0	1350.1	90 40	66.8	1417.1	90 40	66.6	1444.1	90 40	66.3	105
6	1110.7	90 40	67.0	1137.8	90 40	66.8	1204.9	90 40	66.6	1231.9	90 40	66.4	1259.0	90 40	66.2	1326.0	90 40	66.0	1353.1	90 40	65.7	1420.1	90 40	65.5	6
7	1046.6	90 40	66.2	1113.7	90 40	66.0	1140.8	90 40	65.7	1207.9	90 40	65.5	1235.0	90 40	65.3	1302.1	90 40	65.1	1329.2	90 40	64.9	1356.2	90 39	64.6	7
8	1022.6	91 40	65.3	1049.7	91 40	65.1	1116.9	91 40	64.9	1144.0	90 39	64.7	1211.2	90 39	64.4	1238.3	90 39	64.2	1305.4	90 39	64.0	1332.5	90 39	63.8	8
9	958.8	91 39	64.4	1026.0	91 39	64.2	1053.2	91 39	64.0	1120.4	91 39	63.8	1147.5	91 39	63.6	1214.7	91 39	63.4	1241.9	91 39	63.1	1309.0	90 39	62.9	9
110	935.1	91 39	63.6	1002.4	91 39	63.4	1029.6	91 39	63.2	1056.9	91 39	62.9	1124.1	91 39	62.7	1151.3	91 39	62.5	1218.5	91 39	62.3	1245.7	91 39	62.1	110
1	911.7	91 39	62.7	939.0	91 39	62.5	1006.2	91 39	62.3	1033.5	91 39	62.1	1100.8	91 39	61.9	1128.1	91 38	61.7	1155.3	91 38	61.4	1222.6	91 38	61.2	1
2	848.4	91 38	61.8	915.7	91 38	61.6	943.0	91 38	61.4	1010.4	91 38	61.2	1037.7	91 38	61.0	1105.0	91 38	60.8	1132.3	91 38	60.6	1159.6	91 38	60.4	2
3	825.3	91 38	61.0	852.7	91 38	60.8	920.0	91 38	60.6	947.4	91 38	60.4	1014.8	91 38	60.1	1042.1	91 38	59.9	1109.5	91 38	59.7	1136.8	91 38	59.5	3
4	802.4	91 38	60.1	829.8	91 38	59.9	857.2	91 38	59.7	924.7	91 38	59.5	952.1	91 38	59.3	1019.5	91 37	59.1	1046.9	91 37	58.9	1114.3	91 37	58.7	4
115	739.7	92 38	59.2	807.2	92 37	59.0	834.6	92 37	58.8	902.1	92 37	58.6	929.6	92 37	58.4	957.0	92 37	58.2	1024.5	91 37	58.0	1051.9	91 37	57.8	115
6	717.2	92 37	58.4	744.7	92 37	58.2	812.2	92 37	58.0	839.7	92 37	57.8	907.3	92 37	57.6	934.8	92 37	57.4	1002.3	92 37	57.2	1029.7	92 37	57.0	6
7	654.9	92 37	57.5	722.5	92 37	57.3	750.0	92 37	57.1	817.6	92 37	56.9	845.2	92 36	56.7	912.7	92 36	56.5	940.3	92 36	56.3	1007.8	92 36	56.1	7
8	632.8	92 36	56.6	700.4	92 36	56.4	728.1	92 36	56.2	755.7	92 36	56.0	823.3	92 36	55.8	850.9	92 36	55.6	918.5	92 36	55.4	946.1	92 36	55.2	8
9	611.0	92 36	55.8	638.6	92 36	55.6	706.3	92 36	55.4	734.0	92 36	55.2	801.6	92 36	55.0	829.3	92 36	54.8	856.9	92 36	54.6	924.6	92 35	54.4	9
120	549.3	92 36	54.9	617.0	92 36	54.7	644.8	92 35	54.5	712.5	92 35	54.3	740.2	92 35	54.1	807.9	92 35	53.9	835.6	92 35	53.7	903.3	92 35	53.5	120
1	527.9	93 35	54.0	555.7	93 35	53.8	623.5	93 35	53.6	651.2	93 35	53.4	719.0	93 35	53.3	746.8	93 35	53.1	814.5	93 35	52.9	842.3	93 35	52.7	1
2	506.8	93 35	53.1	534.6	93 35	53.0	602.4	93 35	52.8	630.2	93 35	52.6	658.1	93 34	52.4	725.9	93 34	52.2	753.7	93 34	52.0	821.5	93 34	51.8	2
3				513.7	93 34	52.1	541.6	93 34	51.9	609.5	93 34	51.7	637.3	93 34	51.5	705.2	93 34	51.3	733.1	93 34	51.1	800.9	93 34	51.0	3
4																									

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.		
	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.			
00	50 00.0	1.001	180.0	50 30.0	1.001	180.0	51 00.0	1.001	180.0	51 30.0	1.001	180.0	52 00.0	1.001	180.0	52 30.0	1.001	180.0	00
1	49 59.7	1.002	178.6	50 29.7	1.002	178.6	50 59.7	1.002	178.6	51 29.7	1.002	178.6	51 59.7	1.002	178.5	52 29.7	1.002	178.5	01
2	49 58.7	1.003	177.2	50 28.7	1.003	177.1	50 58.7	1.003	177.1	51 28.7	1.003	177.1	51 58.7	1.003	177.0	52 28.7	1.003	177.0	2
3	49 57.1	1.004	175.7	50 27.0	1.004	175.7	50 57.0	1.004	175.7	51 27.0	1.004	175.7	51 57.0	1.004	175.6	52 27.0	1.004	175.6	3
4	49 54.8	1.005	174.3	50 24.8	1.005	174.3	50 54.7	1.005	174.2	51 24.7	1.005	174.2	51 54.6	1.005	174.2	52 24.6	1.005	174.1	4
05	49 51.9	1.006	172.9	50 21.8	1.006	172.9	50 51.8	1.006	172.8	51 21.7	1.006	172.8	51 51.6	1.006	172.7	52 21.6	1.006	172.6	05
6	49 48.3	1.007	171.5	50 18.2	1.007	171.4	50 48.1	1.007	171.4	51 18.1	1.007	171.3	51 48.0	1.007	171.3	52 17.9	1.007	171.1	6
7	49 44.1	1.008	170.0	50 14.0	1.008	170.0	50 43.9	1.008	169.9	51 13.8	1.008	169.9	51 43.6	1.008	169.8	52 13.5	1.008	169.7	7
8	49 39.2	1.009	168.7	50 09.1	1.009	168.6	50 39.0	1.009	168.5	51 08.8	1.009	168.4	51 38.7	1.009	168.4	52 08.5	1.009	168.3	8
9	49 33.8	09 10	167.3	50 03.6	09 10	167.2	50 33.4	09 10	167.1	51 03.2	09 10	167.0	51 33.0	09 10	166.9	52 02.9	09 10	166.8	9
10	49 27.6	09 11	165.9	49 57.4	09 11	165.8	50 27.2	09 11	165.7	50 57.0	09 11	165.6	51 26.8	09 11	165.5	51 56.6	09 11	165.3	10
1	49 20.9	09 12	164.5	49 50.7	09 12	164.4	50 20.4	09 12	164.3	50 50.1	09 12	164.2	51 19.9	09 12	164.1	51 49.6	09 12	163.8	1
2	49 13.6	09 13	163.1	49 43.3	09 13	163.0	50 13.0	09 13	162.9	50 42.7	09 13	162.8	51 12.3	09 13	162.6	51 42.0	09 13	162.5	2
3	49 05.6	09 14	161.7	49 35.3	09 14	161.6	50 04.9	09 14	161.5	50 34.6	09 14	161.4	51 04.2	09 14	161.2	51 33.8	09 14	161.1	3
4	48 57.1	09 15	160.3	49 26.7	09 15	160.2	49 56.3	09 15	160.1	50 25.8	09 15	160.0	50 55.4	09 15	159.8	51 25.0	09 15	159.7	4
15	48 47.9	09 16	159.0	49 17.5	09 16	158.8	49 47.0	09 16	158.7	50 16.5	09 16	158.6	50 46.0	09 16	158.4	51 15.6	09 16	158.3	15
6	48 38.2	09 17	157.6	49 07.7	09 17	157.5	49 37.2	09 17	157.3	50 06.6	09 17	157.2	50 35.1	09 17	157.0	51 05.5	09 17	156.9	6
7	48 27.9	09 18	156.2	48 57.3	09 18	156.1	49 26.7	09 18	155.9	49 56.1	09 18	155.8	50 25.5	09 18	155.6	50 54.9	09 18	155.5	7
8	48 17.6	09 19	154.9	48 46.4	09 19	154.7	49 15.7	09 19	154.6	49 45.1	09 19	154.4	50 14.4	09 19	154.3	50 43.7	09 19	154.1	8
9	48 05.6	09 20	153.6	48 34.9	09 20	153.4	49 04.1	09 20	153.2	49 33.4	09 20	153.1	50 02.7	09 20	152.9	50 31.9	09 20	152.7	9
20	47 53.6	07 21	152.2	48 22.8	07 21	152.1	48 52.0	07 21	151.9	49 21.2	07 21	151.7	49 50.4	07 21	151.5	50 19.6	07 21	151.4	20
1	47 41.1	07 22	150.9	48 10.2	07 22	150.7	48 39.4	07 22	150.5	49 08.5	07 22	150.4	49 37.6	07 22	150.2	50 06.7	07 22	150.0	1
2	47 28.0	07 23	149.6	47 57.1	07 23	149.4	48 26.2	07 23	149.2	48 55.2	07 23	149.0	49 24.3	07 23	148.8	49 53.3	07 23	148.6	2
3	47 14.4	07 24	148.3	47 43.4	07 24	148.1	48 12.4	07 24	147.9	48 41.4	07 24	147.7	49 10.4	07 24	147.5	49 39.3	07 24	147.3	3
4	47 00.3	07 24	147.0	47 29.3	07 24	146.8	47 58.2	07 24	146.6	48 27.1	07 24	146.4	48 56.0	07 24	146.2	49 24.9	07 24	146.0	4
25	46 45.8	06 25	145.7	47 14.6	06 25	145.5	47 43.5	06 25	145.3	48 12.3	06 25	145.1	48 41.1	06 25	144.9	49 09.9	06 25	144.7	25
6	46 30.7	06 26	144.4	46 59.5	06 26	144.2	47 28.3	06 26	144.0	47 57.0	06 26	143.8	48 25.7	06 26	143.6	48 54.4	06 26	143.4	6
7	46 15.2	06 27	143.1	46 43.9	06 27	142.9	47 12.6	06 27	142.7	47 41.2	06 27	142.5	48 09.9	06 27	142.3	48 38.5	06 27	142.1	7
8	45 59.2	06 27	141.9	46 27.8	06 28	141.7	46 56.4	06 28	141.5	47 25.0	06 28	141.2	47 53.6	06 28	141.0	48 22.1	06 28	140.8	8
9	45 42.7	06 28	140.6	46 11.3	06 28	140.4	46 39.8	06 28	140.2	47 08.3	06 28	140.0	47 36.8	06 28	139.7	48 05.2	06 28	139.5	9
30	45 25.8	06 29	139.4	45 54.3	06 29	139.2	46 22.7	06 29	138.9	46 51.2	06 29	138.7	47 19.6	06 29	138.5	47 47.9	06 29	138.2	30
1	45 08.5	06 30	138.2	45 36.9	06 30	137.9	46 05.2	06 30	137.7	46 33.6	06 30	137.5	47 01.9	06 30	137.2	47 30.2	06 30	137.0	1
2	44 50.7	06 30	136.9	45 19.0	06 30	136.7	45 47.3	06 30	136.5	46 15.6	06 30	136.2	46 43.8	06 30	136.0	47 12.1	06 30	135.5	2
3	44 32.5	06 31	135.7	45 00.8	06 31	135.5	45 29.0	06 31	135.2	45 57.2	06 31	135.0	46 25.4	06 31	134.8	46 53.5	06 31	134.5	3
4	44 14.0	06 32	134.5	44 42.2	06 32	134.3	45 10.3	06 32	134.0	45 38.4	06 32	133.8	46 06.5	06 32	133.5	46 34.5	06 32	133.3	4
35	43 55.0	04 32	133.3	44 23.1	04 32	133.1	44 51.2	04 32	132.8	45 19.2	04 32	132.6	45 47.2	04 32	132.3	46 15.2	04 32	132.1	35
6	43 35.7	04 33	132.1	44 03.7	04 33	131.9	44 31.7	04 33	131.6	44 59.7	04 33	131.4	45 27.6	04 33	131.1	45 55.5	04 33	130.9	6
7	43 16.0	04 33	131.0	43 44.0	04 33	130.8	44 11.9	04 33	130.5	44 39.8	04 33	130.2	45 07.6	04 33	129.9	45 35.4	04 33	129.7	7
8	42 56.0	04 34	129.8	43 23.9	04 34	129.6	43 51.7	04 34	129.3	44 19.5	04 34	129.0	44 47.3	04 34	128.8	45 15.0	04 34	128.5	8
9	42 35.6	04 34	128.7	43 03.4	04 34	128.4	43 31.2	04 34	128.1	43 58.9	04 34	127.9	44 26.6	04 34	127.6	44 54.3	04 34	127.3	9
40	42 14.9	02 35	127.5	42 42.7	02 35	127.2	43 10.3	02 35	127.0	43 38.0	02 35	126.7	44 05.6	02 35	126.4	44 33.2	02 35	126.2	40
1	41 53.9	02 36	126.4	42 21.6	02 36	126.1	42 49.2	02 36	125.8	43 16.8	02 36	125.6	43 44.3	02 36	125.3	44 11.8	02 36	125.0	1
2	41 32.6	02 36	125.2	42 00.2	02 36	125.0	42 27.7	02 36	124.7	43 55.2	02 36	124.4	43 22.7	02 36	124.2	43 50.1	02 36	123.9	2
3	41 10.9	02 37	124.1	41 38.5	02 37	123.9	42 05.9	02 37	123.6	42 33.4	02 37	123.3	43 00.8	02 37	123.0	43 28.1	02 37	122.8	3
4	40 49.0	02 37	123.0	41 16.5	02 37	122.7	41 43.9	02 37	122.5	42 11.3	02 37	122.2	42 38.6	02 37	121.9	43 05.9	02 37	121.6	4
45	40 26.8	01 37	121.9	40 54.2	01 38	121.6	41 21.6	01 38	121.4	41 48.9	01 38	121.1	42 16.1	01 38	120.8	42 43.3	01 38	120.5	45
6	40 04.4	01 38	120.8	40 31.7	01 38	120.6	40 59.0	01 38	120.3	41 26.2	01 38	120.0	41 53.4	01 38	119.7	42 20.6	01 38	119.4	6
7	39 41.7	01 38	119.7	40 06.9	01 38	119.5	40 36.1	01 38	119.2	41 03.3	01 38	118.9	41 30.4	01 38	118.6	41 57.5	01 38	118.3	7
8	39 18.7	01 39	118.7	39 45.9	01 39	118.4	40 13.1	01 39	118.1	40 40.2	01 39	117.8	41 07.2	01 39	117.5	41 34.3	01 39	117.0	8
9	38 55.5	01 39	117.6	39 22.6	01 39	117.3	39 49.7	01 39	117.0	40 16.8	01 39	116.8	40 43.8	01 39	116.5	41 10.8	01 39	116.2	9
50	38 32.1	00 39	116.5	38 59.2	00 39	116.3	39 26.2	00 39	116.0	39 53.2	00 39	115.7	40 20.2	00 39	115.4	40 47.1	00 39	115.1	50
1	38 06.5	00 40	115.5	38 35.0	00 40	115.2	39 02.5	00 40	114.9	39 29.4	00 40	114.6	39 56.3	00 40	114.4	40 23.1			

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
91	21 00.8	88 43	78.1	21 27.3	88 43	77.8	21 53.7	88 43	77.6	22 20.2	88 43	77.3	22 46.6	88 43	77.1	23 12.9	88 43	76.8	23 39.3	88 43	76.6	24 05.6	88 42	76.3	91
2	20 35.1	88 43	77.2	21 01.6	88 43	77.0	21 28.1	88 43	76.7	21 54.5	88 43	76.5	22 21.0	88 42	76.2	22 47.4	88 42	76.0	23 13.8	88 42	75.7	23 40.1	88 42	75.4	2
3	20 09.5	88 42	76.4	20 36.0	88 42	76.1	21 02.5	88 42	75.9	21 29.0	88 42	75.6	21 55.5	88 42	75.4	22 21.9	88 42	75.1	22 48.3	88 42	74.8	23 14.7	88 42	74.6	3
4	19 44.0	88 42	75.5	20 10.5	88 42	75.3	20 37.1	88 42	75.0	21 03.6	88 42	74.8	21 30.1	88 42	74.5	21 56.5	88 42	74.3	22 23.0	88 42	74.0	22 49.4	88 42	73.7	4
95	19 18.6	89 42	74.6	19 45.1	89 42	74.4	20 11.7	89 42	74.2	20 38.3	89 42	73.9	21 04.8	89 42	73.7	21 31.3	89 42	73.4	21 57.8	89 42	73.2	22 24.2	89 42	72.9	95
6	18 53.3	89 42	73.8	19 19.9	89 42	73.5	19 46.5	89 42	73.3	20 13.0	89 42	73.1	20 39.6	89 42	72.8	21 06.1	89 42	72.6	21 32.6	89 42	72.3	21 59.1	89 42	72.1	6
7	18 28.1	89 42	72.9	18 54.7	89 42	72.7	19 21.3	89 42	72.4	19 47.9	89 42	72.2	20 14.5	89 42	72.0	20 41.1	89 42	71.7	21 07.6	89 41	71.5	21 34.2	89 41	71.2	7
8	18 03.0	89 42	72.1	18 29.6	89 42	71.8	18 56.3	89 42	71.6	19 23.0	89 41	71.4	19 49.6	89 41	71.1	20 16.2	89 41	70.9	20 42.8	89 41	70.6	21 09.3	89 41	70.4	8
9	17 38.0	89 41	71.2	18 04.7	89 41	71.0	18 31.4	89 41	70.7	18 58.1	89 41	70.5	19 24.8	89 41	70.3	19 51.4	89 41	70.0	20 18.0	89 41	69.8	20 44.6	89 41	69.5	9
100	17 13.2	89 41	70.4	17 39.9	89 41	70.1	18 06.7	89 41	69.9	18 33.4	89 41	69.7	19 00.1	89 41	69.4	19 26.7	89 41	69.2	19 53.4	89 41	68.9	20 20.1	89 41	68.7	100
1	16 48.5	89 41	69.5	17 15.2	89 41	69.3	17 42.0	89 41	69.0	18 08.8	89 41	68.8	18 35.5	89 41	68.6	19 02.2	89 41	68.3	19 28.9	89 41	68.1	19 55.6	89 40	67.8	1
2	16 23.9	89 41	68.7	16 50.7	89 41	68.4	17 17.5	89 41	68.2	17 44.3	89 40	68.0	18 11.1	89 40	67.7	18 37.9	89 40	67.5	19 04.6	89 40	67.2	19 31.3	89 40	67.0	2
3	15 59.5	90 40	67.8	16 26.3	90 40	67.6	16 53.2	89 40	67.4	17 20.0	89 40	67.1	17 46.8	89 40	66.9	18 13.6	89 40	66.6	18 40.4	89 40	66.4	19 07.2	89 40	66.2	3
4	15 35.2	90 40	67.0	16 02.1	90 40	66.7	16 29.0	90 40	66.5	16 55.9	90 40	66.3	17 22.7	90 40	66.0	17 49.6	89 40	65.8	18 16.4	89 40	65.6	18 43.2	89 40	65.3	4
105	15 11.1	90 40	66.1	15 38.0	90 40	65.9	16 04.9	90 40	65.7	16 31.9	90 40	65.4	16 58.8	90 40	65.2	17 25.7	90 40	65.0	17 52.5	90 40	64.7	18 19.4	90 39	64.5	105
6	14 47.1	90 40	65.3	15 14.1	90 40	65.0	15 41.1	90 40	64.8	16 08.0	90 39	64.6	16 35.0	90 39	64.4	17 01.9	90 39	64.1	17 28.8	90 39	63.9	17 55.7	90 39	63.7	6
7	14 23.3	90 39	64.4	14 50.3	90 39	64.2	15 17.3	90 39	64.0	15 44.4	90 39	63.7	16 11.3	90 39	63.5	16 38.3	90 39	63.3	17 05.3	90 39	63.1	17 32.3	90 39	62.8	7
8	13 59.6	90 39	63.6	14 26.7	90 39	63.3	14 53.8	90 39	63.1	15 20.9	90 39	62.9	15 47.9	90 39	62.7	16 14.9	90 39	62.4	16 41.9	90 39	62.2	17 06.9	90 39	62.0	8
9	13 36.2	90 39	62.7	14 03.3	90 39	62.5	14 30.4	90 39	62.3	14 57.5	90 39	62.0	15 24.6	90 38	61.8	15 51.7	90 38	61.6	16 18.8	90 38	61.4	16 45.8	90 38	61.2	9
110	13 12.9	91 38	61.9	13 40.1	91 38	61.6	14 07.2	91 38	61.4	14 34.4	90 38	61.2	15 01.5	90 38	61.0	15 28.7	90 38	60.8	15 55.8	90 38	60.5	16 22.9	90 38	60.3	110
1	12 49.8	91 38	61.0	13 17.0	91 38	60.8	13 44.2	91 38	60.6	14 11.4	91 38	60.4	14 38.6	91 38	60.1	15 05.8	91 38	59.9	15 33.0	91 38	59.7	16 00.1	90 38	59.5	1
2	12 26.9	91 38	60.2	12 54.2	91 38	59.9	13 21.4	91 38	59.7	13 48.7	91 38	59.5	14 15.9	91 38	59.3	14 43.1	91 37	59.1	15 10.3	91 37	58.9	15 37.6	91 37	58.6	2
3	12 04.2	91 38	59.3	12 31.5	91 37	59.1	12 58.8	91 37	58.9	13 26.1	91 37	58.7	13 53.4	91 37	58.5	14 20.7	91 37	58.2	14 47.9	91 37	58.0	15 15.2	91 37	57.8	3
4	11 41.6	91 37	58.5	12 09.0	91 37	58.2	12 36.4	91 37	58.0	13 03.7	91 37	57.8	13 31.1	91 37	57.6	13 58.4	91 37	57.4	14 25.7	91 37	57.2	14 53.0	91 37	57.0	4
115	11 19.3	91 37	57.6	11 46.8	91 37	57.4	12 14.2	91 37	57.2	12 41.6	91 37	57.0	13 09.0	91 36	56.8	13 36.4	91 36	56.6	14 03.7	91 36	56.4	14 31.1	91 36	56.1	115
6	10 57.2	92 36	56.8	11 24.7	92 36	56.5	11 52.2	92 36	56.3	12 19.6	92 36	56.1	12 47.1	92 36	55.9	13 14.5	92 36	55.7	13 41.9	92 36	55.5	14 09.4	92 36	55.3	6
7	10 35.3	92 36	55.9	11 02.9	92 36	55.7	11 30.4	92 36	55.5	11 57.9	92 36	55.3	12 25.4	92 36	55.1	12 52.9	92 36	54.9	13 20.4	92 36	54.7	13 47.8	92 36	54.5	7
8	10 13.7	92 36	55.0	10 41.2	92 36	54.8	11 08.8	92 36	54.6	11 36.4	92 36	54.4	12 03.9	92 36	54.2	12 31.5	92 36	54.0	12 59.0	92 36	53.8	13 26.5	92 36	53.6	8
9	9 52.2	92 35	54.2	10 19.9	92 35	54.0	10 47.5	92 35	53.8	11 15.1	92 35	53.6	11 42.7	92 35	53.4	12 10.3	92 35	53.2	12 37.9	92 35	53.0	13 05.5	92 35	52.8	9
120	9 31.0	92 35	53.3	9 58.7	92 35	53.1	10 26.4	92 35	52.9	10 54.0	92 35	52.8	11 21.7	92 35	52.6	11 49.4	92 35	52.4	12 17.0	92 34	52.2	12 44.6	92 34	52.0	120
1	9 10.0	92 35	52.5	9 37.8	92 34	52.3	10 05.5	92 34	52.1	10 33.2	92 34	51.9	11 00.9	92 34	51.7	11 28.7	92 34	51.5	11 56.4	92 34	51.3	12 24.1	92 34	51.1	1
2	8 49.3	93 34	51.6	9 17.1	93 34	51.4	9 44.9	93 34	51.2	10 12.6	93 34	51.1	10 40.4	93 34	50.9	11 08.2	93 34	50.7	11 35.9	93 34	50.5	12 03.7	93 34	50.3	2
3	8 28.8	93 34	50.8	8 56.6	93 34	50.6	9 24.5	93 34	50.4	9 52.3	93 33	50.2	10 20.1	93 33	50.0	10 48.0	93 33	49.8	11 15.8	93 33	49.6	11 43.6	93 33	49.4	3
4	8 08.5	93 33	49.9	8 36.4	93 33	49.7	9 04.3	93 33	49.5	9 32.2	93 33	49.4	10 00.1	93 33	49.2	10 28.0	93 33	48.8	10 55.9	93 33	48.8	11 23.7	93 33	48.6	4
125	7 48.5	93 33	49.1	8 16.5	93 33	48.9	8 44.5	93 33	48.7	9 12.4	93 33	48.5	9 40.3	93 32	48.3	10 08.3	93 32	48.1	10 36.2	93 32	48.0	11 04.1	93 32	47.8	125
6	7 28.8	93 32	48.2	7 56.8	93 32	48.0	8 24.8	93 32	47.8	8 52.8	93 32	47.7	9 20.8	93 32	47.5	9 48.8	93 32	47.3	10 16.8	93 32	47.1	10 44.8	93 32	46.9	6
7	7 09.3	94 32	47.3	7 37.4	94 32	47.2	8 05.5	94 32	47.0	8 33.5	94 32	46.8	9 01.6	94 32	46.6	9 29.6	94 32	46.4	9 57.7	94 31	46.3	10 25.7	94 31	46.1	7
8	6 50.1	94 32	46.5	7 18.2	94 31	46.3	7 46.4	94 31	46.1	8 14.5	94 31	45.9	8 42.6	94 31	45.8	9 10.7	94 31	45.6	9 38.8	94 31	45.4	10 06.9	94 31	45.2	8
9	6 31.2	94 31	45.6	6 59.4	94 31	45.4	7 27.5	94 31	45.3	7 55.7	94 31	45.1	8 23.9	94 31	44.9	8 52.0	94 31	44.7	9 20.2	94 31	44.6	9 48.4	94 30	44.4	9
130	6 12.5	94 31	44.7	6 40.8	94 31	44.6	7 09.0	94 30	44.4	7 37.2	94 30	44.2	8 05.5	94 30	44.1	8 33.7	94 30	43.9	9 01.9	94 30	43.7	9 30.1	94 30	43.5	130
1	5 54.2	94 30	43.9	6 22.5	94 30	43.7	6 50.7	94 30	43.5	7 19.0	94 30	43.4	7 47.3	94 30	43.2	8 15.6	94 30	43.0	8 43.9	94 30	42.9	9 12.1	94 30	42.7	1
2</																									

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.																						
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.																							
00	54 00.0	1.001	180.0	54 30.0	1.001	180.0	55 00.0	1.001	180.0	56 00.0	1.001	180.0	57 00.0	1.001	180.0	58 00.0	1.001	180.0	59 00.0	1.001	180.0	60 00.0	1.001	180.0	61 00.0	1.001	180.0	62 00.0	1.001	180.0	63 00.0	1.001	180.0	64 00.0	1.001	180.0	65 00.0	1.001	180.0
1	53 59.7	1.002	178.5	54 29.7	1.002	178.5	55 59.6	1.002	178.5	56 59.6	1.002	178.5	57 59.6	1.002	178.5	58 59.6	1.002	178.5	59 59.6	1.002	178.5	60 59.6	1.002	178.5	61 59.6	1.002	178.5	62 59.6	1.002	178.5	63 59.6	1.002	178.5	64 59.6	1.002	178.5	65 59.6	1.002	178.5
2	53 58.6	1.003	177.0	54 28.6	1.003	177.0	55 58.6	1.003	177.0	56 58.6	1.003	177.0	57 58.5	1.003	177.0	58 58.5	1.003	177.0	59 58.5	1.003	177.0	60 58.5	1.003	177.0	61 58.5	1.003	177.0	62 58.5	1.003	177.0	63 58.5	1.003	177.0	64 58.5	1.003	177.0	65 58.5	1.003	177.0
3	53 56.9	1.004	175.5	54 26.9	1.004	175.5	55 56.9	1.004	175.5	56 56.9	1.004	175.5	57 56.7	1.004	175.5	58 56.7	1.004	175.5	59 56.7	1.004	175.5	60 56.7	1.004	175.5	61 56.7	1.004	175.5	62 56.7	1.004	175.5	63 56.7	1.004	175.5	64 56.7	1.004	175.5	65 56.7	1.004	175.5
4	53 54.5	1.005	174.0	54 24.5	1.005	174.0	55 54.4	1.005	173.9	56 54.3	1.005	173.9	57 54.1	1.005	173.9	58 54.1	1.005	173.9	59 53.9	1.005	173.9	60 53.9	1.005	173.9	61 53.9	1.005	173.9	62 53.9	1.005	173.9	63 53.9	1.005	173.9	64 53.9	1.005	173.9	65 53.9	1.005	173.9
5	53 51.4	1.006	172.5	54 21.3	1.006	172.5	55 51.3	1.006	172.4	56 51.2	1.006	172.4	57 51.0	1.006	172.4	58 51.0	1.006	172.4	59 50.8	1.006	172.4	60 50.8	1.006	172.4	61 50.8	1.006	172.4	62 50.8	1.006	172.4	63 50.8	1.006	172.4	64 50.8	1.006	172.4	65 50.8	1.006	172.4
6	53 47.6	1.007	171.0	54 17.5	1.007	171.0	55 47.4	1.007	170.9	56 47.2	1.007	170.9	57 47.1	1.007	170.9	58 47.0	1.007	170.9	59 46.8	1.007	170.9	60 46.8	1.007	170.9	61 46.8	1.007	170.9	62 46.8	1.007	170.9	63 46.8	1.007	170.9	64 46.8	1.007	170.9	65 46.8	1.007	170.9
7	53 43.2	1.009	169.5	54 13.1	1.009	169.5	55 42.9	1.009	169.4	56 42.7	1.009	169.4	57 42.6	1.009	169.4	58 42.5	1.009	169.4	59 42.3	1.009	169.4	60 42.3	1.009	169.4	61 42.3	1.009	169.4	62 42.3	1.009	169.4	63 42.3	1.009	169.4	64 42.3	1.009	169.4	65 42.3	1.009	169.4
8	53 38.1	1.010	168.0	54 07.9	1.010	168.0	55 37.7	1.010	167.9	56 37.4	1.010	167.9	57 37.3	1.010	167.9	58 37.2	1.010	167.9	59 37.0	1.010	167.9	60 37.0	1.010	167.9	61 37.0	1.010	167.9	62 37.0	1.010	167.9	63 37.0	1.010	167.9	64 37.0	1.010	167.9	65 37.0	1.010	167.9
9	53 32.3	1.011	166.6	54 02.1	1.011	166.6	55 31.9	1.011	166.5	56 31.7	1.011	166.5	57 31.6	1.011	166.5	58 31.5	1.011	166.5	59 31.3	1.011	166.5	60 31.3	1.011	166.5	61 31.3	1.011	166.5	62 31.3	1.011	166.5	63 31.3	1.011	166.5	64 31.3	1.011	166.5	65 31.3	1.011	166.5
10	53 25.8	1.012	165.1	53 55.6	1.012	165.0	55 25.3	1.012	164.9	56 25.2	1.012	164.9	57 25.0	1.012	164.9	58 25.0	1.012	164.9	59 24.8	1.012	164.9	60 24.8	1.012	164.9	61 24.8	1.012	164.9	62 24.8	1.012	164.9	63 24.8	1.012	164.9	64 24.8	1.012	164.9	65 24.8	1.012	164.9
11	53 18.7	1.013	163.6	53 48.4	1.013	163.5	55 18.1	1.013	163.4	56 17.9	1.013	163.4	57 17.8	1.013	163.4	58 17.7	1.013	163.4	59 17.5	1.013	163.4	60 17.5	1.013	163.4	61 17.5	1.013	163.4	62 17.5	1.013	163.4	63 17.5	1.013	163.4	64 17.5	1.013	163.4	65 17.5	1.013	163.4
12	53 11.0	1.014	162.2	53 40.7	1.014	162.0	55 10.3	1.014	161.9	56 10.1	1.014	161.9	57 10.0	1.014	161.9	58 9.9	1.014	161.9	59 9.7	1.014	161.9	60 9.7	1.014	161.9	61 9.7	1.014	161.9	62 9.7	1.014	161.9	63 9.7	1.014	161.9	64 9.7	1.014	161.9	65 9.7	1.014	161.9
13	53 02.6	1.015	160.7	53 32.2	1.015	160.6	55 01.8	1.015	160.4	56 01.6	1.015	160.4	57 01.5	1.015	160.4	58 01.4	1.015	160.4	59 01.2	1.015	160.4	60 01.2	1.015	160.4	61 01.2	1.015	160.4	62 01.2	1.015	160.4	63 01.2	1.015	160.4	64 01.2	1.015	160.4	65 01.2	1.015	160.4
14	52 53.6	1.016	159.3	53 23.2	1.016	159.1	55 52.7	1.016	159.0	56 52.5	1.016	159.0	57 52.4	1.016	159.0	58 52.3	1.016	159.0	59 52.1	1.016	159.0	60 52.1	1.016	159.0	61 52.1	1.016	159.0	62 52.1	1.016	159.0	63 52.1	1.016	159.0	64 52.1	1.016	159.0	65 52.1	1.016	159.0
15	52 44.0	1.017	157.8	53 13.5	1.017	157.7	55 42.9	1.017	157.5	56 42.8	1.017	157.5	57 42.7	1.017	157.5	58 42.6	1.017	157.5	59 42.4	1.017	157.5	60 42.4	1.017	157.5	61 42.4	1.017	157.5	62 42.4	1.017	157.5	63 42.4	1.017	157.5	64 42.4	1.017	157.5	65 42.4	1.017	157.5
16	52 33.8	1.018	156.4	53 03.3	1.018	156.2	55 32.6	1.018	156.1	56 32.5	1.018	156.1	57 32.4	1.018	156.1	58 32.3	1.018	156.1	59 32.1	1.018	156.1	60 32.1	1.018	156.1	61 32.1	1.018	156.1	62 32.1	1.018	156.1	63 32.1	1.018	156.1	64 32.1	1.018	156.1	65 32.1	1.018	156.1
17	52 23.0	1.019	155.0	52 52.3	1.019	154.8	55 21.6	1.019	154.6	56 21.5	1.019	154.6	57 21.4	1.019	154.6	58 21.3	1.019	154.6	59 21.1	1.019	154.6	60 21.1	1.019	154.6	61 21.1	1.019	154.6	62 21.1	1.019	154.6	63 21.1	1.019	154.6	64 21.1	1.019	154.6	65 21.1	1.019	154.6
18	52 11.5	1.020	153.6	52 40.8	1.020	153.4	55 10.0	1.020	153.2	56 09.8	1.020	153.2	57 09.7	1.020	153.2	58 09.6	1.020	153.2	59 09.4	1.020	153.2	60 09.4	1.020	153.2	61 09.4	1.020	153.2	62 09.4	1.020	153.2	63 09.4	1.020	153.2	64 09.4	1.020	153.2	65 09.4	1.020	153.2
19	51 59.5	1.021	152.2	52 28.7	1.021	152.0	54 57.9	1.021	151.8	55 57.6	1.021	151.8	56 57.5	1.021	151.8	57 57.4	1.021	151.8	58 57.2	1.021	151.8	60 57.2	1.021	151.8	61 57.2	1.021	151.8	62 57.2	1.021	151.8	63 57.2	1.021	151.8	64 57.2	1.021	151.8	65 57.2	1.021	151.8
20	51 47.0	1.022	150.8	52 16.1	1.022	150.6	54 45.2	1.022	150.4	55 44.9	1.022	150.4	56 44.7	1.022	150.4	57 44.6	1.022	150.4	58 44.4	1.022	150.4	59 44.2	1.022	150.4	60 44.2	1.022	150.4	61 44.2	1.022	150.4	62 44.2	1.022	150.4	63 44.2	1.022	150.4	64 44.2	1.022	150.4
1	51 33.9	1.023	149.4	52 02.9	1.023	149.2	54 31.9	1.023	149.0	55 31.6	1.023	149.0	56 31.4	1.023	149.0	57 31.3	1.023	149.0	58 31.1	1.023	149.0	59 31.0	1.023	149.0	60 31.0	1.023	149.0	61 31.0	1.023	149.0	62 31.0	1.023	149.0	63 31.0	1.023	149.0	64 31.0	1.023	149.0
2	51 20.2	1.024	148.0	51 49.1	1.024	147.8	54 18.1	1.024	147.6	55 17.8	1.024	147.6	56 17.6	1.024	147.6	57 17.5	1.024	147.6	58 17.3	1.024	147.6	59 17.2	1.024	147.6	60 17.2	1.024	147.6	61 17.2	1.024	147.6	62 17.2	1.024	147.6	63 17.2	1.024	147.6	64 17.2	1.024	147.6
3	51 06.0	1.025	146.7	51 34.9	1.025	146.5	54 03.7	1.025	146.2	55 03.4	1.025	146.2	56 03.2	1.025	146.2	57 03.1	1.025	146.2	58 02.9	1.025	146.2	59 02.8	1.025	146.2	60 02.8	1.025	146.2	61 02.8	1.025	146.2	62 02.8	1.025	146.2	63 02.8	1.025	146.2	64 02.8	1.025	146.2
4	50 51.3	1.026	145.3	51 20.1	1.026	145.1	53 48.8	1.026	144.9	54 48.5	1.026	144.9	55 48.2	1.026	144.9	56 48.0	1.026	144.9	57 47.8	1.026	144.9	58 47.7	1.026	144.9	59 47.5	1.026	144.9	60 47.5	1.026	144.9	61 47.5	1.026	144.9	62 47.5	1.026	144.9	63 47.5	1.026	144.9
25	50 36.1	1.027	144.0	51 04.8	1.027	143.8	53 33.4	1.027	143.5	54 33.1	1.027	143.5	55 32.8	1.027	143.5	56 32.6	1.027	143.5	57 32.4	1.027	143.5	58 32.2</																	

DECLINATION SAME NAME AS LATITUDE

Lat. 64°

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.								
	Alt.	Ad Δt	Alt.	Ad Δt	Alt.	Ad Δt	Alt.	Ad Δt	Alt.	Ad Δt	Alt.	Ad Δt	Alt.	Ad Δt	Alt.	Ad Δt									
91	24 31.9	88 42	76.0	24 58.2	88 42	75.8	25 24.4	87 42	75.5	26 16.9	87 42	75.0	28 01.3	87 42	73.8	29 45.2	86 42	72.7	30 11.0	86 42	72.4	31 02.7	86 42	71.8	91
2	24 06.5	88 42	75.2	24 32.8	88 42	74.9	24 59.0	88 42	74.6	25 51.5	87 42	74.1	27 36.1	87 42	73.0	29 20.1	86 42	71.9	29 46.0	86 42	71.6	30 37.7	86 42	71.0	2
3	23 41.1	88 42	74.3	24 07.4	88 42	74.1	24 33.7	88 42	73.8	25 26.3	87 42	73.3	27 11.0	87 42	72.2	28 55.2	87 41	71.1	29 21.1	86 41	70.8	30 12.9	86 41	70.2	3
4	23 15.8	88 42	73.5	23 42.2	88 42	73.2	24 08.5	88 42	73.0	25 01.1	88 42	72.4	26 46.0	87 41	71.4	28 30.3	87 41	70.2	28 56.4	87 41	70.0	29 48.3	86 41	69.4	4
95	22 50.6	88 42	72.6	23 17.0	88 42	72.4	23 43.4	88 42	72.1	24 36.1	88 41	71.6	26 21.1	87 41	70.5	28 05.7	87 41	69.4	28 31.7	87 41	69.1	29 23.7	87 41	68.6	95
6	22 25.6	88 42	71.8	22 52.0	88 41	71.5	23 18.5	88 41	71.3	24 11.2	88 41	70.8	25 56.4	87 41	69.7	27 41.1	87 41	68.6	28 07.2	87 41	68.3	28 59.3	87 41	67.8	6
7	22 00.7	88 41	71.0	22 27.2	88 41	70.7	22 53.6	88 41	70.4	23 46.4	88 41	69.9	25 31.8	88 41	68.9	27 16.7	87 40	67.8	27 42.8	87 40	67.5	28 35.0	87 40	67.0	7
8	21 35.9	88 41	70.1	22 02.4	88 41	69.9	22 28.9	88 41	69.6	23 21.8	88 41	69.1	25 07.3	88 41	68.1	26 52.4	87 40	67.0	27 18.6	87 40	66.7	28 10.9	87 40	66.2	8
9	21 11.2	89 41	69.3	21 37.8	88 41	69.0	22 04.3	88 41	68.8	22 57.3	88 41	68.3	24 40.3	88 40	67.2	26 28.8	88 40	66.2	26 54.5	87 40	65.9	27 46.9	87 40	65.3	9
100	20 46.7	89 41	68.4	21 13.3	89 41	68.2	21 39.9	89 40	67.9	22 32.9	88 40	67.4	24 18.8	88 40	66.4	26 04.3	88 40	65.4	26 30.6	88 40	65.1	27 23.1	87 39	64.5	100
1	20 22.3	89 40	67.6	20 48.9	89 40	67.4	21 15.5	89 40	67.1	22 08.7	89 40	66.6	23 54.8	88 40	65.6	25 40.5	88 39	64.5	26 06.8	88 39	64.3	26 59.4	88 39	63.7	1
2	19 58.0	89 40	66.8	20 24.7	89 40	66.5	20 51.4	89 40	66.3	21 44.7	89 40	65.8	23 30.9	88 40	64.8	25 16.8	88 39	63.7	25 43.2	88 39	63.5	26 35.9	88 39	62.9	2
3	19 33.9	89 40	65.9	20 00.7	89 40	65.7	20 27.4	89 40	65.4	21 20.8	89 40	65.0	23 07.2	89 39	64.0	24 53.3	88 39	62.9	25 19.7	88 39	62.7	26 12.6	88 39	62.1	3
4	19 10.0	89 40	65.1	19 36.8	89 40	64.9	20 03.5	89 39	64.6	20 57.0	89 39	64.1	22 43.7	89 39	63.1	24 29.9	88 39	62.1	24 56.5	88 38	61.9	25 49.4	88 38	61.4	4
105	18 46.2	89 39	64.3	19 13.1	89 39	64.0	19 39.9	89 39	63.8	20 33.4	89 39	63.3	22 20.3	89 39	62.3	24 06.8	89 38	61.3	24 33.3	89 38	61.1	25 26.4	88 38	60.6	105
6	18 22.6	89 39	63.4	18 49.8	89 39	63.2	19 16.4	89 39	63.0	20 10.0	89 39	62.5	21 57.1	89 38	61.5	23 43.8	89 38	60.5	24 10.4	89 38	60.3	25 03.6	89 38	59.8	6
7	17 59.2	89 39	62.6	18 26.1	89 39	62.4	18 53.0	89 39	62.1	19 46.8	89 38	61.7	21 34.0	89 38	60.7	23 21.0	89 38	59.7	23 47.7	89 38	59.5	24 41.0	89 37	59.0	7
8	17 35.9	89 38	61.8	18 02.9	89 38	61.5	18 29.9	89 38	61.3	19 23.7	89 38	60.8	21 11.2	89 38	59.9	22 58.4	89 37	58.9	23 25.1	89 37	58.7	24 18.5	89 37	58.2	8
9	17 12.9	89 38	60.9	17 39.9	89 38	60.7	18 06.9	89 38	60.5	19 00.8	89 38	60.0	20 48.5	89 37	59.1	22 35.9	89 37	58.1	23 02.7	89 37	57.9	23 56.3	89 37	57.4	9
110	16 50.0	90 38	60.1	17 17.0	90 38	59.9	17 44.1	90 38	59.6	18 38.2	90 37	59.2	20 26.1	90 37	58.3	22 13.7	90 37	57.3	22 40.6	90 37	57.1	23 34.2	90 36	56.6	110
1	16 27.3	90 38	59.3	16 54.4	90 37	59.0	17 21.5	90 37	58.8	18 15.7	90 37	58.4	20 03.8	90 37	57.4	21 51.7	90 36	56.5	22 18.6	90 36	56.3	23 12.4	90 36	55.8	1
2	16 04.7	91 37	58.4	16 31.9	91 37	58.2	16 59.1	91 37	58.0	17 53.4	90 37	57.5	19 41.7	90 36	56.6	21 29.8	90 36	55.7	21 56.8	90 36	55.5	22 50.7	90 36	55.0	2
3	15 42.4	91 37	57.6	16 09.7	91 37	57.4	16 36.9	91 37	57.2	17 31.3	91 36	56.7	19 19.9	90 36	55.8	21 08.2	90 36	54.9	21 35.3	90 36	54.7	22 29.3	90 35	54.2	3
4	15 20.3	91 36	56.8	15 47.6	91 36	56.5	16 14.9	91 36	56.3	17 09.4	91 36	55.9	18 58.2	91 36	55.0	20 46.8	90 35	54.1	21 13.9	90 35	53.9	22 08.0	90 35	53.4	4
115	14 58.4	91 36	55.9	15 25.8	91 36	55.7	15 53.1	91 36	55.5	16 47.7	91 36	55.1	18 36.8	91 35	54.2	20 25.6	91 35	53.3	20 52.8	91 35	53.1	21 47.0	91 35	52.6	115
6	14 36.8	91 36	55.1	15 04.2	91 36	54.9	15 31.5	91 36	54.7	16 26.3	91 35	54.2	18 15.6	91 35	53.4	20 04.6	91 35	52.5	20 31.8	91 34	52.3	21 26.2	91 34	51.8	6
7	14 15.3	92 35	54.3	14 42.7	91 35	54.1	15 10.2	91 35	53.8	16 05.0	91 35	53.4	17 54.6	91 35	52.6	19 43.9	91 34	51.7	20 11.2	91 34	51.5	21 05.7	91 34	51.0	7
8	13 54.1	92 35	53.4	14 21.6	92 35	53.2	14 49.1	92 35	53.0	15 44.0	92 35	52.6	17 33.8	91 34	51.8	19 23.3	91 34	50.9	19 50.7	91 34	50.7	20 45.3	91 34	50.2	8
9	13 33.1	92 35	52.6	14 00.6	92 34	52.4	14 28.2	92 34	52.2	15 23.2	92 34	51.8	17 13.3	92 34	50.9	19 03.0	91 33	50.1	19 30.5	91 33	49.9	20 25.2	91 33	49.4	9
120	13 12.3	92 34	51.8	13 39.9	92 34	51.6	14 07.5	92 34	51.4	15 02.7	92 34	51.0	16 52.9	92 33	50.1	18 43.0	92 33	49.3	19 10.5	92 33	49.1	20 05.4	91 33	48.7	120
1	12 51.7	92 34	50.9	13 19.4	92 34	50.7	13 47.1	92 34	50.5	14 42.4	92 33	50.1	16 32.9	92 33	49.3	18 23.2	92 33	48.5	18 50.7	92 33	48.3	19 45.8	92 32	47.9	1
2	12 31.4	92 33	50.1	12 59.1	92 33	49.9	13 26.9	92 33	49.7	14 22.3	92 33	49.3	16 13.1	92 33	48.5	18 03.6	92 32	47.7	18 31.2	92 32	47.5	19 26.4	92 32	47.1	2
3	12 11.4	93 33	49.3	12 39.2	93 33	49.1	13 07.0	93 33	48.9	14 02.5	93 33	48.5	15 53.5	92 32	47.7	17 44.3	92 32	46.9	18 11.9	92 32	46.7	19 07.2	92 31	46.3	3
4	11 51.6	93 33	48.4	12 19.4	93 32	48.2	12 47.3	93 32	48.0	13 42.9	93 32	47.6	15 34.2	93 32	46.9	17 25.2	92 31	46.1	17 52.9	92 31	45.9	18 48.4	92 31	45.5	4
125	11 32.0	93 32	47.6	12 00.0	93 32	47.4	12 27.9	93 32	47.2	13 23.6	93 32	46.8	15 15.1	93 31	46.1	17 06.4	93 31	45.3	17 34.2	93 31	45.1	18 29.7	93 31	44.7	125
6	11 12.8	93 32	46.7	11 40.7	93 32	46.6	12 08.7	93 32	46.4	13 04.6	93 31	46.0	14 56.3	93 31	45.2	16 47.8	93 30	44.5	17 15.7	93 30	44.3	18 11.4	93 30	43.9	6
7	10 53.7	93 31	45.9	11 21.8	93 31	45.7	11 49.8	93 31	45.5	12 45.8	93 31	45.2	14 37.7	93 30	44.4	16 29.5	93 30	43.7	16 57.5	93 30	43.5	17 53.3	93 30	43.1	7
8	10 35.0	94 31	45.1	11 03.1	94 31	44.9	11 31.1	94 31	44.7	12 27.3	94 30	44.3	14 19.5	93 30	43.6	16 11.5	93 30	42.9	16 39.5	93 29	42.7	17 35.4	93 29	42.3	8
9	10 16.5	94 30	44.2	10 44.6	94 30	44.0	11 12.8	94 30	43.9	12 09.0	94 30	43.5	14 01.5	94 30	42.8	15 53.7	94 29	42.1	16 21.8	93 29	41.9	17 17.9	93 29	41.5	9
130	9 58.3	94 30	43.4	10 26.5	94 30	43.2	10 54.7	94 30	43.0	11 51.1	94 29	42.7	13 43.7	94 29	42.0	15 36.3	94 29	41.3	16 04.4	94 29	41.1	17 00.6	94 28	40.7	130
1	9 40.4	94 29	42.5	10 08.6	94 29	42.4	10 36.9	94 29	42.2	11 33.4	94 29	41.8	13 26.3	94 29	41.2										

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., latitude (36° 00' to 45° 00'), and declination. Each latitude column contains two sub-columns for Alt. and Az. The table is organized in 5-degree increments of latitude, with each degree containing 4 rows of data.

Main table with columns for H.A., Az., and values for various declinations (36° 00' to 45° 00').

Lat. 64°

Lat. 65°

Lat. 66°

Lat. 67°

Lat. 68°

Lat. 69°

Lat. 70°

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and H.A. for various declination values from 46° 00' to 54° 00'. Each declination column contains three sub-columns for Alt., Az., and H.A. values.

Main data table with columns for H.A., Alt., Az., and declination values for various latitudes from 91 to 180.

Lat. 64°

Lat. 65°

Lat. 66

Lat. 64°

H.A.	54° 30'		55° 00'		56° 00'		56° 30'		57° 00'		57° 30'		59° 00'		59° 30'		H.A.					
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.						
00	80 30.0	1.00	180.0	81 00.0	1.00	180.0	82 00.0	1.00	180.0	83 00.0	1.00	180.0	85 00.0	1.00	180.0	85 30.0	1.00	180.0	00			
1	80 29.2	1.04	176.5	80 59.2	1.04	176.3	81 59.1	1.06	175.8	82 29.0	1.06	175.5	83 28.9	1.06	175.3	84 58.6	1.07	174.1	85 28.5	1.07	173.6	01
2	80 26.8	1.07	173.0	80 56.6	1.07	172.7	81 56.3	1.08	172.0	82 26.1	1.08	171.6	83 25.7	1.08	171.6	84 54.6	1.09	168.3	85 24.1	1.09	167.2	2
3	80 22.8	1.09	169.5	80 52.5	1.09	169.1	81 51.8	1.10	168.1	82 21.4	1.10	167.5	83 20.3	1.10	166.0	84 48.0	1.11	162.7	85 17.0	1.11	161.2	3
4	80 17.8	1.12	166.1	80 47.7	1.12	165.5	81 45.5	1.13	164.2	82 14.7	1.13	163.4	83 13.0	1.13	162.5	84 39.0	1.14	157.3	85 07.2	1.14	155.4	4
05	80 16.2	1.14	162.8	80 39.4	1.14	162.1	81 37.5	1.15	160.5	82 06.4	1.15	159.5	83 03.7	1.15	157.2	84 27.8	1.16	152.3	85 55.2	1.16	150.0	05
6	80 01.6	1.16	159.5	80 30.5	1.16	158.7	81 27.9	1.17	156.8	81 56.3	1.17	155.7	82 24.6	1.17	154.5	84 14.6	1.18	147.5	84 41.0	1.18	145.1	6
7	79 51.7	1.19	155.3	80 20.3	1.19	154.4	81 16.8	1.20	153.3	81 44.8	1.20	152.1	82 39.9	1.20	149.1	83 50.7	1.21	143.1	84 25.1	1.21	140.5	7
8	79 40.5	1.21	153.2	80 08.6	1.21	152.2	81 04.3	1.22	149.9	81 31.7	1.22	148.6	81 58.9	1.22	145.4	83 43.1	1.23	139.1	84 07.6	1.23	136.3	8
9	79 28.0	1.23	150.2	79 55.8	1.23	149.1	80 50.4	1.24	146.7	81 17.4	1.24	145.2	81 43.9	1.24	143.7	82 10.1	1.25	141.9	83 25.3	1.25	132.5	9
10	79 14.4	1.25	147.3	79 41.7	1.25	146.2	80 35.4	1.26	143.6	81 01.8	1.26	142.1	81 27.8	1.26	140.4	81 53.3	1.27	138.6	83 06.2	1.27	131.9	10
1	78 59.7	1.26	144.5	79 26.5	1.26	143.3	80 19.2	1.27	140.6	80 45.1	1.27	139.1	81 10.5	1.27	137.4	81 35.3	1.28	135.5	82 46.1	1.28	125.9	1
2	78 43.9	1.28	141.8	79 10.3	1.28	140.6	80 02.1	1.28	137.8	80 27.3	1.28	136.2	80 52.2	1.28	134.5	81 16.4	1.29	132.6	82 25.2	1.29	123.0	2
3	78 27.2	1.29	139.3	78 53.1	1.29	138.0	79 43.9	1.29	135.1	80 08.7	1.29	133.5	80 33.0	1.29	131.7	80 56.6	1.30	129.8	82 03.5	1.30	120.3	3
4	78 09.6	1.31	136.8	78 35.1	1.31	135.5	79 25.0	1.31	132.6	79 49.2	1.31	130.9	80 18.9	1.31	129.2	80 36.1	1.31	127.3	81 41.1	1.31	117.9	4
15	77 51.2	1.32	134.4	78 16.3	1.32	133.1	79 05.2	1.32	130.1	79 29.0	1.32	128.5	79 52.2	1.32	126.7	80 14.8	1.33	124.8	81 18.2	1.33	118.2	15
6	77 32.0	1.33	132.1	77 56.7	1.33	130.8	78 44.8	1.33	127.8	79 08.1	1.33	126.2	79 30.8	1.33	124.4	79 52.9	1.34	122.5	80 54.8	1.34	116.0	6
7	77 12.2	1.34	130.0	77 36.5	1.34	128.6	78 23.7	1.34	125.6	78 46.5	1.34	124.0	79 08.8	1.34	122.3	79 30.5	1.35	120.4	80 30.9	1.35	114.0	7
8	76 51.7	1.35	127.9	77 15.6	1.35	126.5	78 02.0	1.35	123.5	78 24.5	1.35	121.9	78 46.3	1.35	120.2	79 07.5	1.36	118.3	80 06.7	1.36	112.1	8
9	76 30.7	1.36	125.9	76 54.2	1.36	124.5	77 39.9	1.36	121.6	78 01.9	1.36	119.9	78 23.4	1.36	118.2	78 44.2	1.37	116.4	79 42.2	1.37	110.3	9
20	76 09.1	1.37	123.9	76 32.3	1.37	122.6	77 17.2	1.37	119.6	77 38.9	1.37	118.1	78 00.0	1.37	116.4	78 20.5	1.38	114.6	79 17.4	1.38	108.6	20
1	75 47.9	1.38	122.1	76 09.9	1.38	120.7	76 54.2	1.38	117.8	77 15.5	1.38	116.3	77 36.3	1.38	114.6	77 56.4	1.39	112.8	78 52.3	1.39	107.0	1
2	75 24.6	1.39	120.3	75 47.1	1.39	119.0	76 30.7	1.39	116.1	76 51.7	1.39	114.5	77 12.2	1.39	112.9	77 32.0	1.40	111.2	78 27.1	1.40	105.5	2
3	75 01.6	1.40	118.6	75 23.9	1.40	117.3	76 06.9	1.40	114.4	76 27.7	1.40	112.9	76 47.8	1.40	111.3	77 07.3	1.41	109.6	78 01.6	1.41	103.0	3
4	74 38.4	1.41	116.9	75 00.3	1.41	115.6	75 42.8	1.41	112.8	76 03.3	1.41	111.3	76 23.2	1.41	109.8	76 42.4	1.42	108.1	77 36.0	1.42	102.7	4
25	74 14.7	1.42	115.3	74 36.5	1.42	114.0	75 18.4	1.42	111.3	75 38.7	1.42	109.8	75 58.3	1.42	108.3	76 17.3	1.43	106.7	77 10.3	1.43	101.4	25
6	73 50.8	1.43	113.8	74 12.3	1.43	112.5	74 02.9	1.43	109.4	74 23.9	1.43	107.8	74 43.8	1.43	106.5	75 06.0	1.44	105.0	75 26.6	1.44	98.9	6
7	73 26.6	1.44	112.3	73 42.3	1.44	111.1	74 29.0	1.44	108.4	74 48.8	1.44	107.0	75 08.0	1.44	105.5	75 26.6	1.45	103.9	75 44.3	1.45	97.9	7
8	73 02.2	1.45	110.9	73 23.2	1.45	109.6	74 03.9	1.45	106.7	74 23.5	1.45	105.6	74 42.5	1.45	104.2	75 01.0	1.46	102.7	75 52.5	1.46	97.8	8
9	72 37.5	1.46	109.5	72 58.3	1.46	108.3	73 38.7	1.46	105.7	73 58.1	1.46	104.3	74 17.0	1.46	102.9	74 35.3	1.47	101.4	75 26.4	1.47	96.7	9
30	72 12.6	1.47	108.1	72 33.3	1.47	106.9	73 13.3	1.47	104.4	73 32.5	1.47	103.1	73 51.3	1.47	101.7	74 09.3	1.48	100.2	75 03.3	1.48	95.6	30
1	71 47.5	1.48	106.8	72 08.0	1.48	105.7	72 47.7	1.48	103.2	73 06.9	1.48	101.9	73 25.5	1.48	100.5	73 43.5	1.49	99.1	74 34.1	1.49	94.5	1
2	71 22.8	1.49	105.6	71 42.6	1.49	104.4	72 22.1	1.49	102.0	72 41.1	1.49	100.7	73 00.6	1.49	99.3	73 17.5	1.50	98.0	74 07.8	1.50	93.5	2
3	70 56.6	1.50	104.3	71 17.1	1.50	103.2	72 03.6	1.50	100.8	72 22.5	1.50	99.5	72 41.3	1.50	98.2	73 00.0	1.51	96.9	73 15.6	1.51	92.5	3
4	70 31.3	1.51	103.1	70 51.4	1.51	102.0	71 30.4	1.51	99.7	71 49.2	1.51	98.4	72 07.5	1.51	97.1	72 25.3	1.52	95.8	73 15.3	1.52	91.6	4
35	70 05.6	1.52	102.0	70 25.6	1.52	100.9	71 04.4	1.52	98.6	71 23.1	1.52	97.3	71 41.4	1.52	96.1	71 59.1	1.53	94.8	72 49.0	1.53	90.7	35
6	69 39.8	1.53	100.8	69 59.8	1.53	99.8	70 38.4	1.53	97.5	70 57.0	1.53	96.3	71 15.2	1.53	95.1	71 32.9	1.54	93.8	72 22.7	1.54	89.8	6
7	69 13.9	1.54	99.7	69 33.8	1.54	98.7	70 12.3	1.54	96.4	70 30.8	1.54	95.3	70 49.0	1.54	94.1	71 06.6	1.55	92.8	71 56.4	1.55	88.9	7
8	68 48.0	1.55	98.7	69 07.8	1.55	97.6	69 46.1	1.55	95.4	70 04.6	1.55	94.3	70 22.7	1.55	93.1	70 40.3	1.56	91.9	71 30.1	1.56	88.0	8
9	68 21.9	1.56	97.6	68 41.6	1.56	96.6	69 19.9	1.56	94.4	69 38.4	1.56	93.3	69 56.4	1.56	92.1	70 14.0	1.57	90.9	71 03.8	1.57	87.2	9
40	67 55.8	1.57	96.6	68 15.5	1.57	95.5	68 53.7	1.57	93.4	69 12.1	1.57	92.3	69 30.2	1.57	91.2	69 47.7	1.58	90.0	70 37.7	1.58	86.3	40
1	67 29.7	1.58	95.6	67 49.3	1.58	94.6	68 27.4	1.58	92.5	68 45.8	1.58	91.4	69 03.9	1.58	90.3	69 21.4	1.59	89.1	70 11.3	1.59	85.5	1
2	67 03.5	1.59	94.6	67 23.1	1.59	93.6	68 01.1	1.59	91.5	68 19.5	1.59	90.5	68 37.6	1.59	89.4	68 55.1	1.60	88.3	69 45.1	1.60	84.7	2
3	66 37.2	1.60	93.6	66 56.8	1.60	92.6	67 34.8	1.60	90.6	67 53.2	1.60	89.6	68 11.3	1.60	88.5	68 28.9	1.61	87.4	69 18.9	1.61	84.0	3
4	66 11.0	1.61	92.6	66 30.5	1.61	91.7	67 08.5	1.61	89.7	67 26.9	1.61	88.7	67 45.0	1.61	87.7	68 02.6	1.62	86.6	68 52.8	1.62	83.2	4
45	65 44.7	1.62	91.7	66 04.2	1.62	90.8	66 42.2	1.62	88.8	67 00.6	1.62	87.8	67 18.7	1.62	86.8	67 36.4	1.63	85.7	68 26.7	1.63	82.4	45
6	65 18.4	1.63	90.7	65 37.9	1.63	89.9	66 15.9	1.63	88.0	66 34.4	1.63	87.0	66 52.4									

Main table with columns for H.A., latitude (54° 30' to 59° 30'), and declination values. Includes sub-headers for Alt. and Az. and a final H.A. column.

Lat. 64°

Lat. 65°

Lat. 66°

Lat. 67°

Lat. 68°

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and H.A. for various declination values (60° 00', 60° 30', 62° 00', 62° 30', 63° 00', 69° 00', 69° 30', 74° 30'). Each cell contains numerical data representing astronomical coordinates.

DECLINATION SAME NAME AS LATITUDE

H.A.	60° 00'			60° 30'			62° 00'			62° 30'			63° 00'			69° 00'			69° 30'			74° 30'			H.A.
	Alt.	Ad At	Az.																						
91	50 45.9	72 34	52.2	51 07.4	72 34	51.7	52 11.1	70 33	50.0	52 32.0	69 33	49.4	52 52.7	69 33	48.8	56 45.4	60 29	40.8	57 03.3	59 28	40.1	59 46.5	49 23	32.1	91
2	50 25.2	73 34	51.7	50 46.9	73 34	51.1	51 51.1	70 33	49.4	52 12.1	70 33	48.8	52 33.0	69 33	48.3	56 28.3	61 28	40.4	56 46.5	60 28	39.7	59 32.6	50 23	31.8	2
3	50 04.6	73 34	51.1	50 26.5	73 34	50.5	51 31.2	71 33	48.9	51 52.4	71 33	48.9	52 13.5	70 32	47.7	56 11.3	62 28	40.0	56 29.7	61 28	39.3	59 18.8	51 23	31.5	3
4	49 44.2	74 34	50.5	50 06.3	73 33	50.0	51 11.4	72 33	48.4	51 32.8	71 32	47.8	51 54.1	71 32	47.2	55 54.5	63 28	39.6	56 13.1	62 27	38.9	59 05.1	52 23	31.3	4
95	49 24.0	74 33	49.9	49 46.2	74 33	49.4	50 51.8	72 32	47.8	51 13.4	72 32	47.3	51 34.9	71 32	46.7	55 37.8	63 28	39.2	55 56.7	63 27	38.5	58 51.5	54 22	31.0	95
6	49 04.0	75 33	49.4	49 26.3	74 33	48.9	50 32.4	73 32	47.3	50 54.2	72 32	46.7	51 15.8	72 31	46.2	55 21.2	64 27	38.8	55 40.4	63 27	38.1	58 38.0	56 22	30.7	6
7	48 44.1	76 33	48.8	49 06.6	75 33	48.3	50 13.2	73 32	46.7	50 35.1	73 32	46.2	50 56.9	72 31	45.7	55 04.8	65 27	38.4	55 24.2	64 27	37.7	58 24.7	56 22	30.4	7
8	48 24.4	76 33	48.2	48 47.0	75 32	47.7	49 54.1	74 32	46.2	50 16.2	73 31	45.7	50 38.2	73 31	45.1	54 48.5	66 27	38.0	55 08.1	65 26	37.3	58 11.4	57 22	30.1	8
9	48 04.9	76 32	47.7	48 27.6	76 32	47.2	49 35.2	74 31	45.7	49 57.5	74 31	45.1	50 19.6	73 31	44.6	54 32.4	67 27	37.6	54 52.3	66 26	37.0	57 58.3	58 22	29.8	9
100	47 45.5	77 32	47.1	48 08.4	76 32	46.6	49 16.5	75 31	45.1	49 38.9	75 31	44.6	50 01.2	74 30	44.1	54 16.4	67 26	37.2	54 36.5	67 26	36.5	57 45.2	59 22	29.6	100
1	47 26.3	77 32	46.5	47 49.4	77 31	46.0	48 58.0	76 31	44.6	49 20.5	75 30	44.1	49 43.0	75 30	43.6	54 00.6	68 26	36.8	54 20.9	67 26	36.1	57 32.3	60 21	29.3	1
2	47 07.5	78 31	46.0	47 30.6	77 31	45.5	48 39.6	76 30	44.0	49 02.3	76 30	43.5	49 25.0	75 30	43.0	53 44.9	69 26	36.4	54 05.5	68 25	35.7	57 19.5	61 21	29.0	2
3	46 48.3	78 31	45.4	47 11.9	78 31	44.9	48 21.4	77 30	43.5	48 44.3	76 30	43.0	49 07.1	76 29	42.5	53 29.4	70 26	35.9	53 50.2	69 25	35.3	57 06.8	62 21	28.7	3
4	46 29.9	79 31	44.8	46 53.4	78 30	44.4	48 03.4	77 30	43.0	48 26.4	77 29	42.5	48 49.4	76 29	42.0	53 14.1	70 25	35.5	53 35.1	70 25	34.9	56 54.3	63 21	28.4	4
105	46 11.4	79 30	44.2	46 35.1	79 30	43.8	47 45.5	78 29	42.4	48 08.8	77 29	41.9	48 31.9	77 29	41.5	52 58.9	71 25	35.1	53 20.1	71 25	34.5	56 41.9	64 21	28.0	105
6	45 53.2	80 30	43.7	46 17.0	79 30	43.2	47 27.9	78 29	41.9	47 51.3	77 29	41.4	48 14.6	77 29	40.9	52 43.8	72 25	34.7	53 05.3	71 24	34.1	56 29.6	65 20	27.7	6
7	45 35.1	80 30	43.1	45 59.1	80 30	42.7	47 10.4	79 29	41.3	47 34.0	78 29	40.9	47 57.4	78 28	40.4	52 28.9	73 25	34.2	52 50.6	72 24	33.7	56 17.4	66 20	27.4	7
8	45 17.3	81 29	42.5	45 41.4	80 29	42.1	46 53.1	79 28	40.8	47 16.9	79 28	40.3	47 40.5	79 28	39.9	52 14.2	73 24	33.8	52 36.1	73 24	33.3	56 05.3	66 20	27.1	8
9	44 59.6	81 29	42.0	45 23.8	81 29	41.5	46 36.1	80 28	40.2	46 59.9	79 28	39.8	47 23.7	79 28	39.4	51 59.7	74 24	33.4	52 21.8	73 24	32.8	55 53.4	67 20	26.8	9
110	44 42.1	81 29	41.4	45 06.5	81 29	41.0	46 19.2	80 28	39.7	46 43.2	80 28	39.3	47 07.1	80 27	38.8	51 45.3	75 24	33.0	52 07.6	74 23	32.4	55 41.6	68 19	26.5	110
1	44 24.8	82 28	40.8	44 49.3	82 28	40.4	46 02.5	81 28	39.2	46 26.6	80 27	38.7	46 50.7	80 27	38.3	51 31.0	75 23	32.5	51 53.6	75 23	32.0	55 30.0	69 19	26.1	1
2	44 07.7	82 28	40.2	44 32.4	82 28	39.8	45 45.9	81 27	38.6	46 10.3	81 27	38.2	46 34.5	81 27	37.8	51 17.0	76 23	32.1	51 39.7	76 23	31.6	55 18.5	70 19	25.8	2
3	43 50.8	83 28	39.7	44 15.6	83 28	39.3	45 29.6	82 27	38.1	45 54.1	81 27	37.6	46 18.5	81 26	37.2	51 03.1	77 23	31.7	51 26.0	76 23	31.1	55 07.1	71 19	25.5	3
4	43 34.1	83 27	39.1	43 59.1	83 27	38.7	45 13.5	82 27	37.5	45 38.1	82 26	37.1	46 02.7	82 26	36.7	50 49.4	77 23	31.2	51 12.5	77 22	30.7	54 55.8	72 18	25.1	4
115	43 17.7	84 27	38.5	43 42.8	84 27	38.1	44 57.6	83 26	37.0	45 22.4	82 26	36.6	45 47.1	82 26	36.2	50 35.8	78 22	30.8	50 59.2	78 22	30.3	54 44.7	73 18	24.8	115
6	43 01.4	84 27	37.9	43 26.6	84 27	37.6	44 41.9	83 26	36.4	45 06.8	83 26	36.0	45 31.7	83 25	35.6	50 22.5	79 22	30.3	50 46.0	78 22	29.8	54 33.8	73 18	24.5	6
7	42 45.3	85 26	37.4	43 10.7	84 26	37.0	44 26.4	84 26	35.9	44 51.4	83 26	35.5	45 16.4	83 26	35.1	50 09.3	79 22	29.9	50 33.0	79 21	29.4	54 22.9	74 18	24.1	7
8	42 29.5	86 26	36.8	42 55.0	85 26	36.4	44 11.1	84 25	35.3	44 36.3	84 26	34.9	45 01.4	84 26	34.5	49 56.3	80 21	29.4	50 20.2	80 21	29.0	54 12.3	75 18	23.8	8
9	42 13.8	86 26	36.2	42 39.5	85 26	35.8	43 96.0	85 25	34.8	44 21.3	84 26	34.4	44 46.6	84 26	34.0	49 43.4	81 21	29.0	50 07.5	80 21	28.5	54 01.7	76 17	23.4	9
120	41 58.4	86 25	35.6	42 24.2	86 25	35.3	43 41.1	85 24	34.2	44 06.6	85 24	33.8	44 32.0	85 24	33.5	49 30.8	81 21	28.6	49 55.0	81 20	28.1	53 51.3	77 17	23.1	120
1	41 43.2	86 25	35.0	42 09.1	86 25	34.7	43 26.4	86 24	33.7	43 52.0	85 24	33.3	44 17.6	85 24	32.9	49 18.3	82 20	28.1	49 42.7	81 20	27.7	53 41.1	77 17	22.8	1
2	41 28.7	87 25	34.5	41 54.2	87 24	34.1	43 11.9	86 24	33.1	43 37.7	86 24	32.8	44 03.4	86 23	32.4	49 06.0	82 20	27.7	49 30.6	82 20	27.2	53 31.0	77 17	22.2	2
3	41 13.4	87 24	33.9	41 39.6	87 24	33.6	42 57.7	86 23	32.5	43 23.6	86 23	32.2	43 49.4	86 23	31.9	48 53.8	83 20	27.2	49 18.7	83 20	26.8	53 21.0	79 16	22.1	3
4	40 58.9	88 24	33.3	41 25.1	87 24	33.0	42 43.6	87 23	32.0	43 09.7	87 23	31.7	43 35.6	86 23	31.3	48 41.9	83 20	26.8	49 06.9	83 19	26.3	53 11.2	80 16	21.7	4
125	40 44.5	88 24	32.7	41 10.9	88 23	32.4	42 29.8	87 23	31.4	42 56.0	87 22	31.1	43 22.1	87 22	30.8	48 30.2	84 19	26.3	48 55.3	84 19	25.9	53 01.6	80 16	21.3	125
6	40 30.4	88 23	32.1	40 56.9	88 23	31.8	42 16.2	88 22	30.9	42 42.5	88 22	30.6	43 08.7	87 22	30.2	48 18.6	85 19	25.8	48 43.9	84 19	25.4	52 52.1	81 16	21.0	6
7	40 16.6	89 23	31.6	40 43.2	89 23	31.3	42 02.8	88 22	30.3	42 29.2	88 22	30.0	42 55.6	88 22	29.7	48 07.2	85 19	25.4	48 32.7	85 18	25.0	52 42.7	82 15	20.6	7
8	40 02.9	89 22	31.0	40 29.7	89 22	30.7	41 49.6	89 22	29.8	42 16.2	88 21	29.5	42 42.7	88 21	29.1	47 56.1	86 18	24.9	48 21.7	85 18	24.5	52 33.5	82 15	20.3	8
9	39 49.5	90 22	30.4	40 16.3	89 22	30.1	41 36.7	89 21	29.2	42 03.4	89 21	28.9	42 30.0	89 21	28.6	47 45.1	86 18	24.5	48 10.9	86 18	24.1	52 24.5	83 15	19.9	9
130	39 36.3	90 22	29.8	40 03.3	90 21	29.5	41 23.9	89 21	28.6	41 50.8	89 21	28.3	42 17.5	89 20	28.0	47 34.3	87 18	24.0	48 00.3	86 17	23.6	52 15.6	84 15	19.5	130
1	39 23.0	91 21	29.2	39 50.4	90 21	28.9	41 11.5	90 20	28.1	41 38.4	90 20	27.8	42 05.3	90 20											

# STAR IDENTIFICATION TABLE

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ALTITUDE

Lat.  
64°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.																					
00	30	180	34	180	38	180	42	180	46	180	50	180	54	180	58	180	62	180	66	180	70	180	00
4	30	175	34	175	38	175	42	175	46	175	50	174	54	174	58	174	62	173	66	172	70	172	4
8	30	171	34	170	38	170	42	170	46	169	50	169	54	168	58	167	62	166	66	165	69	163	8
12	29	166	33	166	37	165	41	165	45	164	49	163	53	162	57	161	61	160	65	158	69	155	12
16	29	162	33	161	37	160	41	160	45	159	49	158	53	156	56	155	60	153	64	151	68	148	16
20	28	157	32	156	36	156	40	155	44	153	48	152	52	151	56	149	59	147	63	144	67	141	20
24	28	153	31	152	35	151	39	150	43	148	47	147	51	145	55	143	58	141	62	138	66	134	24
28	27	148	31	147	34	146	38	145	42	143	46	142	50	140	54	138	57	135	61	132	65	128	28
32	26	144	30	143	33	142	37	140	41	139	45	137	49	135	52	133	56	130	60	127	63	123	32
36	25	140	28	139	32	137	36	136	40	134	44	132	47	130	51	128	55	125	58	121	62	117	36
40	23	136	27	134	31	133	35	131	39	129	42	128	46	125	50	123	53	120	57	117	60	112	40
44	22	132	26	130	30	129	33	127	37	125	41	123	44	121	48	118	52	115	55	112	58	108	44
48	21	128	25	126	28	124	32	123	36	121	39	119	43	116	46	114	50	111	53	107	57	103	48
52	19	124	23	122	27	120	30	118	34	117	38	114	41	112	45	110	48	107	52	103	55	99	52
56	18	120	22	118	25	116	29	114	33	112	36	110	40	108	43	105	47	103	50	99	53	95	56
60	16	116	20	114	24	112	27	110	31	109	34	106	38	104	41	101	45	99	48	95	51	92	60
64	15	112	18	110	22	109	26	107	29	105	33	102	36	100	40	98	43	95	46	92	50	88	64
68	13	108	17	107	20	105	24	103	27	101	31	99	35	96	38	94	41	91	45	88	48	85	68
72	11	105	15	103	19	101	22	99	26	97	29	95	33	93	36	90	40	88	43	85	46	81	72
76	10	101	13	99	17	97	20	95	24	93	28	91	31	89	34	87	38	84	41	81	44	78	76
80	08	97	12	95	15	94	19	92	22	90	26	88	29	86	33	83	36	81	39	78	43	75	80
84	06	94	10	92	13	90	17	88	21	86	24	84	28	82	31	80	34	77	38	75	41	72	84
88	04	90	08	88	12	86	15	85	19	83	22	81	26	79	29	76	33	74	36	71	39	69	88
92	03	86	06	85	10	83	13	81	17	79	21	77	24	75	28	73	31	71	34	68	38	66	92
96	01	83	05	81	08	79	12	78	15	76	19	74	22	72	26	70	29	67	33	65	36	63	96
100	01	79	03	78	06	76	10	74	14	72	17	70	21	68	24	66	28	64	31	62	35	60	100
104	02	76	01	74	05	72	08	71	12	69	16	67	19	65	23	63	26	61	30	59	33	57	104
108	04	72	01	70	03	69	07	67	10	65	14	64	18	62	21	60	25	58	28	56	32	54	108
112	06	68	02	67	02	65	05	63	09	62	12	60	16	58	20	57	23	55	27	53	30	51	112
116	07	65	04	63	00	62	04	60	07	58	11	57	15	55	18	53	22	52	26	50	29	48	116
120	09	61	05	59	02	58	02	56	06	55	10	53	13	52	17	50	21	48	24	47	28	45	120
124	10	57	07	56	03	54	01	53	04	51	08	50	12	48	16	47	19	45	23	44	27	42	124
128	12	53	08	52	04	51	01	49	03	48	07	46	11	45	14	44	18	42	22	41	25	39	128
132	13	50	10	48	06	47	02	46	02	44	06	43	09	42	13	40	17	39	21	37	24	36	132
136	15	46	11	44	07	43	03	42	01	41	04	40	08	38	12	37	16	36	20	34	23	33	136
140	16	42	12	41	08	39	04	38	00	37	03	36	07	35	11	34	15	33	19	31	23	30	140
144	17	38	13	37	09	36	05	35	01	34	02	33	06	31	10	30	14	29	18	28	22	27	144
148	18	34	14	33	10	32	06	31	02	30	01	29	05	28	09	27	13	26	17	25	21	24	148
152	19	30	15	29	11	28	07	27	03	26	01	25	05	24	09	24	12	23	16	22	20	21	152
156	20	26	16	25	12	24	08	23	04	23	00	22	04	21	08	20	12	20	16	19	20	18	156
160	20	21	16	21	12	20	09	19	05	19	01	18	03	17	07	17	11	16	15	16	19	15	160
164	21	17	17	17	13	16	09	16	05	15	01	15	03	14	07	14	11	13	15	13	19	12	164
168	21	13	17	12	13	12	09	12	05	11	01	11	02	11	06	10	10	10	14	09	18	09	168
172	22	09	18	08	14	08	10	08	06	08	02	07	02	07	06	07	10	07	14	06	18	06	172
176	22	04	18	04	14	04	10	04	06	04	02	04	02	04	06	03	10	03	14	03	18	03	176
180	22	00	18	00	14	00	10	00	06	00	02	00	02	00	06	00	10	00	14	00	18	00	180
	4°	8°	12°	16°	20°	24°	28°	32°	36°	40°	44°												

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

# STAR IDENTIFICATION TABLE

## ALTITUDE

131

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.																					
00	74	180	78	180	82	180	86	180	90	....	86	00	82	00	78	00	74	00	70	00	66	00	00
4	74	170	78	168	82	164	86	153	88	88	86	20	82	09	78	05	74	03	70	01	66	00	4
8	73	161	77	157	81	150	85	133	87	86	85	36	81	17	78	09	74	05	70	02	66	01	8
12	73	152	76	147	80	138	83	120	85	85	84	45	81	24	77	13	74	07	70	04	66	01	12
16	72	144	75	138	79	128	82	111	83	83	82	51	80	30	77	17	73	10	70	05	66	01	16
20	71	136	74	130	77	120	80	104	81	81	81	55	79	34	76	21	73	12	70	06	66	02	20
24	69	129	73	123	76	113	78	99	80	79	80	57	78	38	76	23	73	14	69	07	66	02	24
28	68	123	71	116	74	107	76	94	78	77	78	58	77	40	75	26	72	16	69	08	66	02	28
32	66	117	70	111	72	102	75	90	76	76	77	59	76	42	74	28	72	17	69	09	66	03	32
36	65	112	68	106	71	97	73	87	74	74	75	59	75	43	73	30	71	18	69	10	66	03	36
40	63	107	66	101	69	93	71	84	73	72	74	58	73	44	72	31	71	20	68	10	66	03	40
44	62	103	64	97	67	90	69	81	71	70	72	58	72	45	72	32	70	21	68	11	65	03	44
48	60	99	63	93	65	86	68	78	69	68	71	57	71	45	71	33	69	22	68	12	65	04	48
52	58	95	61	89	64	83	66	75	68	66	69	56	70	45	70	33	69	22	67	12	65	04	52
56	56	91	59	86	62	80	64	73	66	64	68	55	69	44	69	33	68	23	67	13	65	04	56
60	55	88	57	83	60	77	63	70	65	63	66	54	67	44	68	33	67	23	66	13	65	04	60
64	53	84	56	79	58	74	61	68	63	61	65	52	66	43	67	33	67	23	66	13	65	04	64
68	51	81	54	76	57	71	59	65	62	59	63	51	65	42	66	33	66	23	66	14	65	04	68
72	49	78	52	73	55	69	58	63	60	57	62	50	64	42	65	33	65	23	65	14	65	04	72
76	48	74	51	70	54	66	56	61	59	55	61	48	63	41	64	32	65	23	65	14	64	04	76
80	46	71	49	68	52	63	55	59	57	53	60	47	61	40	63	32	64	23	64	14	64	05	80
84	44	68	47	65	50	61	53	56	56	51	58	45	60	38	62	31	63	23	64	14	64	05	84
88	43	65	46	62	49	58	52	54	55	49	57	43	59	37	61	30	63	22	64	14	64	05	88
92	41	63	44	59	47	56	50	52	53	47	56	42	58	36	60	29	62	22	63	13	64	05	92
96	40	60	43	57	46	53	49	49	52	45	55	40	57	35	59	28	61	21	63	13	64	04	96
100	38	57	41	54	45	51	48	47	51	43	54	38	56	33	59	27	61	20	62	13	64	04	100
104	37	54	40	51	43	48	46	45	50	41	53	37	55	32	58	26	60	20	62	12	63	04	104
108	35	51	39	49	42	46	45	43	48	39	52	35	54	30	57	25	60	19	62	12	63	04	108
112	34	48	37	46	41	43	44	40	47	37	51	33	54	29	56	24	59	18	61	12	63	04	112
116	33	46	36	43	40	41	43	38	46	35	50	31	53	27	56	23	58	17	61	11	63	04	116
120	31	43	35	41	39	38	42	36	45	33	49	29	52	26	55	21	58	16	61	11	63	04	120
124	30	40	34	38	37	36	41	33	44	31	48	28	51	24	54	20	57	16	60	10	63	04	124
128	29	37	33	35	36	33	40	31	44	28	47	26	50	22	54	19	57	15	60	09	63	03	128
132	28	34	32	33	36	31	39	29	43	26	46	24	50	21	53	17	57	14	60	09	63	03	132
136	27	32	31	30	35	28	38	26	42	24	46	22	49	19	53	16	56	13	59	08	63	03	136
140	26	29	30	27	34	26	38	24	41	22	45	20	49	18	52	15	56	11	59	08	62	03	140
144	26	26	29	25	33	23	37	22	41	20	44	18	48	16	52	13	55	10	59	07	62	03	144
148	25	23	29	22	32	21	36	19	40	18	44	16	48	14	51	12	55	09	59	06	62	02	148
152	24	20	28	19	32	18	36	17	40	16	43	14	47	12	51	10	55	08	59	05	62	02	152
156	24	17	27	16	31	15	35	14	39	13	43	12	47	11	51	09	55	07	58	05	62	02	156
160	23	14	27	14	31	13	35	12	39	11	43	10	47	09	51	07	54	06	58	04	62	01	160
164	23	12	27	11	31	10	35	10	39	09	42	08	46	07	50	06	54	05	58	03	62	01	164
168	22	09	26	08	30	08	34	07	38	07	42	06	46	05	50	05	54	04	58	02	62	01	168
172	22	06	26	05	30	05	34	05	38	04	42	04	46	04	50	03	54	02	58	02	62	01	172
176	22	03	26	03	30	03	34	02	38	02	42	02	46	02	50	02	54	01	58	01	62	00	176
180	22	00	26	00	30	00	34	00	38	00	42	00	46	00	50	00	54	00	58	00	62	00	180

Lat. 64°

Lat. 65°

Lat. 66°

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

DECLINATION SAME NAME AS LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Az.															
00	25 00.0	1.00 180.0	25 30.0	1.00 180.0	26 00.0	1.00 180.0	26 30.0	1.00 180.0	27 00.0	1.00 180.0	27 30.0	1.00 180.0	28 00.0	1.00 180.0	28 30.0	1.00 180.0	00
1	24 59.8	1.01 178.9	25 29.8	1.01 178.9	25 59.8	1.01 178.9	26 29.8	1.01 178.9	26 59.8	1.01 178.9	27 29.8	1.01 178.9	27 59.8	1.01 178.9	28 29.8	1.01 178.9	1
2	24 59.0	1.02 177.8	25 29.0	1.02 177.8	25 59.0	1.02 177.8	26 29.0	1.02 177.8	26 59.0	1.02 177.8	27 29.0	1.02 177.8	27 59.0	1.02 177.8	28 29.0	1.02 177.8	2
3	24 57.8	1.03 176.7	25 27.8	1.03 176.7	25 57.8	1.03 176.7	26 27.8	1.03 176.7	26 57.8	1.03 176.7	27 27.8	1.03 176.7	27 57.8	1.03 176.7	28 27.8	1.03 176.7	3
4	24 56.1	1.04 175.6	25 26.1	1.04 175.6	25 56.1	1.04 175.6	26 26.0	1.04 175.5	26 56.0	1.04 175.5	27 26.0	1.04 175.5	27 56.0	1.04 175.5	28 26.0	1.04 175.5	4
05	24 53.9	1.04 174.5	25 23.9	1.04 174.5	25 53.9	1.04 174.5	26 23.8	1.05 174.4	26 53.8	1.05 174.4	27 23.8	1.05 174.4	27 53.8	1.05 174.3	28 23.7	1.05 174.3	05
6	24 51.2	1.05 173.4	25 21.2	1.05 173.4	25 51.2	1.05 173.3	26 21.1	1.05 173.3	26 51.1	1.05 173.3	27 21.0	1.05 173.2	27 51.0	1.05 173.2	28 21.0	1.05 173.2	6
7	24 48.1	1.05 172.3	25 18.0	1.05 172.3	25 48.0	1.05 172.2	26 17.9	1.05 172.2	26 47.9	1.05 172.2	27 17.8	1.05 172.1	27 47.8	1.05 172.1	28 17.7	1.05 172.1	7
8	24 44.4	1.07 171.2	25 14.4	1.07 171.1	25 44.3	1.07 171.1	26 14.2	1.07 171.0	26 44.2	1.07 171.0	27 14.1	1.07 171.0	27 44.0	1.07 171.0	28 14.0	1.07 171.0	8
9	24 40.3	1.08 170.1	25 10.2	1.08 170.0	25 40.1	1.08 170.0	26 10.0	1.08 169.9	26 40.0	1.08 169.9	27 09.9	1.08 169.9	27 39.8	1.08 169.8	28 09.7	1.08 169.8	9
10	24 35.7	1.08 169.0	25 05.5	1.08 168.9	25 35.5	1.09 168.9	26 05.4	1.09 168.9	26 35.3	1.09 168.8	27 05.2	1.09 168.8	27 35.1	1.09 168.7	28 05.0	1.09 168.7	10
1	24 30.6	1.09 167.9	25 00.5	1.09 167.8	25 30.4	1.09 167.8	26 00.2	1.09 167.7	26 30.1	1.09 167.7	27 00.0	1.09 167.6	27 29.9	1.09 167.6	28 00.0	1.09 167.5	1
2	24 25.1	1.10 166.8	24 54.9	1.10 166.7	25 24.8	1.10 166.7	25 54.6	1.10 166.6	26 24.5	1.10 166.6	26 54.3	1.10 166.5	27 24.2	1.10 166.5	27 54.0	1.10 166.4	2
3	24 19.0	1.11 165.7	24 48.3	1.11 165.7	25 18.7	1.11 165.6	25 48.5	1.11 165.5	26 18.4	1.11 165.5	26 48.2	1.11 165.4	27 18.0	1.11 165.4	27 47.8	1.11 165.3	3
4	24 12.5	1.12 164.6	24 42.3	1.12 164.6	25 12.2	1.12 164.5	25 42.0	1.12 164.4	26 11.8	1.12 164.4	26 41.6	1.12 164.3	27 11.5	1.12 164.2	27 41.2	1.12 164.2	4
15	24 05.6	1.12 163.5	24 35.4	1.12 163.5	25 05.1	1.12 163.4	25 34.9	1.12 163.3	26 04.7	1.12 163.3	26 34.5	1.12 163.2	27 04.2	1.12 163.1	27 34.0	1.12 163.1	15
6	23 58.2	1.13 162.4	24 27.9	1.13 162.4	24 57.7	1.13 162.3	25 27.4	1.13 162.2	25 57.2	1.13 162.2	26 26.9	1.13 162.1	26 56.7	1.13 162.0	27 26.4	1.13 162.0	6
7	23 50.3	1.14 161.4	24 20.0	1.14 161.3	24 49.7	1.14 161.2	25 19.4	1.14 161.1	25 49.2	1.14 161.1	26 18.9	1.14 161.0	26 48.6	1.14 160.9	27 18.3	1.14 160.8	7
8	23 41.9	1.15 160.3	24 11.6	1.15 160.2	24 41.3	1.15 160.1	25 11.0	1.15 160.0	25 40.7	1.15 160.0	26 10.4	1.15 159.9	26 40.0	1.15 159.8	27 09.7	1.15 159.7	8
9	23 33.2	1.15 159.2	24 02.8	1.15 159.1	24 32.5	1.15 159.0	25 02.1	1.15 158.9	25 31.8	1.15 158.9	26 01.4	1.15 158.8	26 31.1	1.15 158.7	27 00.7	1.15 158.6	9
20	23 23.9	1.16 158.1	23 53.6	1.16 158.0	24 23.2	1.16 157.9	24 52.8	1.16 157.9	25 22.4	1.16 157.8	25 52.0	1.16 157.7	26 21.6	1.16 157.6	26 51.2	1.16 157.5	20
1	23 14.3	1.17 157.0	23 43.9	1.17 157.0	24 13.4	1.17 156.9	24 43.0	1.17 156.8	25 12.6	1.17 156.7	25 42.2	1.17 156.6	26 11.7	1.17 156.5	26 41.3	1.17 156.4	1
2	23 04.2	1.18 156.0	23 33.7	1.18 155.9	24 03.3	1.18 155.8	24 32.8	1.18 155.7	25 02.3	1.18 155.6	25 31.9	1.18 155.5	26 01.4	1.18 155.4	26 30.9	1.18 155.3	2
3	22 53.6	1.18 154.9	23 23.1	1.18 154.8	23 52.6	1.18 154.7	24 22.1	1.18 154.6	24 51.6	1.18 154.5	25 21.1	1.18 154.4	25 50.6	1.18 154.3	26 20.1	1.18 154.2	3
4	22 42.7	1.19 153.8	23 12.1	1.19 153.7	23 41.6	1.19 153.6	24 11.1	1.19 153.5	24 40.5	1.19 153.4	25 10.0	1.19 153.3	25 39.4	1.19 153.2	26 08.9	1.19 153.1	4
25	22 31.3	1.20 152.8	23 00.7	1.20 152.7	23 30.1	1.20 152.6	23 59.5	1.20 152.5	24 29.0	1.20 152.3	24 58.4	1.20 152.2	25 27.8	1.20 152.1	25 57.2	1.20 152.0	25
6	22 19.5	1.20 151.7	22 48.8	1.20 151.6	23 18.2	1.20 151.5	23 47.6	1.20 151.4	24 17.0	1.20 151.3	24 46.4	1.20 151.2	25 15.7	1.20 151.1	25 45.1	1.20 151.0	6
7	22 07.2	1.21 150.7	22 36.6	1.21 150.5	23 06.9	1.21 150.4	23 35.3	1.21 150.3	24 04.6	1.21 150.2	24 33.9	1.21 150.1	25 03.2	1.21 150.0	25 32.6	1.21 149.9	7
8	21 54.6	1.21 149.6	22 23.9	1.21 149.5	22 53.2	1.21 149.4	23 22.5	1.21 149.3	23 51.8	1.21 149.1	24 21.1	1.21 149.0	24 50.3	1.21 148.9	25 19.6	1.21 148.8	8
9	21 41.6	1.22 148.5	22 10.8	1.22 148.4	22 40.1	1.22 148.3	23 09.3	1.22 148.2	23 38.6	1.22 148.1	24 07.8	1.22 147.9	24 37.0	1.22 147.8	25 06.3	1.22 147.7	9
30	21 28.1	1.23 147.5	21 57.4	1.23 147.4	22 26.6	1.23 147.3	22 55.8	1.23 147.1	23 25.0	1.23 147.0	23 54.2	1.23 146.9	24 23.3	1.23 146.8	24 52.5	1.23 146.6	30
1	21 14.3	1.24 146.5	21 43.5	1.24 146.3	22 12.7	1.24 146.2	22 41.8	1.24 146.1	23 11.0	1.24 145.9	23 40.1	1.24 145.8	24 09.2	1.24 145.7	24 38.4	1.24 145.6	1
2	21 00.1	1.24 145.4	21 29.2	1.24 145.3	21 58.4	1.24 145.2	22 27.5	1.24 145.0	22 56.6	1.24 144.9	23 25.7	1.24 144.8	23 54.8	1.24 144.6	24 23.8	1.24 144.5	2
3	20 45.5	1.25 144.4	21 14.6	1.25 144.2	21 43.7	1.25 144.1	22 12.7	1.25 144.0	22 41.8	1.25 143.8	23 10.8	1.25 143.7	23 39.9	1.25 143.6	24 08.9	1.25 143.4	3
4	20 30.6	1.26 143.3	20 59.6	1.26 143.2	21 28.6	1.26 143.1	21 57.6	1.26 142.9	22 26.6	1.26 142.8	22 55.6	1.26 142.7	23 24.6	1.26 142.5	23 53.6	1.26 142.4	4
35	20 15.3	1.27 142.3	20 44.2	1.27 142.2	21 13.2	1.27 142.0	21 42.2	1.27 141.9	22 11.1	1.27 141.8	22 40.1	1.27 141.6	23 09.0	1.27 141.5	23 38.0	1.27 141.3	35
6	19 59.6	1.27 141.3	20 28.5	1.27 141.1	20 57.4	1.27 141.0	21 26.3	1.27 140.9	21 55.3	1.27 140.7	22 24.2	1.27 140.6	22 53.0	1.27 140.4	23 21.9	1.27 140.3	6
7	19 43.5	1.28 140.3	20 12.5	1.28 140.1	20 41.3	1.28 140.0	21 10.2	1.28 139.8	21 39.0	1.28 139.7	22 07.9	1.28 139.5	22 36.7	1.28 139.4	23 05.6	1.28 139.2	7
8	19 27.2	1.28 139.2	19 56.0	1.28 139.1	20 24.8	1.28 138.9	20 53.6	1.28 138.8	21 22.4	1.28 138.6	21 51.2	1.28 138.5	22 20.0	1.28 138.3	22 48.8	1.28 138.2	8
9	19 10.4	1.29 138.2	19 39.2	1.29 138.1	20 08.0	1.29 137.9	20 36.8	1.29 137.8	21 05.5	1.29 137.6	21 34.3	1.29 137.5	22 03.0	1.29 137.3	22 31.7	1.29 137.2	9
40	18 53.4	1.29 137.2	19 22.1	1.29 137.1	19 50.8	1.29 136.9	20 19.5	1.29 136.7	20 48.3	1.29 136.6	21 17.0	1.29 136.4	21 45.7	1.29 136.3	22 14.3	1.29 136.1	40
1	18 36.0	1.30 136.2	19 04.7	1.30 136.0	19 33.3	1.30 135.9	20 02.0	1.30 135.7	20 30.7	1.30 135.6	20 59.3	1.30 135.4	21 28.0	1.30 135.3	21 56.6	1.30 135.1	1
2	18 18.3	1.30 135.2	18 46.9	1.30 135.0	19 15.5	1.30 134.9	19 44.1	1.30 134.7	20 12.8	1.30 134.6	20 41.4	1.30 134.4	21 10.0	1.30 134.2	21 38.5	1.30 134.1	2
3	18 00.2	1.31 134.2	18 28.8	1.31 134.0	18 57.4	1.31 133.9	19 26.0	1.31 133.7	19 54.5	1.31 133.5	20 23.1	1.31 133.4	20 51.6	1.31 133.2	21 20.2	1.31 133.0	3
4	17 41.9	1.31 133.2	18 10.4	1.31 133.0	18 39.0	1.31 132.9	19 07.5	1.31 132.7	19 36.0	1.31 132.5	20 04.5	1.31 132.4	20 33.0	1.31 132.2	21 01.5	1.31 132.0	4
45	17 23.3	1.32 132.2	17 51.7	1.32 132.0	18 20.2	1.32 131.9	18 48.7	1.32 131.7	19 17.2	1.32 131.5	19 45.6	1.32 131.4	20 14.1	1.32 131.2	20 42.5	1.32 131.0	45
6	17 04.3	1.32 131.2	17 32.8	1.32 131.0	18 01.2	1.32 130.9	18 29.6	1.32 130.7	18 58.0	1.32 130.5	19 26.4	1.32 130.4	19 54.8	1.32 130.2	20 23.2	1.32 130.0	6
7	16 45.1	1.33 130.2	17 13.5	1.33 130.0	17 41.9	1.33 129.											

DECLINATION CONTRARY NAME TO LATITUDE

HA.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		HA.		
	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.			
00	2500.0	1.00	180.0	2430.0	1.00	180.0	2400.0	1.00	180.0	2330.0	1.00	180.0	2200.0	1.00	180.0	2130.0	1.00	180.0	00
1	2459.8	1.00	178.9	2429.8	1.00	178.9	2359.8	1.00	178.9	2299.8	1.00	178.9	2229.8	1.00	178.9	2159.8	1.00	178.9	1
2	2459.9	1.00	177.8	2429.9	1.00	177.8	2359.9	1.00	177.8	2299.9	1.00	177.8	2229.9	1.00	177.8	2159.9	1.00	177.8	2
3	2457.8	1.00	176.7	2427.8	1.00	176.7	2357.8	1.00	176.7	2297.8	1.00	176.7	2227.8	1.00	176.7	2157.8	1.00	176.7	3
4	2456.1	1.00	175.6	2426.1	1.00	175.6	2356.1	1.00	175.6	2296.1	1.00	175.6	2226.1	1.00	175.6	2156.1	1.00	175.6	4
5	2453.9	1.00	174.5	2423.9	1.00	174.5	2353.9	1.00	174.5	2293.9	1.00	174.5	2223.9	1.00	174.5	2153.9	1.00	174.5	5
6	2451.2	1.00	173.4	2421.2	1.00	173.4	2351.2	1.00	173.4	2291.2	1.00	173.4	2221.2	1.00	173.4	2151.2	1.00	173.4	6
7	2448.1	1.00	172.3	2418.1	1.00	172.3	2348.1	1.00	172.3	2288.1	1.00	172.3	2218.1	1.00	172.3	2148.1	1.00	172.3	7
8	2444.4	1.00	171.2	2414.4	1.00	171.2	2344.4	1.00	171.2	2284.4	1.00	171.2	2214.4	1.00	171.2	2144.4	1.00	171.2	8
9	2440.3	1.00	170.1	2410.3	1.00	170.1	2340.3	1.00	170.1	2280.3	1.00	170.1	2210.3	1.00	170.1	2140.3	1.00	170.1	9
10	2435.7	1.00	169.0	2405.8	1.00	169.0	2335.9	1.00	169.0	2270.3	1.00	169.0	2200.3	1.00	169.0	2130.3	1.00	169.0	05
1	2430.6	1.00	167.9	2400.7	1.00	167.9	2330.8	1.00	168.0	2265.2	1.00	168.0	2195.2	1.00	168.0	2125.2	1.00	168.0	6
2	2425.1	1.00	166.8	2395.2	1.00	166.9	2325.3	1.00	168.0	2260.1	1.00	168.0	2190.1	1.00	168.0	2120.1	1.00	168.0	7
3	2419.0	00	11 165.7	2389.2	00	11 165.8	2320.3	00	11 165.9	2255.5	00	11 166.0	2185.5	00	11 166.0	2115.5	00	11 166.0	8
4	2412.5	00	12 164.6	2383.2	00	12 164.7	2314.4	00	11 165.9	2250.7	00	11 166.0	2180.7	00	11 166.0	2110.7	00	11 166.0	9
5	2405.6	00	12 163.5	2377.2	00	12 163.6	2305.6	00	11 165.9	2246.0	00	11 166.0	2175.0	00	11 166.0	2105.0	00	11 166.0	10
6	2358.2	00	13 162.4	2371.2	00	13 162.5	2299.6	00	11 165.9	2237.5	00	11 166.0	2166.5	00	11 166.0	2095.5	00	11 166.0	1
7	2350.3	00	14 161.4	2365.2	00	14 161.4	2293.6	00	11 165.9	2229.0	00	11 166.0	2158.0	00	11 166.0	2088.0	00	11 166.0	2
8	2341.9	00	15 160.3	2359.2	00	15 160.4	2287.6	00	11 165.9	2221.0	00	11 166.0	2150.0	00	11 166.0	2080.0	00	11 166.0	3
9	2333.2	00	15 159.2	2353.2	00	15 159.3	2281.6	00	11 165.9	2213.0	00	11 166.0	2142.0	00	11 166.0	2072.0	00	11 166.0	4
10	2323.9	00	16 158.1	2347.2	00	16 158.2	2275.6	00	11 165.9	2205.0	00	11 166.0	2134.0	00	11 166.0	2064.0	00	11 166.0	5
1	2314.3	00	17 157.0	2341.2	00	17 157.1	2269.6	00	11 165.9	2197.0	00	11 166.0	2125.0	00	11 166.0	2055.0	00	11 166.0	6
2	2304.2	00	18 156.0	2335.2	00	18 156.1	2264.6	00	11 165.9	2189.0	00	11 166.0	2116.0	00	11 166.0	2046.0	00	11 166.0	7
3	2293.6	00	18 155.0	2329.2	00	18 155.1	2259.6	00	11 165.9	2181.0	00	11 166.0	2107.0	00	11 166.0	2037.0	00	11 166.0	8
4	2282.7	00	19 153.9	2323.2	00	19 153.9	2255.6	00	11 165.9	2173.0	00	11 166.0	2098.0	00	11 166.0	2028.0	00	11 166.0	9
5	2271.3	00	20 152.8	2317.2	00	20 152.9	2251.6	00	11 165.9	2165.0	00	11 166.0	2089.0	00	11 166.0	2019.0	00	11 166.0	10
6	2259.5	00	21 151.7	2311.2	00	21 151.8	2247.6	00	11 165.9	2157.0	00	11 166.0	2080.0	00	11 166.0	2010.0	00	11 166.0	1
7	2247.2	00	22 150.6	2305.2	00	22 150.7	2243.6	00	11 165.9	2149.0	00	11 166.0	2071.0	00	11 166.0	2001.0	00	11 166.0	2
8	2234.5	00	23 149.5	2299.2	00	23 149.6	2239.6	00	11 165.9	2141.0	00	11 166.0	2062.0	00	11 166.0	1992.0	00	11 166.0	3
9	2221.3	00	24 148.4	2293.2	00	24 148.5	2235.6	00	11 165.9	2133.0	00	11 166.0	2053.0	00	11 166.0	1983.0	00	11 166.0	4
10	2207.6	00	25 147.3	2287.2	00	25 147.4	2231.6	00	11 165.9	2125.0	00	11 166.0	2044.0	00	11 166.0	1974.0	00	11 166.0	5
1	2193.5	00	26 146.2	2281.2	00	26 146.3	2227.6	00	11 165.9	2117.0	00	11 166.0	2035.0	00	11 166.0	1965.0	00	11 166.0	6
2	2179.0	00	27 145.1	2275.2	00	27 145.2	2224.6	00	11 165.9	2109.0	00	11 166.0	2026.0	00	11 166.0	1956.0	00	11 166.0	7
3	2164.1	00	28 144.0	2269.2	00	28 144.1	2221.6	00	11 165.9	2101.0	00	11 166.0	2017.0	00	11 166.0	1947.0	00	11 166.0	8
4	2148.8	00	29 142.9	2263.2	00	29 143.0	2218.6	00	11 165.9	2093.0	00	11 166.0	2008.0	00	11 166.0	1938.0	00	11 166.0	9
5	2133.1	00	30 141.8	2257.2	00	30 141.9	2215.6	00	11 165.9	2085.0	00	11 166.0	1999.0	00	11 166.0	1929.0	00	11 166.0	10
6	2117.0	00	31 140.7	2251.2	00	31 140.8	2212.6	00	11 165.9	2077.0	00	11 166.0	1990.0	00	11 166.0	1920.0	00	11 166.0	1
7	2100.5	00	32 139.6	2245.2	00	32 139.7	2209.6	00	11 165.9	2069.0	00	11 166.0	1981.0	00	11 166.0	1911.0	00	11 166.0	2
8	2083.6	00	33 138.5	2239.2	00	33 138.6	2206.6	00	11 165.9	2061.0	00	11 166.0	1972.0	00	11 166.0	1902.0	00	11 166.0	3
9	2066.3	00	34 137.4	2233.2	00	34 137.5	2203.6	00	11 165.9	2053.0	00	11 166.0	1963.0	00	11 166.0	1893.0	00	11 166.0	4
10	2048.6	00	35 136.3	2227.2	00	35 136.4	2200.6	00	11 165.9	2045.0	00	11 166.0	1954.0	00	11 166.0	1884.0	00	11 166.0	5
1	2030.5	00	36 135.2	2221.2	00	36 135.3	2197.6	00	11 165.9	2037.0	00	11 166.0	1945.0	00	11 166.0	1875.0	00	11 166.0	6
2	2012.0	00	37 134.1	2215.2	00	37 134.2	2194.6	00	11 165.9	2029.0	00	11 166.0	1936.0	00	11 166.0	1866.0	00	11 166.0	7
3	1993.1	00	38 133.0	2209.2	00	38 133.1	2191.6	00	11 165.9	2021.0	00	11 166.0	1927.0	00	11 166.0	1857.0	00	11 166.0	8
4	1973.8	00	39 131.9	2203.2	00	39 132.0	2188.6	00	11 165.9	2013.0	00	11 166.0	1918.0	00	11 166.0	1848.0	00	11 166.0	9
5	1954.1	00	40 130.8	2197.2	00	40 130.9	2185.6	00	11 165.9	2005.0	00	11 166.0	1909.0	00	11 166.0	1839.0	00	11 166.0	10
6	1934.0	00	41 129.7	2191.2	00	41 129.8	2182.6	00	11 165.9	1997.0	00	11 166.0	1900.0	00	11 166.0	1830.0	00	11 166.0	1
7	1913.5	00	42 128.6	2185.2	00	42 128.7	2179.6	00	11 165.9	1989.0	00	11 166.0	1891.0	00	11 166.0	1821.0	00	11 166.0	2
8	1892.6	00	43 127.5	2179.2	00	43 127.6	2176.6	00	11 165.9	1981.0	00	11 166.0	1882.0	00	11 166.0	1812.0	00	11 166.0	3
9	1871.3	00	44 126.4	2173.2	00	44 126.5	2173.6	00	11 165.9	1973.0	00	11 166.0	1873.0	00	11 166.0	1803.0	00	11 166.0	4
10	1849.6	00	45 125.3	2167.2	00	45 125.4	2170.6	00	11 165.9	1965.0	00	11 166.0	1864.0	00	11 166.0	1794.0	00	11 166.0	5
1	1827.5	00	46 124.2	2161.2	00	46 124.3	2167.6	00	11 165.9	1957.0	00	11 166.0	1855.0	00	11 166.0	1785.0	00	11 166.0	6
2	1805.0	00	47 123.1	2155.2	00	47 123.2	2164.6	00	11 165.9	1949.0	00	11 166.0	1846.0	00	11 166.0	1776.0	00	11 166.0	7
3	1782.1	00	48 122.0	2149.2	00	48 122.1	2161.6	00	11 165.9	1941.0	00	11							

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and declination values for various latitudes (00, 05, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90). Each latitude section contains 4 rows of data.

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.															
00	21 00.0	1.00 180.0	20 30.0	1.00 180.0	20 00.0	1.00 180.0	19 30.0	1.00 180.0	19 00.0	1.00 180.0	18 30.0	1.00 180.0	18 00.0	1.00 180.0	17 30.0	1.00 180.0	00
1	20 59.8	1.00 178.9	20 29.8	1.00 178.9	19 59.8	1.00 178.9	19 29.8	1.00 178.9	18 59.8	1.00 178.9	18 29.8	1.00 179.0	17 59.8	1.00 179.0	17 29.8	1.00 179.0	1
2	20 59.1	1.00 177.9	20 29.1	1.00 177.9	19 59.1	1.00 177.9	19 29.1	1.00 177.9	18 59.1	1.00 177.9	18 29.1	1.00 177.9	17 59.1	1.00 177.9	17 29.1	1.00 177.9	2
3	20 57.9	1.00 176.8	20 27.9	1.00 176.8	19 57.9	1.00 176.8	19 27.9	1.00 176.8	18 57.9	1.00 176.8	18 27.9	1.00 176.9	17 57.9	1.00 176.9	17 27.9	1.00 176.9	3
4	20 56.2	1.00 175.7	20 26.2	1.00 175.7	19 56.2	1.00 175.8	19 26.2	1.00 175.8	18 56.3	1.00 175.8	18 26.3	1.00 175.8	17 56.3	1.00 175.8	17 26.3	1.00 175.8	4
05	20 54.1	1.00 174.7	20 24.1	1.00 174.7	19 54.1	1.00 174.7	19 24.1	1.00 174.7	18 54.2	1.00 174.7	18 24.2	1.00 174.8	17 54.2	1.00 174.8	17 24.2	1.00 174.8	05
6	20 51.5	1.00 173.6	20 21.5	1.00 173.6	19 51.6	1.00 173.6	19 21.6	1.00 173.7	18 51.6	1.00 173.7	18 21.7	1.00 173.7	17 51.7	1.00 173.7	17 21.7	1.00 173.8	6
7	20 48.4	1.00 172.5	20 18.5	1.00 172.6	19 48.5	1.00 172.6	19 18.6	1.00 172.6	18 48.6	1.00 172.6	18 18.7	1.00 172.7	17 48.7	1.00 172.7	17 18.7	1.00 172.7	7
8	20 44.9	1.00 171.5	20 15.0	1.00 171.5	19 45.0	1.00 171.5	19 15.1	1.00 171.6	18 45.1	1.00 171.6	18 15.2	1.00 171.6	17 45.3	1.00 171.7	17 15.3	1.00 171.7	8
9	20 40.9	1.00 170.4	20 11.0	1.00 170.4	19 41.1	1.00 170.5	19 11.1	1.00 170.5	18 41.2	1.00 170.5	18 11.3	1.00 170.6	17 41.3	1.00 170.6	17 11.4	1.00 170.7	9
10	20 36.4	1.00 169.3	20 06.5	1.00 169.4	19 36.6	1.00 169.4	19 06.7	1.00 169.5	18 36.8	1.00 169.5	18 06.9	1.00 169.5	17 37.0	1.00 169.6	17 07.1	1.00 169.6	10
1	20 31.5	1.00 168.3	20 01.6	1.00 168.3	19 31.7	1.00 168.4	19 01.9	1.00 168.4	18 32.0	1.00 168.5	18 02.1	1.00 168.5	17 32.2	1.00 168.5	17 02.3	1.00 168.6	1
2	20 26.1	1.00 167.2	19 56.3	1.00 167.3	19 26.4	1.00 167.3	19 01.9	1.00 167.4	18 26.7	1.00 167.4	18 01.9	1.00 167.5	17 26.9	1.00 167.5	17 02.3	1.00 168.6	2
3	20 20.3	99 10 166.2	19 50.5	99 10 166.2	19 20.6	99 10 166.3	18 50.8	99 10 166.3	18 20.9	99 10 166.4	18 01.9	99 10 166.4	17 21.2	1.00 166.5	16 57.0	1.00 167.6	3
4	20 14.0	99 11 165.1	19 44.2	99 11 165.2	19 14.4	99 11 165.2	18 44.5	99 11 165.3	18 14.7	99 11 165.3	17 44.9	99 11 165.4	17 15.1	99 11 165.4	16 51.4	1.00 166.5	4
15	20 07.3	99 12 164.0	19 37.5	99 12 164.1	19 07.7	99 12 164.2	18 37.9	99 12 164.2	18 08.1	99 12 164.3	17 38.3	99 12 164.3	17 08.5	99 12 164.4	16 45.2	99 11 165.5	15
6	20 00.1	99 13 163.0	19 30.3	99 13 163.1	19 00.5	99 13 163.1	18 30.7	99 13 163.2	18 01.0	99 13 163.2	17 31.2	99 12 163.3	17 01.4	99 12 163.4	16 38.7	99 12 164.5	6
7	19 52.4	99 13 161.9	19 22.7	99 13 162.0	18 52.9	99 13 162.1	18 23.2	99 13 162.1	17 53.4	99 13 162.2	17 23.7	99 13 162.3	16 54.0	99 13 162.3	16 24.2	99 13 162.4	7
8	19 44.3	99 14 160.9	19 14.6	99 14 161.0	18 44.9	99 14 161.0	18 15.2	99 14 161.1	17 45.5	99 14 161.2	17 15.8	99 14 161.2	16 46.0	99 14 161.3	16 16.3	99 14 161.4	8
9	19 35.8	99 15 159.8	19 06.1	99 15 159.9	18 36.4	99 15 160.0	18 06.8	99 15 160.1	17 37.1	99 15 160.1	17 07.4	99 15 160.2	16 37.7	99 15 160.3	16 08.0	99 15 160.4	9
20	19 26.9	99 16 158.8	18 57.2	99 16 158.9	18 27.6	99 16 158.9	17 57.9	99 16 159.0	17 28.3	99 16 159.1	16 58.6	99 16 159.2	16 28.9	99 16 159.3	15 59.3	99 16 159.3	20
1	19 17.5	99 16 157.7	18 47.8	99 16 157.8	18 18.2	99 16 157.9	17 48.6	99 16 158.0	17 19.0	99 16 158.1	16 49.4	99 16 158.2	16 19.8	99 16 158.2	15 50.1	99 16 158.3	1
2	19 07.6	99 17 156.7	18 38.1	99 17 156.8	18 08.5	99 17 156.9	17 38.9	99 17 157.0	17 09.3	99 17 157.1	16 39.7	99 17 157.1	16 10.1	99 17 157.2	15 40.6	99 17 157.3	2
3	18 57.4	98 18 155.7	18 27.9	98 18 155.8	17 58.3	98 18 155.8	17 28.8	98 18 155.9	16 59.2	98 18 156.0	16 29.7	99 17 156.1	16 00.1	99 17 156.2	15 30.6	99 17 156.3	3
4	18 46.7	98 18 154.6	18 17.2	98 18 154.7	17 47.7	98 18 154.8	17 18.2	98 18 154.9	16 48.7	98 18 155.0	16 19.2	98 18 155.1	15 49.7	98 18 155.2	15 20.2	98 18 155.3	4
25	18 35.7	98 19 153.6	18 06.2	98 19 153.7	17 36.7	98 19 153.8	17 07.3	98 19 153.9	16 37.8	98 19 154.0	16 08.3	98 19 154.1	15 38.8	98 19 154.2	15 09.4	98 19 154.3	25
6	18 24.2	98 20 152.6	17 54.8	98 20 152.7	17 25.3	98 20 152.8	16 55.9	98 20 152.9	16 26.5	98 20 153.0	15 57.0	98 19 153.1	15 27.6	98 19 153.2	14 58.2	98 19 153.3	6
7	18 12.3	98 20 151.5	17 42.9	98 20 151.6	17 13.5	98 20 151.7	16 44.1	98 20 151.8	16 14.7	98 20 151.9	15 45.3	98 20 152.0	15 15.9	98 20 152.1	14 46.5	98 20 152.3	7
8	18 00.0	98 21 150.5	17 30.7	98 21 150.6	17 01.3	98 21 150.7	16 32.0	98 21 150.8	16 02.6	98 21 150.9	15 33.3	98 21 151.0	15 03.9	98 21 151.1	14 32.2	98 21 151.3	8
9	17 47.3	98 22 149.5	17 18.0	98 22 149.6	16 48.7	98 22 149.7	16 19.4	98 22 149.8	15 50.1	98 22 149.9	15 20.8	98 21 150.0	14 51.5	98 21 150.1	14 22.8	98 21 150.3	9
30	17 34.3	98 22 148.5	17 05.0	98 22 148.6	16 35.7	98 22 148.7	16 06.5	98 22 148.8	15 37.2	98 22 148.9	15 07.9	98 22 149.0	14 38.7	98 22 149.1	14 09.4	98 22 149.3	30
1	17 20.8	98 23 147.4	16 51.6	98 23 147.6	16 22.4	98 23 147.7	15 53.1	98 23 147.8	15 23.9	98 23 147.9	14 54.7	98 23 148.0	14 25.5	98 23 148.1	13 56.2	98 23 148.3	1
2	17 07.0	97 24 146.4	16 37.8	97 24 146.5	16 08.6	97 24 146.6	15 39.4	97 24 146.8	15 10.3	97 24 146.9	14 41.1	97 23 147.0	14 11.9	97 23 147.1	13 47.7	97 23 147.3	2
3	16 52.7	97 24 145.4	16 23.6	97 24 145.5	16 08.6	97 24 146.7	15 25.4	97 24 146.8	14 56.2	97 24 146.9	14 27.1	97 24 147.0	14 11.9	97 23 147.1	13 47.7	97 23 147.3	3
4	16 38.2	97 25 144.4	16 09.1	97 25 144.5	15 40.0	97 25 144.7	15 10.9	97 25 144.8	14 41.8	97 25 144.9	14 12.7	97 25 145.0	13 58.0	97 24 146.1	13 28.8	97 24 146.3	4
35	16 23.2	97 26 143.4	15 54.2	97 26 143.5	15 25.2	97 26 143.6	14 56.1	97 26 143.8	14 27.1	97 26 143.9	13 58.0	97 26 144.0	13 29.0	97 26 144.2	12 59.9	97 26 144.3	35
6	16 07.9	97 26 142.4	15 38.9	97 26 142.5	15 10.0	97 26 142.6	14 41.0	97 26 142.8	14 12.0	97 26 142.9	13 43.0	97 26 143.0	13 14.0	97 26 143.2	12 45.0	97 26 143.3	6
7	15 52.3	97 27 141.4	15 23.3	97 27 141.5	14 54.4	97 27 141.7	14 25.5	97 26 141.8	13 56.5	97 26 141.9	13 27.5	97 26 142.1	12 58.6	97 26 142.2	12 29.6	97 26 142.3	7
8	15 36.3	96 27 140.4	15 07.4	96 27 140.5	14 38.5	96 27 140.7	14 09.6	96 27 140.8	13 40.7	96 27 140.9	13 11.8	96 27 141.1	12 42.9	96 27 141.2	12 14.0	96 27 141.3	8
9	15 19.9	96 28 139.4	14 51.1	96 28 139.5	14 22.2	96 28 139.7	13 53.4	96 28 139.8	13 24.5	96 27 140.0	12 55.7	96 27 140.1	12 26.8	96 27 140.2	11 58.0	96 27 140.4	9
40	15 03.3	96 28 138.4	14 34.5	96 28 138.5	14 05.7	96 28 138.7	13 36.9	96 28 138.8	13 08.1	96 28 139.0	12 39.3	96 28 139.1	12 10.4	96 28 139.3	11 41.6	96 28 139.4	40
1	14 46.3	96 29 137.4	14 17.5	96 29 137.6	13 48.8	96 29 137.7	13 20.0	96 29 137.8	12 51.3	96 29 138.0	12 22.5	96 28 138.1	11 53.7	96 28 138.3	11 25.0	96 28 138.4	1
2	14 28.9	96 29 136.4	14 00.2	96 29 136.6	13 31.5	96 29 136.7	13 02.8	96 29 136.9	12 34.1	96 29 137.0	12 05.4	96 29 137.2	11 36.7	96 29 137.3	11 08.0	96 29 137.5	2
3	14 11.3	95 30 135.4	13 42.7	95 30 135.6	13 14.0	95 30 135.7	12 45.3	95 30 135.9	12 16.7	96 30 136.0	11 48.0	96 30 136.2	11 19.3	96 29 136.3	10 50.7	96 29 136.5	3
4	13 53.4	95 30 134.5	13 24.8	95 30 134.6	12 56.1	95 30 134.8	12 27.5	95 30 134.9	11 58.9	95 30 135.1	11 30.3	95 30 135.2	11 01.7	95 30 135.4	10 33.1	95 30 135.5	4
45	13 35.1	95 31 133.5	13 06.5	95 31 133.6	12 38.0	95 31 133.8	12 09.4	95 31 133.9	11 40.9	95 31 134.1	11 12.3	95 31 134.3	10 43.7	95 30 134.4	10 15.1	95 30 134.6	45
6	13 16.6	95 31 132.5	12 48.0	95 31 132.7	12												

Lat.  
65°

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Dist.															
00	33 00.0	1.00 180.0	33 30.0	1.00 180.0	34 00.0	1.00 180.0	34 30.0	1.00 180.0	35 00.0	1.00 180.0	35 30.0	1.00 180.0	36 00.0	1.00 180.0	36 30.0	1.00 180.0	00
1	32 59.7	1.00 178.8	33 29.7	1.00 178.8	33 59.7	1.00 178.8	34 29.7	1.00 178.8	34 59.7	1.00 178.8	35 29.7	1.00 178.8	35 59.7	1.00 178.8	36 29.7	1.00 178.8	1
2	32 59.0	1.02 177.6	33 29.0	1.02 177.6	33 58.9	1.02 177.6	34 28.9	1.02 177.6	34 58.9	1.02 177.6	35 28.9	1.02 177.6	35 58.9	1.02 177.6	36 28.9	1.02 177.6	2
3	32 57.6	1.03 176.5	33 27.6	1.03 176.4	33 57.6	1.03 176.4	34 27.6	1.03 176.4	34 57.6	1.03 176.4	35 27.6	1.03 176.4	35 57.6	1.03 176.4	36 27.6	1.03 176.4	3
4	32 55.8	1.04 175.3	33 25.8	1.04 175.3	33 55.8	1.04 175.2	34 25.8	1.04 175.2	34 55.7	1.04 175.2	35 25.7	1.04 175.2	35 55.7	1.04 175.1	36 25.7	1.04 175.1	4
05	32 53.5	1.05 174.1	33 23.4	1.05 174.1	33 53.4	1.05 174.0	34 23.4	1.05 174.0	34 53.4	1.05 174.0	35 23.3	1.05 174.0	35 53.3	1.05 173.9	36 23.3	1.05 173.9	05
6	32 50.6	1.06 172.9	33 20.6	1.06 172.9	33 50.5	1.06 172.9	34 20.5	1.06 172.8	34 50.4	1.06 172.8	35 20.4	1.06 172.8	35 50.4	1.06 172.7	36 20.3	1.06 172.7	6
7	32 47.1	1.07 171.7	33 17.2	1.07 171.7	33 47.1	1.07 171.7	34 17.1	1.07 171.6	34 47.0	1.07 171.6	35 16.9	1.07 171.6	35 46.9	1.07 171.5	36 16.8	1.07 171.5	7
8	32 43.3	1.07 170.6	33 13.3	1.07 170.5	33 43.2	1.07 170.5	34 13.1	1.07 170.4	34 43.0	1.07 170.4	35 13.0	1.07 170.4	35 42.9	1.07 170.3	36 12.8	1.07 170.3	8
9	32 38.9	1.08 169.4	33 08.8	1.08 169.3	33 38.7	1.08 169.3	34 08.6	1.08 169.2	34 38.5	1.08 169.2	35 08.4	1.08 169.2	35 38.3	1.08 169.1	36 08.2	1.08 169.1	9
10	32 34.0	1.09 168.2	33 03.9	1.09 168.2	33 33.8	1.09 168.1	34 03.7	1.09 168.1	34 33.5	1.09 168.0	35 03.4	1.09 168.0	35 33.3	1.09 167.9	36 03.2	1.09 167.9	10
1	32 28.6	1.10 167.1	32 58.4	1.10 167.0	33 28.3	1.10 166.9	33 58.2	1.10 166.9	34 28.0	1.10 166.8	34 57.9	1.10 166.8	35 27.7	1.10 166.7	35 57.6	1.10 166.6	1
2	32 22.6	1.11 165.9	32 52.5	1.11 165.8	33 22.3	1.11 165.7	33 52.1	1.11 165.7	34 22.0	1.11 165.6	34 51.8	1.11 165.6	35 21.6	1.11 165.5	35 51.5	1.11 165.4	2
3	32 16.2	1.12 164.7	32 46.0	1.12 164.7	33 15.8	1.12 164.6	33 45.6	1.12 164.5	34 15.4	1.12 164.5	34 45.2	1.12 164.5	35 15.0	1.12 164.3	35 44.8	1.12 164.3	3
4	32 09.3	1.12 163.6	32 39.1	1.12 163.5	33 08.8	1.12 163.4	33 38.6	1.12 163.3	34 08.4	1.12 163.3	34 38.2	1.12 163.2	35 07.9	1.12 163.1	35 37.7	1.12 163.0	4
15	32 01.9	1.13 162.4	32 31.6	1.13 162.3	33 01.4	1.13 162.2	33 31.1	1.13 162.2	34 00.8	1.13 162.1	34 30.6	1.13 162.0	35 00.3	1.13 161.9	35 30.0	1.13 161.8	15
6	31 54.0	1.14 161.2	32 23.7	1.14 161.2	32 53.4	1.14 161.1	33 23.1	1.14 161.0	33 52.8	1.14 160.9	34 22.5	1.14 160.8	34 52.2	1.14 160.7	35 21.9	1.14 160.7	6
7	31 45.6	1.15 160.1	32 15.2	1.15 160.0	32 44.9	1.15 159.9	33 14.6	1.15 159.8	33 44.3	1.15 159.7	34 13.9	1.15 159.7	34 43.6	1.15 159.6	35 13.2	1.15 159.5	7
8	31 36.7	1.16 158.9	32 06.3	1.16 158.9	32 36.0	1.16 158.8	33 05.6	1.16 158.7	33 35.2	1.16 158.6	34 04.9	1.16 158.5	34 34.5	1.16 158.4	35 04.1	1.16 158.3	8
9	31 27.3	1.16 157.8	31 56.9	1.16 157.7	32 26.5	1.16 157.6	32 56.1	1.16 157.5	33 25.7	1.16 157.4	33 55.3	1.16 157.4	34 24.9	1.16 157.2	34 54.5	1.16 157.1	9
20	31 17.5	1.17 156.6	31 47.1	1.17 156.6	32 16.6	1.17 156.4	32 46.2	1.17 156.3	33 15.8	1.17 156.2	33 45.3	1.17 156.1	34 14.8	1.17 156.0	34 44.4	1.17 155.9	20
1	31 07.2	1.18 155.5	31 36.8	1.18 155.4	32 06.3	1.18 155.3	32 35.8	1.18 155.2	33 05.3	1.18 155.1	33 34.8	1.18 155.0	34 04.3	1.18 154.9	34 33.8	1.18 154.8	1
2	30 56.5	1.19 154.4	31 26.0	1.19 154.3	31 55.5	1.19 154.2	32 24.9	1.19 154.0	32 54.3	1.19 153.9	33 23.9	1.19 153.8	33 53.3	1.19 153.7	34 22.8	1.19 153.6	2
3	30 45.3	1.19 153.2	31 14.7	1.19 153.1	31 44.2	1.19 153.0	32 13.6	1.19 152.9	32 43.0	1.19 152.8	33 12.4	1.19 152.7	33 41.8	1.19 152.5	34 11.2	1.19 152.4	3
4	30 33.7	1.20 152.1	31 03.1	1.20 152.0	31 32.4	1.20 151.9	32 01.8	1.20 151.8	32 31.2	1.20 151.6	33 00.6	1.20 151.5	33 29.9	1.20 151.4	33 59.3	1.20 151.3	4
25	30 21.6	1.21 151.0	30 50.9	1.21 150.9	31 20.7	1.21 150.7	31 49.6	1.21 150.6	32 18.9	1.21 150.5	32 48.3	1.21 150.4	33 17.6	1.21 150.2	33 46.9	1.21 150.1	25
6	30 09.1	1.22 149.9	30 38.4	1.22 149.7	31 07.3	1.22 149.6	31 37.0	1.22 149.5	32 06.2	1.22 149.4	32 35.5	1.22 149.2	33 04.8	1.22 149.1	33 34.0	1.22 149.0	6
7	29 56.1	1.22 148.7	30 25.4	1.22 148.6	30 54.6	1.22 148.5	31 23.9	1.22 148.4	31 53.1	1.22 148.2	32 22.3	1.22 148.1	32 51.5	1.22 148.0	33 20.7	1.22 147.8	7
8	29 42.8	1.23 147.6	30 12.0	1.23 147.5	30 41.2	1.23 147.4	31 10.3	1.23 147.2	31 39.5	1.23 147.1	32 08.7	1.23 147.0	32 37.9	1.23 146.8	33 07.0	1.23 146.7	8
9	29 29.0	1.23 146.5	29 58.1	1.23 146.4	30 27.3	1.23 146.3	30 56.4	1.23 146.1	31 25.5	1.23 146.0	31 54.7	1.23 145.8	32 23.8	1.23 145.7	32 52.9	1.23 145.5	9
30	29 14.8	1.24 145.4	29 43.9	1.24 145.3	30 13.0	1.24 145.1	30 42.1	1.24 145.0	31 11.2	1.24 144.9	31 40.2	1.24 144.7	32 09.3	1.24 144.6	32 38.3	1.24 144.4	30
1	29 00.2	1.24 144.3	29 29.3	1.24 144.2	29 58.3	1.24 144.0	30 27.3	1.24 143.9	30 56.4	1.24 143.7	31 25.4	1.24 143.6	31 54.4	1.24 143.4	32 23.4	1.24 143.3	1
2	28 45.2	1.25 143.2	29 14.2	1.25 143.1	29 43.2	1.25 142.9	30 12.2	1.25 142.8	30 41.2	1.25 142.6	31 10.1	1.25 142.5	31 39.1	1.25 142.3	32 08.0	1.25 142.2	2
3	28 29.9	1.25 142.1	28 58.8	1.25 142.0	29 27.7	1.25 141.8	29 56.7	1.25 141.7	30 25.6	1.25 141.5	30 54.5	1.25 141.4	31 23.4	1.25 141.2	31 52.3	1.25 141.1	3
4	28 14.1	1.26 141.1	28 43.0	1.26 140.9	29 11.9	1.26 140.8	29 40.8	1.26 140.6	30 09.6	1.26 140.4	30 38.5	1.26 140.3	31 07.3	1.26 140.1	31 36.3	1.26 140.0	4
35	27 58.0	1.27 140.0	28 28.8	1.27 139.8	28 55.7	1.27 139.7	29 24.5	1.27 139.5	29 53.3	1.27 139.3	30 22.1	1.27 139.2	30 50.9	1.27 139.0	31 19.6	1.27 138.9	35
6	27 41.5	1.28 138.9	28 10.3	1.28 138.7	28 39.1	1.28 138.6	29 07.8	1.28 138.4	29 36.6	1.28 138.3	30 05.3	1.28 138.1	30 34.1	1.28 137.9	31 02.8	1.28 137.8	6
7	27 24.6	1.29 137.8	27 53.4	1.29 137.7	28 22.1	1.29 137.5	28 50.8	1.29 137.3	29 19.5	1.29 137.2	29 48.2	1.29 137.0	30 16.9	1.29 136.8	30 45.6	1.29 136.7	7
8	27 07.5	1.29 136.8	27 36.1	1.29 136.6	28 04.8	1.29 136.5	28 33.5	1.29 136.3	29 02.1	1.29 136.1	29 30.7	1.29 135.9	29 59.4	1.29 135.8	30 28.0	1.29 135.6	8
9	26 49.9	1.30 135.7	27 18.5	1.30 135.5	27 47.2	1.30 135.4	28 15.8	1.30 135.2	28 44.4	1.30 135.0	29 12.9	1.30 134.8	29 41.5	1.30 134.7	30 10.1	1.30 134.5	9
40	26 32.0	1.31 134.6	27 00.6	1.31 134.5	27 29.2	1.31 134.3	27 57.7	1.31 134.1	28 26.3	1.31 133.9	28 54.8	1.31 133.8	29 23.3	1.31 133.6	29 51.8	1.31 133.4	40
1	26 13.8	1.32 133.6	26 42.4	1.32 133.4	27 10.9	1.32 133.2	27 39.4	1.32 133.1	28 07.9	1.32 132.9	28 36.5	1.32 132.7	29 04.8	1.32 132.5	29 33.2	1.32 132.4	1
2	25 55.3	1.32 132.5	26 23.8	1.32 132.4	26 52.2	1.32 132.2	27 20.7	1.32 132.0	27 49.1	1.32 131.8	28 17.5	1.32 131.7	28 45.9	1.32 131.5	29 14.3	1.32 131.3	2
3	25 36.5	1.33 131.5	26 04.9	1.33 131.3	26 33.3	1.33 131.1	27 01.7	1.33 130.9	27 30.1	1.33 130.7	27 58.4	1.33 130.6	28 26.8	1.33 130.4	28 55.1	1.33 130.2	3
4	25 17.3	1.33 130.5	25 45.7	1.33 130.3	26 14.1	1.33 130.1	26 42.4	1.33 129.9	27 10.7	1.33 129.7	27 39.0	1.33 129.5	28 07.3	1.33 129.4	28 35.6	1.33 129.2	4
45	24 57.9	1.34 129.4	25 26.2	1.34 129.2	25 54.5	1.34 129.1	26 22.8	1.34 128.9	26 51.1	1.34 128.7	27 19.3	1.34 128.5	27 47.6	1.34 128.3	28 15.8	1.34 128.1	45
6	24 38.4	1.35 128.4	25 06.4	1.35 128.2	25 34.7	1.35 128.0	26 02.9	1.35 127.8	26 31.1	1.35 127.6	26 59.3	1.35 127.5	27 27.5	1.35 127.3	27 55.7	1.35 127.1	6
7	24 18.1	1.36 127.4	24 46.4														

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 65°

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Az.															
00	17 00.0	180.0	16 30.0	180.0	16 00.0	180.0	15 30.0	180.0	15 00.0	180.0	14 30.0	180.0	14 00.0	180.0	13 30.0	180.0	00
1	16 59.8	179.0	16 29.8	179.0	15 59.8	179.0	15 29.8	179.0	14 59.8	179.0	14 29.8	179.0	13 59.8	179.0	13 29.8	179.0	1
2	16 59.1	177.9	16 29.1	177.9	15 59.1	177.9	15 29.1	177.9	14 59.1	177.9	14 29.1	177.9	13 59.1	177.9	13 29.1	177.9	2
3	16 57.9	176.9	16 27.9	176.9	15 57.9	176.9	15 27.9	176.9	14 57.9	176.9	14 27.9	176.9	13 57.9	176.9	13 27.9	176.9	3
4	16 56.3	175.9	16 26.4	175.9	15 56.4	175.9	15 26.4	175.9	14 56.4	175.9	14 26.4	175.9	13 56.4	175.9	13 26.4	175.9	4
05	16 54.3	174.8	16 24.3	174.8	15 54.3	174.8	15 24.3	174.8	14 54.4	174.9	14 24.4	174.9	13 54.4	174.9	13 24.4	175.0	05
6	16 51.8	173.8	16 21.8	173.8	15 51.8	173.8	15 21.9	173.9	14 51.9	173.9	14 21.9	173.9	13 52.0	173.9	13 22.0	174.0	6
7	16 48.8	172.8	16 18.8	172.8	15 48.9	172.8	15 18.9	172.8	14 49.0	172.9	14 19.0	172.9	13 49.0	172.9	13 19.1	173.0	7
8	16 45.4	171.7	16 15.4	171.8	15 45.5	171.8	15 15.5	171.8	14 45.6	171.9	14 15.6	171.9	13 45.7	171.9	13 15.8	172.0	8
9	16 41.5	170.7	16 11.6	170.7	15 41.6	170.8	15 11.7	170.8	14 41.8	170.8	14 11.8	170.9	13 41.9	170.9	13 12.0	170.9	9
10	16 37.2	169.7	16 07.3	169.7	15 37.3	169.7	15 07.4	169.8	14 37.5	169.8	14 07.6	169.9	13 37.7	169.9	13 07.8	169.9	10
1	16 32.4	168.8	16 02.5	168.8	15 32.6	168.8	15 02.7	168.8	14 32.8	168.8	14 02.9	168.8	13 33.0	168.9	13 03.1	168.9	1
2	16 27.2	167.8	15 57.3	167.8	15 27.4	167.8	14 57.5	167.8	14 27.7	167.8	13 57.8	167.8	13 27.9	167.9	12 58.0	167.9	2
3	16 21.5	166.8	15 51.7	166.8	15 21.8	166.7	14 51.9	166.7	14 22.1	166.8	13 52.2	166.8	13 22.4	166.8	12 52.5	166.9	3
4	16 15.4	165.5	15 45.6	165.5	15 15.7	165.7	14 45.9	165.7	14 16.1	165.8	13 46.2	165.8	13 16.4	165.9	12 46.6	165.9	4
15	16 08.9	164.5	15 39.0	164.6	15 09.2	164.6	14 39.4	164.7	14 09.6	164.8	13 39.8	164.8	13 10.0	164.9	12 40.2	164.9	15
6	16 01.9	163.5	15 32.1	163.6	15 02.3	163.6	14 32.5	163.7	14 02.7	163.8	13 33.0	163.8	13 03.2	163.9	12 33.4	163.9	6
7	15 54.4	162.5	15 24.7	162.5	14 54.9	162.6	14 25.2	162.7	13 55.4	162.7	13 25.7	162.8	12 55.9	162.9	12 26.2	162.9	7
8	15 46.6	161.5	15 16.9	161.5	14 47.2	161.6	14 17.4	161.7	13 47.7	161.7	13 18.0	161.8	12 48.2	161.9	12 18.5	161.9	8
9	15 38.3	160.4	15 08.6	160.5	14 38.9	160.6	14 09.2	160.7	13 39.5	160.7	13 09.8	160.8	12 40.1	160.9	12 10.4	161.0	9
20	15 29.6	159.4	15 00.0	159.5	14 30.3	159.6	14 00.6	159.7	13 31.0	159.7	13 01.3	159.8	12 31.6	159.9	12 02.0	160.0	20
1	15 20.5	158.4	14 50.9	158.5	14 21.2	158.6	13 51.6	158.7	13 22.0	158.7	12 52.3	158.8	12 22.7	158.9	11 53.1	159.0	1
2	15 11.0	157.4	14 41.4	157.5	14 11.8	157.6	13 42.2	157.6	13 12.6	157.7	12 43.0	157.8	12 13.4	157.9	11 43.8	158.0	2
3	15 01.0	156.4	14 31.4	156.5	14 01.9	156.6	13 32.3	156.6	13 02.8	156.7	12 33.2	156.8	12 03.6	156.9	11 34.1	157.0	3
4	14 50.6	155.4	14 21.1	155.5	13 51.6	155.6	13 22.1	155.6	12 52.5	155.7	12 23.0	155.8	11 53.5	155.9	11 23.9	156.0	4
25	14 39.9	154.4	14 10.4	154.5	13 40.9	154.6	13 11.4	154.7	12 41.9	154.7	12 12.4	154.8	11 42.9	154.9	11 13.4	155.0	25
6	14 28.7	153.4	13 59.3	153.5	13 29.8	153.6	13 00.4	153.7	12 30.9	153.8	12 01.5	153.9	11 32.0	153.9	11 02.5	154.0	6
7	14 17.1	152.4	13 47.7	152.5	13 18.3	152.6	12 48.9	152.7	12 19.5	152.8	11 50.1	152.9	11 20.7	153.0	10 51.2	153.1	7
8	14 05.2	151.4	13 35.8	151.5	13 06.4	151.6	12 37.1	151.7	12 07.7	151.8	11 38.3	151.9	11 08.9	152.0	10 39.6	152.1	8
9	13 52.8	150.4	13 23.5	150.5	12 54.2	150.6	12 24.9	150.7	11 55.5	150.8	11 26.2	150.9	10 56.8	151.0	10 27.5	151.1	9
30	13 40.1	149.4	13 10.8	149.5	12 41.5	149.6	12 12.2	149.7	11 43.0	149.8	11 13.7	149.9	10 44.4	150.0	10 15.1	150.1	30
1	13 27.0	148.4	12 57.8	148.5	12 28.5	148.6	11 59.3	148.7	11 30.0	148.8	11 00.8	148.9	10 31.5	149.0	10 02.3	149.1	1
2	13 13.5	147.4	12 44.3	147.5	12 15.1	147.6	11 45.9	147.7	11 16.7	147.8	10 47.5	147.9	10 18.3	148.0	9 49.1	148.1	2
3	12 59.7	146.4	12 30.5	146.5	12 01.4	146.6	11 32.2	146.8	11 03.0	146.9	10 33.9	147.0	10 04.7	147.1	9 35.5	147.2	3
4	12 45.4	145.4	12 16.3	145.5	11 47.2	145.7	11 18.1	145.8	10 49.0	145.9	10 19.9	146.0	9 50.7	146.1	9 21.6	146.2	4
35	12 30.9	144.4	12 01.8	144.5	11 32.7	144.7	11 03.7	144.8	10 34.6	144.9	10 05.5	145.0	9 36.4	145.1	9 07.4	145.2	35
6	12 15.9	143.4	11 46.9	143.6	11 17.9	143.7	10 48.9	143.8	10 19.9	144.0	9 50.8	144.1	9 21.8	144.2	8 52.8	144.3	6
7	12 00.7	142.5	11 31.7	142.6	11 02.7	142.7	10 33.7	142.9	10 04.8	143.0	9 35.8	143.1	9 06.8	143.2	8 37.8	143.3	7
8	11 45.0	141.5	11 16.1	141.6	10 47.2	141.8	10 18.3	141.9	9 49.3	142.0	9 20.4	142.2	8 51.4	142.3	8 22.5	142.4	8
9	11 29.1	140.5	11 00.2	140.6	10 31.3	140.8	10 02.4	140.9	9 33.6	141.1	9 04.7	141.2	8 35.8	141.3	8 06.9	141.5	9
40	11 12.8	139.5	10 44.0	139.7	10 15.1	139.8	9 46.3	140.0	9 17.5	140.1	8 48.6	140.2	8 19.8	140.4	7 50.9	140.5	40
1	10 56.2	138.6	10 27.4	138.7	9 58.6	138.9	9 29.8	139.0	9 01.0	139.1	8 32.2	139.3	8 03.4	139.4	7 34.6	139.6	1
2	10 39.2	137.6	10 10.5	137.8	9 41.8	137.9	9 13.0	138.0	8 44.3	138.2	8 15.5	138.3	7 46.8	138.5	7 18.0	138.6	2
3	10 22.0	136.6	9 53.3	136.8	9 24.6	136.9	8 55.9	137.1	8 27.2	137.2	7 58.5	137.4	7 29.8	137.5	7 01.1	137.7	3
4	10 04.4	135.7	9 35.8	135.8	9 07.1	136.0	8 38.5	136.1	8 09.8	136.3	7 41.2	136.4	7 12.5	136.6	6 43.9	136.7	4
45	9 46.6	134.7	9 18.0	134.9	8 49.4	135.0	8 20.8	135.2	7 52.2	135.3	7 23.6	135.5	6 55.0	135.6	6 26.3	135.8	45
6	9 28.4	133.8	8 59.8	133.9	8 31.3	134.1	8 02.8	134.2	7 34.2	134.4	7 05.6	134.5	6 37.1	134.7	6 08.5	134.8	6
7	9 09.9	132.8	8 41.4	133.0	8 12.9	133.1	7 44.4	133.3	7 15.9	133.4	6 47.4	133.6	6 18.9	133.8	5 50.4	133.9	7
8	8 51.2	131.9	8 22.7	132.0	7 54.3	132.2	7 25.8	132.3	6 57.4	132.5	6 28.9	132.7	6 00.5	132.8	5 32.0	133.0	8
9	8 32.2	130.9	8 03.8	131.1	7 35.4	131.2	7 07.0	131.4	6 38.5	131.6	6 10.1	131.7	5 41.7	131.9	5 13.3	132.0	9
50	8 12.9	130.0	7 44.5	130.1	7 16.2	130.3	6 47.8	130.5	6 19.4	130.6	5 51.1	130.8	5 22.7	130.9	5 00.0	131.0	50
1	7 53.3	129.0	7 25.0	129.2	6 56.7	129.4	6 28.4	129.5	6 00.1	129.7	5 31.7	129.9	5 03.4	130.0			1
2	7 33.5	128.1	7 05.2	128.2	6 36.9	128.4	6 06.7	128.6	5 40.4	128.8	5 12.1	128.9					2
3	7 13.4	127.1	6 45.2	127.3	6 16.9	127.5	5 48.7	127.7	5 28.5	127.8							3
4	6 53.0	126.2	6 24.9	126.4	5 56.7	126.5	5 28.5	126.7	5 00.3	126.9							4
55	6 32.4	125.3	6 04.3	125.4	5 36.2	125.6	5 06.1	125.8									55
6	6 11.6	124.3	5 43.6	124.5	5 15.5	124.7											6
7	5 50.6	123.4	5 22.5	123.6													7
8	5 29.3	122.5	5 0														

Lat. 65°

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.
	Alt.	As.															
00	37 00.0	1.00 180.0	37 30.0	1.00 180.0	38 00.0	1.00 180.0	38 30.0	1.00 180.0	39 00.0	1.00 180.0	39 30.0	1.00 180.0	40 00.0	1.00 180.0	40 30.0	1.00 180.0	00
1	36 59.7	1.001 178.8	37 29.7	1.001 178.8	37 59.7	1.001 178.8	38 29.7	1.001 178.8	38 59.7	1.001 178.8	39 29.7	1.001 178.8	39 59.7	1.001 178.8	40 29.7	1.001 178.8	1
2	36 58.9	1.002 177.6	37 28.9	1.002 177.6	37 58.9	1.002 177.6	38 28.9	1.002 177.6	38 58.9	1.002 177.6	39 28.9	1.002 177.6	39 58.9	1.002 177.6	40 28.9	1.002 177.6	2
3	36 57.6	1.003 176.3	37 27.6	1.003 176.3	37 57.6	1.003 176.3	38 27.6	1.003 176.3	38 57.6	1.003 176.3	39 27.6	1.003 176.3	39 57.6	1.003 176.3	40 27.6	1.003 176.3	3
4	36 55.7	1.004 175.1	37 25.6	1.004 175.1	37 55.6	1.004 175.1	38 25.6	1.004 175.1	38 55.6	1.004 175.0	39 25.6	1.004 175.0	39 55.6	1.004 175.0	40 25.6	1.004 174.9	4
05	36 53.2	1.005 173.9	37 23.2	1.005 173.9	37 53.2	1.005 173.8	38 23.1	1.005 173.8	38 53.1	1.005 173.8	39 23.1	1.005 173.7	39 53.0	1.005 173.7	40 23.0	1.005 173.7	05
6	36 50.3	1.006 172.7	37 20.2	1.006 172.6	37 50.2	1.006 172.6	38 20.1	1.006 172.6	38 50.1	1.006 172.5	39 20.0	1.006 172.5	39 50.0	1.006 172.4	40 19.9	1.006 172.4	6
7	36 46.8	1.007 171.4	37 16.7	1.007 171.4	37 46.6	1.007 171.4	38 16.6	1.007 171.3	38 46.5	1.007 171.3	39 16.4	1.007 171.2	39 46.4	1.007 171.2	40 16.3	1.007 171.1	7
8	36 42.7	1.008 170.2	37 12.6	1.008 170.2	37 42.6	1.008 170.1	38 12.5	1.008 170.1	38 42.4	1.008 170.0	39 12.3	1.008 170.0	39 42.2	1.008 169.9	40 12.1	1.008 169.9	8
9	36 38.1	1.009 169.0	37 08.0	1.009 169.0	37 37.9	1.009 168.9	38 07.8	1.009 168.9	38 37.7	1.009 168.8	39 07.6	1.009 168.7	39 37.5	1.009 168.7	40 07.4	1.009 168.6	9
10	36 33.0	1.009 167.8	37 02.9	1.009 167.7	37 32.8	1.009 167.7	38 02.7	1.010 167.6	38 32.5	1.010 167.6	39 02.4	1.010 167.6	39 32.3	1.010 167.4	40 02.1	1.010 167.4	10
1	36 27.4	09 10 166.6	36 57.3	09 10 166.5	37 27.1	09 10 166.5	37 57.0	09 10 166.4	38 26.8	09 10 166.3	38 56.6	09 10 166.3	39 26.5	09 11 166.2	39 56.3	09 11 166.1	1
2	36 21.3	09 11 165.4	36 51.1	09 11 165.3	37 20.9	09 11 165.2	37 50.7	09 11 165.2	38 20.5	09 11 165.1	38 50.4	09 11 165.0	39 20.2	09 11 165.0	39 50.0	09 11 164.9	2
3	36 14.6	09 12 164.2	36 44.4	09 12 164.1	37 14.2	09 12 164.0	37 44.0	09 12 163.9	38 13.8	09 12 163.9	38 43.5	09 12 163.8	39 13.3	09 12 163.7	39 43.1	09 12 163.6	3
4	36 07.4	09 13 163.0	36 37.2	09 13 162.9	37 07.0	09 13 162.8	37 36.7	09 13 162.7	38 06.5	09 13 162.6	38 36.2	09 13 162.6	39 05.9	09 13 162.5	39 35.7	09 13 162.4	4
15	35 59.8	09 14 161.8	36 29.5	09 14 161.7	36 59.2	09 14 161.6	37 28.9	09 14 161.5	37 58.6	09 14 161.4	38 28.3	09 14 161.3	38 58.0	09 14 161.2	39 27.7	09 14 161.2	15
6	35 51.6	09 14 160.6	36 21.3	09 15 160.5	36 50.9	09 15 160.4	37 20.6	09 15 160.3	37 50.3	09 15 160.2	38 20.0	09 15 160.1	38 49.6	09 15 160.0	39 19.3	09 15 159.9	6
7	35 42.9	09 15 159.4	36 12.5	09 15 159.3	36 42.2	09 15 159.2	37 11.8	09 15 159.1	37 41.5	09 15 159.0	38 11.1	09 15 158.9	38 40.7	09 15 158.8	39 10.3	09 15 158.7	7
8	35 33.7	09 16 158.2	36 03.3	09 16 158.1	36 32.9	09 16 158.0	37 02.5	09 16 157.9	37 32.1	09 16 157.8	38 01.7	09 16 157.7	38 31.3	09 16 157.6	39 00.9	09 16 157.5	8
9	35 24.1	09 17 157.0	35 53.6	09 17 156.9	36 23.2	09 17 156.8	36 52.7	09 17 156.6	37 22.3	09 17 156.6	37 51.8	09 17 156.5	38 21.4	09 17 156.4	38 50.9	09 17 156.2	9
20	35 13.9	08 18 155.8	35 43.4	08 18 155.7	36 12.9	08 18 155.6	36 42.5	08 18 155.5	37 12.0	08 18 155.4	37 41.5	08 18 155.3	38 11.0	08 18 155.1	38 40.4	08 18 155.0	20
1	35 03.3	08 19 154.6	35 32.8	08 19 154.5	36 02.2	08 19 154.4	36 31.7	08 19 154.3	37 01.2	08 19 154.2	37 30.6	08 19 154.1	38 00.1	08 19 153.9	38 29.5	08 19 153.8	1
2	34 52.6	08 19 153.5	35 21.6	08 19 153.4	35 51.0	08 19 153.3	36 20.5	08 20 153.2	36 49.8	08 20 153.0	37 19.3	08 20 152.9	37 48.7	08 20 152.7	38 18.1	08 20 152.6	2
3	34 40.8	08 20 152.3	35 10.0	08 20 152.2	35 39.4	08 20 152.1	36 08.8	08 20 151.9	36 38.1	08 20 151.8	37 07.5	08 20 151.7	37 36.8	08 20 151.5	38 06.2	08 20 151.4	3
4	34 28.6	08 21 151.1	34 58.0	08 21 151.0	35 27.3	08 21 150.9	35 56.6	08 21 150.8	36 25.9	08 21 150.6	36 55.2	08 21 150.5	37 24.5	08 21 150.4	37 53.8	08 21 150.2	4
25	34 16.2	08 22 150.0	34 45.4	08 22 149.9	35 14.7	08 22 149.7	35 44.0	08 22 149.6	36 13.3	08 22 149.4	36 42.5	08 22 149.3	37 11.7	08 22 149.2	37 41.0	08 22 149.0	25
6	34 03.3	08 22 148.8	34 32.5	08 22 148.7	35 01.7	08 22 148.6	35 30.9	08 22 148.5	36 00.1	08 22 148.3	36 28.7	08 22 148.2	36 58.5	08 22 148.0	37 27.7	08 22 147.9	6
7	33 49.9	08 23 147.7	34 19.1	08 23 147.5	34 48.3	08 23 147.4	35 17.4	08 23 147.3	35 46.6	08 23 147.1	36 15.7	08 23 147.0	36 44.9	08 23 146.8	37 14.0	08 23 146.7	7
8	33 36.1	08 24 146.5	34 05.3	08 24 146.4	34 34.4	08 24 146.3	35 03.5	08 24 146.1	35 32.6	08 24 146.0	36 01.7	08 24 145.8	36 30.8	08 24 145.7	36 59.8	08 24 145.5	8
9	33 22.9	08 24 145.4	33 51.0	08 24 145.3	34 20.1	08 24 145.1	34 49.2	08 24 144.8	35 18.2	08 24 144.8	35 47.2	08 24 144.6	36 16.3	08 24 144.5	36 45.3	08 24 144.3	9
30	33 07.4	08 25 144.3	33 36.4	08 25 144.1	34 05.4	08 25 144.0	34 34.4	08 25 143.8	35 03.4	08 25 143.7	35 32.4	08 25 143.5	36 01.3	08 25 143.3	36 30.3	08 25 143.2	30
1	32 52.3	08 26 143.1	33 21.3	08 26 143.0	33 50.3	08 26 142.8	34 19.2	08 26 142.7	34 48.2	08 26 142.5	35 17.1	08 26 142.3	35 46.0	08 26 142.2	36 14.9	08 26 142.0	1
2	32 39.9	08 26 142.0	33 05.9	08 26 141.9	33 34.8	08 26 141.7	34 03.6	08 27 141.5	34 32.5	08 27 141.4	35 01.4	08 27 141.2	35 30.2	08 27 141.0	35 59.1	08 27 140.9	2
3	32 21.1	08 27 140.9	32 50.0	08 27 140.7	33 18.8	08 27 140.6	33 47.7	08 27 140.4	34 16.5	08 27 140.2	34 45.3	08 27 140.1	35 14.1	08 28 139.9	35 42.9	08 28 139.7	3
4	32 05.4	08 28 139.8	32 33.8	08 28 139.6	33 02.6	08 28 139.5	33 31.3	08 28 139.3	34 00.1	08 28 139.1	34 28.8	08 28 138.9	34 57.6	08 28 138.8	35 26.3	08 28 138.6	4
35	31 48.4	08 28 138.7	32 17.2	08 28 138.5	32 45.9	08 28 138.3	33 14.6	08 28 138.2	33 43.3	08 28 138.0	34 12.0	08 28 137.8	34 40.7	08 28 137.6	35 09.3	08 28 137.5	35
6	31 31.5	08 29 137.6	32 00.2	08 29 137.4	32 28.8	08 29 137.2	32 57.5	08 29 137.1	33 26.2	08 29 136.9	33 54.8	08 29 136.7	34 23.4	08 29 136.5	34 52.0	08 29 136.3	6
7	31 14.6	08 29 136.5	31 42.8	08 29 136.3	32 11.5	08 29 136.1	32 40.1	08 29 136.0	33 08.7	08 29 135.8	33 37.2	08 29 135.6	34 05.8	08 29 135.4	34 34.3	08 29 135.2	7
8	30 56.6	08 30 135.4	31 25.1	08 30 135.2	31 53.7	08 30 135.0	32 22.3	08 30 134.9	32 50.8	08 30 134.7	33 19.3	08 30 134.5	33 47.8	08 30 134.3	34 16.3	08 30 134.1	8
9	30 38.6	08 31 134.3	31 07.1	08 31 134.1	31 35.6	08 31 133.9	32 04.1	08 31 133.8	32 32.6	08 31 133.6	33 01.1	08 31 133.4	33 29.5	08 31 133.2	33 57.9	08 31 133.0	9
40	30 20.3	08 31 133.2	30 48.8	08 31 133.1	31 17.2	08 31 132.9	31 45.6	08 31 132.7	32 14.1	08 31 132.5	32 42.5	08 31 132.3	33 10.8	08 31 132.1	33 39.2	08 31 131.9	40
1	30 01.7	08 32 132.2	30 30.1	08 32 132.0	30 58.5	08 32 131.8	31 26.8	08 32 131.6	31 55.2	08 32 131.4	32 23.5	08 32 131.2	32 51.9	08 32 131.0	33 20.2	08 32 130.8	1
2	29 42.7	08 32 131.1	30 11.1	08 32 130.9	30 39.4	08 32 130.7	31 07.7	08 32 130.5	31 36.0	08 32 130.3	32 04.3	08 32 130.1	32 32.6	08 32 129.9	33 00.8	08 32 129.7	2
3	29 23.4	08 33 130.0	29 51.7	08 33 129.8	30 20.0	08 33 129.7	30 48.3	08 33 129.5	31 16.5	08 33 129.3	31 44.8	08 33 129.1	32 13.0	08 33 128.9	32 41.2	08 33 128.7	3
4	29 03.9	08 33 129.0	29 32.1	08 33 128.8	30 00.4	08 33 128.6	30 28.6	08 33 128.4	30 56.8	08 33 128.2	31 24.9	08 34 128.0	31 53.1	08 34 127.8	32 21.4	08 34 127.6	4
45	28 44.0	08 34 127.9	29 12.2	08 34 127.7	29 40.4	08 34 127.5	30 08.6	08 34 127.3	30 36.7	08 34 127.1	31 04.8	08 34 126.9	31 32.9				

Table with columns for H.A., Alt., Az., and declination values for latitudes 12° 00' to 15° 30'.

Lat. 65°

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and declination values for latitudes 12° 00' to 15° 30'.

Lat 66°

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.				
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.					
00	41 06.0	1.000	180.0	41 39.0	1.000	180.0	42 09.0	1.000	180.0	42 39.0	1.000	180.0	43 09.0	1.000	180.0	44 00.0	1.000	180.0	00		
1	40 59.7	1.001	178.7	41 29.7	1.001	178.7	41 59.7	1.001	178.7	42 29.7	1.001	178.7	42 59.7	1.001	178.7	43 29.7	1.001	178.7	44 29.7	1.001	178.7
2	40 58.9	1.002	177.5	41 28.9	1.002	177.4	41 58.9	1.002	177.4	42 28.9	1.002	177.4	42 58.8	1.002	177.4	43 28.8	1.002	177.4	44 28.8	1.002	177.4
3	40 57.5	1.008	176.2	41 27.5	1.008	176.2	41 57.4	1.008	176.1	42 27.4	1.008	176.1	42 57.4	1.008	176.1	43 27.4	1.008	176.1	44 27.4	1.008	176.0
4	40 55.5	1.004	174.9	41 25.5	1.004	174.9	41 55.4	1.004	174.9	42 25.4	1.004	174.8	42 55.4	1.004	174.8	43 25.4	1.004	174.8	44 25.4	1.004	174.7
05	40 53.0	1.006	173.6	41 22.9	1.006	173.6	41 52.9	1.006	173.6	42 22.9	1.006	173.5	42 52.8	1.006	173.5	43 22.8	1.006	173.5	44 22.7	1.006	173.4
6	40 49.9	1.006	172.4	41 19.8	1.006	172.3	41 49.8	1.006	172.3	42 19.7	1.006	172.2	42 49.7	1.006	172.2	43 19.6	1.006	172.2	44 19.5	1.006	172.1
7	40 46.2	1.007	171.1	41 16.2	1.007	171.1	41 46.1	1.007	171.0	42 16.0	1.007	171.0	42 45.9	1.007	170.9	43 15.8	1.007	170.9	44 15.7	1.007	170.8
8	40 42.0	1.008	169.8	41 11.9	1.008	169.8	41 41.8	1.008	169.7	42 11.8	1.008	169.7	42 41.7	1.008	169.6	43 11.6	1.008	169.6	44 11.4	1.008	169.5
9	40 37.3	1.009	168.6	41 07.2	1.009	168.5	41 37.1	1.009	168.5	42 06.9	1.009	168.4	42 36.8	1.009	168.3	43 06.7	1.009	168.3	44 06.4	1.009	168.1
10	40 32.0	1.010	167.3	41 01.8	1.010	167.2	41 31.7	1.010	167.1	42 01.6	1.010	167.1	42 31.4	1.010	167.0	43 01.3	1.010	167.0	44 01.0	1.010	166.8
1	40 26.1	99 11	166.1	40 56.0	99 11	166.0	41 25.8	99 11	165.8	41 55.6	99 11	165.7	42 25.5	99 11	165.7	42 55.3	99 11	165.6	43 25.1	99 11	165.5
2	40 19.8	99 12	164.8	40 49.6	99 12	164.7	41 19.4	99 12	164.6	41 49.2	99 12	164.5	42 18.9	99 12	164.5	42 48.7	99 12	164.4	43 18.5	99 12	164.3
3	40 12.9	99 12	163.6	40 42.6	99 12	163.5	41 12.4	99 12	163.4	41 42.1	99 12	163.3	42 11.9	99 12	163.2	42 41.6	99 12	163.1	43 11.4	99 12	163.0
4	40 05.4	99 13	162.3	40 35.1	99 13	162.2	41 04.9	99 13	162.1	41 34.6	99 13	162.0	42 04.3	99 13	161.9	42 34.0	99 13	161.9	43 03.7	99 13	161.8
15	39 57.4	99 14	161.1	40 27.1	99 14	161.0	40 56.8	99 14	160.9	41 26.5	99 14	160.8	41 56.2	99 14	160.7	42 25.8	99 14	160.6	42 55.5	99 14	160.5
6	39 48.9	99 15	159.8	40 18.6	99 15	159.7	40 48.2	99 15	159.6	41 17.9	99 15	159.5	41 47.5	99 15	159.4	42 17.1	99 15	159.3	42 46.8	99 15	159.2
7	39 39.9	99 16	158.6	40 09.6	99 16	158.5	40 39.2	99 16	158.4	41 08.8	99 16	158.3	41 38.3	99 16	158.2	42 07.9	99 16	158.0	42 37.5	99 16	157.9
8	39 30.4	99 17	157.4	40 00.0	99 17	157.2	40 29.6	99 17	157.1	40 59.1	99 17	157.0	41 28.7	99 17	156.9	41 58.2	99 17	156.8	42 27.7	99 17	156.7
9	39 20.4	99 18	156.1	39 49.9	99 18	155.9	40 49.0	99 18	155.8	41 18.5	99 18	155.7	41 47.9	99 18	155.5	41 47.9	99 18	155.5	42 17.4	99 18	155.4
20	39 09.9	99 18	154.9	39 39.4	99 18	154.8	40 08.8	99 18	154.7	40 38.3	99 18	154.5	41 07.8	99 18	154.4	41 37.2	99 18	154.3	42 06.6	99 18	154.2
1	38 58.9	99 19	153.7	39 28.3	99 19	153.6	39 57.8	99 19	153.4	40 27.2	99 19	153.3	40 56.6	99 19	153.2	41 25.9	99 20	153.0	41 55.3	99 20	152.9
2	38 47.4	99 20	152.5	39 16.8	99 20	152.4	39 46.2	99 20	152.2	40 15.5	99 20	152.1	40 44.9	99 20	151.9	41 14.2	99 20	151.8	41 43.5	99 20	151.7
3	38 35.8	99 21	151.3	39 04.8	99 21	151.1	39 34.1	99 21	150.9	40 03.4	99 21	150.8	40 32.7	99 21	150.7	41 02.0	99 21	150.6	41 31.3	99 21	150.4
4	38 23.1	99 21	150.1	38 52.3	99 22	149.8	39 21.6	99 22	149.8	39 50.8	99 22	149.7	40 20.1	99 22	149.5	40 49.3	99 22	149.4	41 18.5	99 22	149.2
25	38 10.2	99 22	148.9	38 39.4	99 22	148.7	39 08.6	99 22	148.6	39 37.8	99 22	148.4	40 07.0	99 22	148.3	40 36.1	99 22	148.1	41 05.3	99 22	148.0
6	37 56.9	99 23	147.7	38 26.0	99 23	147.5	38 55.2	99 23	147.4	39 24.3	99 23	147.2	39 53.4	99 23	147.1	40 22.5	99 23	146.9	40 51.6	99 23	146.8
7	37 43.1	99 24	146.5	38 12.2	99 24	146.4	38 41.3	99 24	146.2	39 10.4	99 24	146.0	39 39.4	99 24	145.9	40 08.5	99 24	145.7	40 37.5	99 24	145.6
8	37 28.9	99 24	145.3	37 57.9	99 24	145.2	38 27.0	99 24	145.0	38 56.0	99 24	144.9	39 25.0	99 24	144.7	39 54.0	99 24	144.5	40 22.9	99 24	144.4
9	37 14.3	99 25	144.2	37 43.2	99 25	143.8	38 12.2	99 25	143.8	38 41.2	99 25	143.7	39 10.1	99 25	143.5	39 39.0	99 25	143.3	40 08.0	99 25	143.2
30	36 59.2	99 26	143.0	37 28.1	99 26	142.8	37 57.0	99 26	142.7	38 25.9	99 26	142.5	38 54.8	99 26	142.3	39 23.7	99 26	142.2	39 52.5	99 26	142.0
1	36 43.8	99 26	141.8	37 12.6	99 27	141.7	37 41.5	99 27	141.5	38 10.3	99 27	141.3	38 39.1	99 27	141.2	39 07.9	99 27	141.0	39 36.7	99 27	140.8
2	36 27.9	99 27	140.7	36 56.7	99 27	140.5	37 25.5	99 27	140.3	37 54.3	99 27	140.2	38 23.0	99 27	140.0	38 51.8	99 27	139.8	39 20.5	99 27	139.6
3	36 11.6	99 28	139.6	36 40.4	99 28	139.4	37 09.1	99 28	139.2	37 37.8	99 28	139.0	38 06.5	99 28	138.8	38 35.2	99 28	138.6	39 03.9	99 28	138.5
4	35 55.0	99 28	138.4	36 23.7	99 28	138.2	36 52.3	99 29	138.1	37 21.0	99 29	137.9	37 49.6	99 29	137.7	38 18.3	99 29	137.5	38 46.8	99 29	137.3
35	35 38.0	99 29	137.3	36 06.6	99 29	137.1	36 35.2	99 29	136.9	37 03.8	99 29	136.7	37 32.4	99 29	136.5	38 00.9	99 29	136.3	38 29.5	99 29	136.1
6	35 20.6	99 30	136.2	35 49.2	99 30	136.0	36 17.7	99 30	135.8	36 46.2	99 30	135.6	37 14.7	99 30	135.4	37 43.2	99 30	135.2	38 11.7	99 30	135.0
7	35 02.9	99 30	135.0	35 31.4	99 30	134.8	35 59.8	99 30	134.7	36 28.3	99 30	134.5	36 56.8	99 31	134.3	37 25.2	99 31	134.1	37 53.6	99 31	133.9
8	34 44.8	99 31	133.9	35 13.2	99 31	133.7	35 41.6	99 31	133.5	36 10.0	99 31	133.3	36 38.4	99 31	133.1	37 06.8	99 31	132.9	37 35.1	99 31	132.7
9	34 26.3	99 31	132.8	34 54.7	99 31	132.6	35 25.1	99 31	132.4	35 51.4	99 32	132.2	36 19.8	99 32	132.0	36 48.1	99 32	131.8	37 16.4	99 32	131.6
40	34 07.6	99 32	131.7	34 35.9	99 32	131.5	35 04.2	99 32	131.3	35 32.5	99 32	131.1	36 00.8	99 32	130.9	36 29.0	99 32	130.7	36 57.2	99 32	130.5
1	33 48.5	99 32	130.6	34 16.7	99 32	130.4	34 45.0	99 32	130.2	35 13.2	99 32	130.0	35 41.4	99 32	129.8	36 09.6	99 32	129.6	36 37.8	99 32	129.4
2	33 29.1	99 33	129.5	33 57.3	99 33	129.3	34 25.5	99 33	129.1	34 53.7	99 33	128.9	35 21.8	99 33	128.7	35 49.9	99 33	128.5	36 18.0	99 33	128.3
3	33 09.4	99 33	128.5	33 37.5	99 33	128.2	34 05.7	99 34	128.0	34 33.8	99 34	127.8	35 01.9	99 34	127.6	35 29.9	99 34	127.4	35 58.0	99 34	127.2
4	32 49.4	99 34	127.4	33 17.5	99 34	127.2	33 45.5	99 34	127.0	34 13.6	99 34	126.7	34 41.6	99 34	126.5	35 09.6	99 34	126.3	35 37.6	99 34	126.1
45	32 29.1	99 34	126.3	32 57.1	99 34	126.1	33 25.1	99 34	125.9	33 53.1	99 34	125.7	34 21.1	99 34	125.5	34 49.1	99 34	125.3	35 17.0	99 34	125.1
6	32 08.5	99 35	125.3	32 36.5	99 35	125.0	33 04.5	99 35</													

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
00	9 00.0	1.00 180.0	8 30.0	1.00 180.0	8 00.0	1.00 180.0	7 30.0	1.00 180.0	7 00.0	1.00 180.0	6 30.0	1.00 180.0	6 00.0	1.00 180.0	5 30.0	1.00 180.0	00
1	8 59.8	1.001 179.0	8 29.8	1.001 179.0	7 59.8	1.001 179.0	7 29.8	1.001 179.0	6 59.8	1.001 179.0	6 29.8	1.001 179.0	5 59.8	1.001 179.0	5 29.8	1.001 179.0	1
2	8 59.1	1.002 178.1	8 29.1	1.002 178.1	7 59.1	1.002 178.1	7 29.1	1.002 178.1	6 59.2	1.002 178.1	6 29.2	1.002 178.1	5 59.2	1.002 178.1	5 29.2	1.002 178.1	2
3	8 58.1	1.003 177.1	8 28.1	1.003 177.1	7 58.1	1.003 177.1	7 28.1	1.003 177.1	6 58.1	1.003 177.1	6 28.1	1.003 177.1	5 58.1	1.003 177.1	5 28.1	1.003 177.1	3
4	8 56.6	1.003 176.1	8 26.6	1.003 176.1	7 56.6	1.003 176.1	7 26.6	1.003 176.2	6 56.6	1.003 176.2	6 26.6	1.003 176.2	5 56.6	1.003 176.2	5 26.6	1.003 176.2	4
05	8 54.6	1.004 175.1	8 24.6	1.004 175.2	7 54.7	1.004 175.2	7 24.7	1.004 175.2	6 54.7	1.004 175.2	6 24.7	1.004 175.2	5 54.7	1.004 175.2	5 24.8	1.004 175.3	05
6	8 52.3	1.006 174.2	8 22.3	1.006 174.2	7 52.3	1.006 174.2	7 22.3	1.006 174.2	6 52.4	1.006 174.3	6 22.4	1.006 174.3	5 52.4	1.006 174.3	5 22.5	1.006 174.3	6
7	8 49.5	1.005 173.2	8 19.5	1.005 173.2	7 49.5	1.005 173.2	7 19.6	1.005 173.3	6 49.6	1.005 173.3	6 19.7	1.005 173.3	5 49.7	1.005 173.3	5 19.7	1.005 173.4	7
8	8 46.2	1.006 172.2	8 16.3	1.006 172.3	7 46.3	1.006 172.3	7 16.4	1.006 172.3	6 46.5	1.006 172.3	6 16.5	1.006 172.4	5 46.6	1.006 172.4	5 16.6	1.006 172.4	8
9	8 42.6	1.007 171.2	8 12.7	1.007 171.3	7 42.7	1.007 171.3	7 12.8	1.007 171.4	6 42.9	1.007 171.4	6 12.9	1.007 171.4	5 43.0	1.007 171.5	5 13.1	1.007 171.5	9
10	8 38.5	1.008 170.3	8 08.6	1.007 170.3	7 38.7	1.007 170.4	7 08.8	1.007 170.4	6 38.9	1.007 170.4	6 08.9	1.007 170.5	5 39.0	1.007 170.5	5 09.1	1.007 170.5	10
1	8 34.0	1.008 169.3	8 04.1	1.008 169.4	7 34.2	1.008 169.4	7 04.3	1.008 169.4	6 34.4	1.008 169.5	6 04.5	1.008 169.5	5 34.6	1.008 169.6	5 04.7	1.008 169.6	1
2	8 29.1	1.009 168.3	7 59.2	1.009 168.4	7 29.4	1.009 168.4	6 59.5	1.009 168.5	6 29.6	1.009 168.5	5 59.7	1.009 168.6	5 29.8	1.009 168.6			2
3	8 23.8	1.010 167.4	7 53.9	1.010 167.4	7 24.1	1.010 167.5	6 54.2	1.009 167.5	6 24.3	1.009 167.6	5 54.5	1.009 167.6	5 24.6	1.009 167.7			3
4	8 18.0	99 10 166.4	7 48.2	99 10 166.5	7 18.4	99 10 166.5	6 48.5	99 10 166.6	6 18.7	99 10 166.6	5 48.8	99 10 166.7	5 19.0	99 10 166.7			4
15	8 11.9	99 11 165.4	7 42.1	99 11 165.5	7 12.2	99 11 165.6	6 42.4	99 11 165.6	6 12.6	99 11 165.7	5 42.8	99 11 165.7	5 13.0	99 11 165.8			15
6	8 05.3	99 12 164.5	7 35.5	99 12 164.5	7 05.7	99 12 164.6	6 35.9	99 12 164.7	6 06.1	99 12 164.7	5 36.3	99 12 164.8	5 06.5	99 12 164.8			6
7	7 58.3	99 12 163.5	7 28.5	99 12 163.6	6 58.8	99 12 163.6	6 29.0	99 12 163.7	5 59.2	99 12 163.8	5 29.5	99 12 163.8					7
8	7 50.9	99 13 162.6	7 21.2	99 13 162.6	6 51.4	99 13 162.6	6 21.7	99 13 162.8	5 51.9	99 13 162.8	5 22.2	99 13 162.9					8
9	7 43.1	99 14 161.6	7 13.4	99 14 161.7	6 43.7	99 14 161.7	6 14.0	99 14 161.8	5 44.3	99 13 161.9	5 14.5	99 13 161.9					9
20	7 34.9	99 14 160.6	7 05.2	99 14 160.7	6 35.5	99 14 160.8	6 05.8	99 14 160.8	5 36.2	99 14 160.9	5 06.5	99 14 161.0					20
1	7 26.3	99 15 159.7	6 56.6	99 15 159.7	6 27.0	99 15 159.8	5 57.3	99 15 159.9	5 27.7	99 15 160.0							1
2	7 17.3	99 16 158.7	6 47.7	99 16 158.8	6 18.0	99 16 158.9	5 48.4	99 16 159.0	5 18.8	99 15 159.0							2
3	7 07.9	99 16 157.8	6 38.3	99 16 157.8	6 08.7	99 16 157.9	5 39.1	99 16 158.0	5 09.5	99 16 158.1							3
4	6 58.1	98 17 156.8	6 28.5	98 17 156.9	5 59.0	98 17 157.0	5 29.4	98 17 157.1									4
25	6 47.9	98 18 155.8	6 18.4	98 18 155.9	5 48.9	98 17 156.0	5 19.4	98 17 156.1									25
6	6 37.3	98 18 154.9	6 07.9	98 18 155.0	5 38.4	98 18 155.1	5 08.9	98 18 155.2									6
7	6 26.4	98 19 153.9	5 56.9	98 19 154.0	5 27.5	98 19 154.1											7
8	6 15.1	98 20 153.0	5 45.7	98 19 153.1	5 16.3	98 19 153.2											8
9	6 03.4	98 20 152.1	5 34.0	98 20 152.2	5 04.6	98 20 152.3											9
30	5 51.3	98 21 151.1	5 22.0	98 21 151.2													30
1	5 38.9	98 21 150.2	5 09.6	98 21 150.3													1
2	5 26.1	97 22 149.2															2
3	5 12.9	97 22 148.3															3

Lat. 65°

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
91	14 02.8	90 42 82.2	14 29.8	90 42 82.0	14 56.8	90 42 81.7	15 23.8	90 42 81.5	15 50.7	90 42 81.3	16 17.7	90 42 81.1	16 44.6	90 42 80.8	17 11.5	90 42 80.6	91
2	13 37.7	90 42 81.3	14 04.8	90 42 81.1	14 31.8	90 42 80.9	14 58.7	90 42 80.6	15 25.7	90 42 80.4	15 52.7	90 42 80.2	16 19.6	90 42 79.9	16 46.6	90 42 79.7	2
3	13 12.7	90 42 80.4	13 39.7	90 42 80.2	14 06.8	90 42 80.0	14 33.8	90 42 79.7	15 09.7	90 42 79.5	15 27.7	90 42 79.3	15 54.7	90 42 79.1	16 21.6	90 42 78.8	3
4	12 47.7	90 42 79.5	13 14.8	90 42 79.3	13 41.8	90 42 79.1	14 08.8	90 42 78.9	14 35.8	90 42 78.6	15 02.8	90 42 78.4	15 29.8	90 42 78.2	15 56.8	90 42 78.0	4
95	12 22.8	90 41 78.6	12 49.9	90 41 78.4	13 17.0	90 41 78.2	13 44.0	90 41 78.0	14 11.0	90 41 77.7	14 38.0	90 41 77.5	15 05.1	90 41 77.3	15 32.0	90 41 77.1	95
6	11 58.0	90 41 77.8	12 25.2	90 41 77.5	12 52.2	90 41 77.3	13 19.2	90 41 77.1	13 46.3	90 41 76.9	14 13.3	90 41 76.6	14 40.4	90 41 76.4	15 07.4	90 41 76.2	6
7	11 33.3	90 41 76.9	12 00.4	90 41 76.6	12 27.5	90 41 76.4	12 54.6	90 41 76.2	13 21.6	90 41 76.0	13 48.7	90 41 75.8	14 15.8	90 41 75.5	14 42.8	90 41 75.3	7
8	11 08.6	90 41 76.0	11 35.8	90 41 75.8	12 02.9	90 41 75.5	12 30.0	90 41 75.3	12 57.1	90 41 75.1	13 24.2	90 41 74.9	13 51.3	90 41 74.7	14 18.3	90 41 74.4	8
9	10 44.1	91 41 75.1	11 11.2	90 41 74.9	11 38.4	90 41 74.7	12 05.5	90 41 74.4	12 32.6	90 41 74.2	12 59.7	90 41 74.0	13 26.9	90 40 73.8	13 53.9	90 40 73.6	9
100	10 19.6	91 41 74.2	10 46.8	91 41 74.0	11 14.0	91 40 73.8	11 41.1	91 40 73.6	12 08.3	90 40 73.3	12 35.4	90 40 73.1	13 02.6	90 40 72.9	13 29.7	90 40 72.7	100
1	9 55.3	91 40 73.3	10 22.5	91 40 73.1	10 49.7	91 40 72.9	11 16.9	91 40 72.7	11 44.1	91 40 72.5	12 11.2	91 40 72.2	12 38.4	91 40 72.0	13 05.5	90 40 71.8	1
2	9 31.1	91 40 72.4	9 58.3	91 40 72.2	10 25.5	91 40 72.0	10 52.7	91 40 71.8	11 19.9	91 40 71.6	11 47.1	91 40 71.4	12 14.3	91 40 71.2	12 41.5	91 40 70.9	2
3	9 06.9	91 40 71.6	9 34.2	91 40 71.3	10 01.5	91 40 71.1	10 28.7	91 40 70.9	10 55.9	91 40 70.7	11 23.2	91 40 70.5	11 50.4	91 40 70.3	12 17.6	91 40 70.1	3
4	8 42.9	91 40 70.7	9 10.2	91 40 70.5	9 37.5	91 40 70.2	10 04.8	91 40 70.0	10 32.1	91 40 69.8	10 59.3	91 40 69.6	11 26.6	91 39 69.4	11 53.8	91 39 69.2	4
105	8 19.1	91 40 69.8	8 46.4	91 39 69.6	9 13.7	91 39 69.4	9 41.0	91 39 69.2	10 08.3	91 39 68.9	10 35.6	91 39 68.7	11 02.9	91 39 68.5	11 30.2	91 39 68.3	105
6	7 55.4	91 39 68.9	8 22.7	91 39 68.7	8 50.1	91 39 68.5	9 17.4	91 39 68.3	9 44.7	91 39 68.1	10 12.1	91 39 67.9	10 39.4	91 39 67.6	11 06.7	91 39 67.4	6
7	7 31.8	91 39 68.0	7 59.2	91 39 67.8	8 26.5	91 39 67.6	8 53.9	91 39 67.4	9 21.3	91 39 67.2	9 48.7	91 39 67.0	10 16.0	91 39 66.8	10 43.4	91 39 66.6	7
8	7 08.3	91 39 67.1	7 35.8	91 39 66.9	8 03.2	91 39 66.7	8 30.6										

Lat. 65°

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.		
	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.			
00	45 00.0	1.000	180.0	45 30.0	1.000	180.0	46 00.0	1.000	180.0	46 30.0	1.000	180.0	47 00.0	1.000	180.0	47 30.0	1.000	180.0	00
1	44 59.7	1.001	178.7	45 29.7	1.001	178.7	45 59.7	1.001	178.7	46 29.7	1.002	178.6	46 59.7	1.002	178.6	47 29.7	1.002	178.6	1
2	44 58.8	1.002	177.3	45 28.8	1.002	177.3	45 58.8	1.002	177.3	46 28.8	1.002	177.3	46 58.8	1.002	177.3	47 28.8	1.002	177.3	2
3	44 57.4	1.003	176.0	45 27.3	1.003	176.0	45 57.3	1.003	176.0	46 27.3	1.004	175.9	46 57.3	1.004	175.9	47 27.3	1.004	175.9	3
4	44 55.3	1.004	174.7	45 25.2	1.004	174.7	45 55.2	1.004	174.6	46 25.2	1.004	174.6	46 55.2	1.004	174.6	47 25.2	1.004	174.6	4
05	44 52.7	1.005	173.4	45 22.6	1.005	173.3	45 52.6	1.005	173.3	46 22.5	1.005	173.3	46 52.5	1.005	173.2	47 22.4	1.005	173.2	05
6	44 49.4	1.006	172.0	45 19.4	1.006	172.0	45 49.3	1.006	172.0	46 19.3	1.006	171.9	46 49.2	1.006	171.9	47 19.1	1.006	171.8	6
7	44 45.6	1.007	170.7	45 15.6	1.007	170.7	45 45.5	1.007	170.6	46 15.4	1.007	170.6	46 45.3	1.007	170.5	47 15.2	1.007	170.5	7
8	44 41.3	1.008	169.4	45 11.2	1.008	169.3	45 41.1	1.008	169.3	46 10.9	1.008	169.2	46 40.8	1.008	169.2	47 10.7	1.008	169.1	8
9	44 36.3	1.009	168.1	45 06.2	1.009	168.0	45 36.0	1.009	168.0	46 05.9	1.009	167.9	46 35.8	1.009	167.8	47 05.6	1.009	167.7	9
10	44 30.8	0.910	166.8	45 00.6	0.910	166.7	45 30.5	0.910	166.6	46 00.3	0.910	166.5	46 30.0	0.910	166.4	47 00.0	0.910	166.3	10
1	44 24.7	0.911	165.5	44 54.5	0.911	165.4	45 24.3	0.911	165.3	45 54.1	0.911	165.2	46 23.9	0.911	165.1	46 53.7	0.911	165.0	1
2	44 18.1	0.912	164.2	44 47.8	0.912	164.1	45 17.6	0.912	164.0	45 47.4	0.912	163.9	46 17.1	0.912	163.8	46 46.9	0.912	163.7	2
3	44 10.9	0.913	162.9	44 40.6	0.913	162.8	45 10.3	0.913	162.7	45 40.0	0.913	162.6	46 09.8	0.913	162.5	46 39.5	0.913	162.4	3
4	44 03.1	0.914	161.6	44 32.8	0.914	161.5	45 02.5	0.914	161.4	45 32.2	0.914	161.3	46 01.9	0.914	161.2	46 31.5	0.914	161.1	4
15	43 54.8	0.915	160.3	44 24.5	0.915	160.2	44 54.1	0.915	160.1	45 23.8	0.915	159.9	45 53.4	0.915	159.8	46 23.0	0.915	159.7	15
6	43 46.0	0.916	159.0	44 15.6	0.916	158.9	44 45.2	0.916	158.8	45 14.8	0.916	158.6	45 44.4	0.916	158.5	46 13.9	0.916	158.4	6
7	43 36.6	0.917	157.7	44 06.2	0.917	157.6	44 35.7	0.917	157.5	45 05.3	0.917	157.3	45 34.8	0.917	157.2	46 03.9	0.917	157.1	7
8	43 26.8	0.918	156.4	43 56.3	0.918	156.3	44 25.8	0.918	156.2	44 55.2	0.918	156.0	45 24.7	0.918	155.9	45 54.2	0.918	155.8	8
9	43 16.4	0.919	155.2	43 45.3	0.919	155.0	44 15.3	0.919	154.9	44 44.7	0.919	154.8	45 14.1	0.919	154.6	45 43.5	0.919	154.5	9
20	43 05.4	0.820	153.9	43 34.9	0.820	153.8	44 04.2	0.820	153.6	44 33.6	0.820	153.5	45 03.0	0.820	153.3	45 32.4	0.820	153.2	20
1	42 54.0	0.821	152.6	43 23.4	0.821	152.5	43 52.7	0.821	152.3	44 22.0	0.821	152.2	44 51.4	0.821	152.0	45 20.7	0.821	151.9	1
2	42 42.1	0.822	151.4	43 11.4	0.822	151.2	43 40.7	0.822	151.1	44 10.0	0.822	150.9	44 39.2	0.822	150.8	45 08.5	0.822	150.6	2
3	42 29.8	0.823	150.1	42 59.0	0.823	150.0	43 28.2	0.823	149.8	43 57.4	0.823	149.7	44 26.6	0.823	149.5	44 55.8	0.823	149.3	3
4	42 16.9	0.824	148.9	42 46.1	0.824	148.7	43 15.2	0.824	148.6	43 44.4	0.824	148.4	44 13.5	0.824	148.2	44 42.6	0.824	148.1	4
25	42 03.6	0.725	147.7	42 32.7	0.725	147.5	43 01.8	0.725	147.3	43 30.8	0.725	147.2	44 00.0	0.725	147.0	44 29.0	0.725	146.8	25
6	41 49.8	0.726	146.4	42 18.8	0.726	146.3	42 47.8	0.726	146.1	43 16.9	0.726	145.9	43 45.9	0.726	145.8	44 14.9	0.726	145.6	6
7	41 35.5	0.727	145.2	42 04.5	0.727	145.0	42 33.5	0.727	144.9	43 02.4	0.727	144.7	43 31.4	0.727	144.5	44 00.3	0.727	144.3	7
8	41 20.8	0.728	144.0	41 49.8	0.728	143.8	42 18.7	0.728	143.7	42 47.6	0.728	143.5	43 16.4	0.728	143.3	43 45.3	0.728	143.1	8
9	41 05.9	0.729	142.8	41 34.6	0.729	142.6	42 03.4	0.729	142.4	42 32.3	0.729	142.2	43 01.1	0.729	142.0	43 29.8	0.729	141.9	9
30	40 50.2	0.630	141.6	41 19.0	0.630	141.4	41 47.8	0.630	141.2	42 16.5	0.630	141.0	42 45.3	0.630	140.8	43 14.0	0.630	140.7	30
1	40 34.8	0.631	140.4	41 03.0	0.631	140.2	41 31.7	0.631	140.0	42 00.4	0.631	139.8	42 29.0	0.631	139.6	42 57.7	0.631	139.4	1
2	40 17.9	0.632	139.2	40 46.5	0.632	139.0	41 15.2	0.632	138.8	41 43.8	0.632	138.6	42 12.4	0.632	138.4	42 41.0	0.632	138.2	2
3	40 01.1	0.633	138.1	40 29.7	0.633	137.9	40 58.3	0.633	137.7	41 26.9	0.633	137.5	41 55.4	0.633	137.3	42 23.9	0.633	137.0	3
4	39 44.0	0.634	136.9	40 12.5	0.634	136.7	40 41.0	0.634	136.5	41 09.5	0.634	136.3	41 38.0	0.634	136.1	42 06.5	0.634	135.9	4
35	39 26.5	0.535	135.7	39 54.9	0.535	135.5	40 23.4	0.535	135.3	40 51.8	0.535	135.1	41 20.2	0.535	134.9	41 48.6	0.535	134.7	35
6	39 08.6	0.536	134.6	39 37.0	0.536	134.4	40 05.4	0.536	134.2	40 33.8	0.536	134.0	41 02.1	0.536	133.7	41 30.4	0.536	133.5	6
7	38 50.4	0.537	133.4	39 18.7	0.537	133.2	39 47.0	0.537	133.0	40 15.3	0.537	132.8	40 43.6	0.537	132.6	41 11.8	0.537	132.4	7
8	38 31.8	0.538	132.3	39 00.1	0.538	132.1	39 28.3	0.538	131.9	39 56.5	0.538	131.7	40 24.9	0.538	131.4	40 52.9	0.538	131.2	8
9	38 12.9	0.539	131.2	38 41.1	0.539	131.0	39 09.3	0.539	130.7	39 37.4	0.539	130.5	40 05.6	0.539	130.3	40 33.7	0.539	130.1	9
40	37 53.6	0.440	130.1	38 21.8	0.440	129.8	38 49.9	0.440	129.6	39 18.0	0.440	129.4	39 46.1	0.440	129.2	40 14.1	0.440	128.9	40
1	37 34.0	0.441	128.9	38 02.1	0.441	128.7	38 30.2	0.441	128.5	38 58.2	0.441	128.3	39 26.3	0.441	128.0	39 54.2	0.441	127.8	1
2	37 14.2	0.442	127.8	37 42.2	0.442	127.6	38 10.2	0.442	127.4	38 38.2	0.442	127.2	39 06.1	0.442	126.9	39 34.1	0.442	126.7	2
3	36 54.0	0.443	126.7	37 22.0	0.443	126.5	37 49.9	0.443	126.3	38 17.8	0.443	126.0	38 45.7	0.443	125.8	39 13.6	0.443	125.5	3
4	36 33.5	0.444	125.6	37 01.4	0.444	125.4	37 29.3	0.444	125.2	37 57.2	0.444	124.9	38 25.0	0.444	124.7	38 52.8	0.444	124.5	4
45	36 12.8	0.345	124.6	36 40.6	0.345	124.3	37 08.5	0.345	124.1	37 36.3	0.345	123.9	38 04.0	0.345	123.6	38 31.8	0.345	123.4	45
6	35 51.8	0.346	123.5	36 19.6	0.346	123.2	36 47.3	0.346	123.0	37 15.1	0.346	122.8	37 42.8	0.346	122.5	38 10.5	0.346	122.3	6
7	35 30.8	0.347	122.4	35 58.2	0.347	122.2	36 25.9	0.347	122.0	36 53.6	0.347	121.7	37 21.3	0.347	121.5	37 48.9	0.347	121.2	7
8	35 09.0	0.348	121.3	35 36.6	0.348	121.1	36 04.3	0.348	120.9	36 31.9	0.348	120.6	36 59.5	0.348	120.4	37 27.1	0.348	120.1	8
9	34 47.2	0.349	120.3	35 14.8	0.349	120.0	35 42.4	0.349	119.8	36 10.0	0.349	119.6	36 37.5	0.349	119.3	37 05.0	0.349	119.1	9
50	34 25.2	0.250	119.2	34 52.7	0.250	119.0	35 20.3	0.250	118.7	35 47.8	0.250	118.5	36 15.3	0.250	118.3	36 42.8	0.250	118.0	50
1	34 02.9	0.251	118.2	34 30.5	0.251	118.0	34 58.0	0.251	117.7	35 25.4	0.251	117.5	35 5						



DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., 24° 00', 24° 30', 25° 00', 25° 30', 26° 00', 26° 30', 27° 00', 27° 30', and H.A. Each column contains numerical data for Altitude, Azimuth, and Ad At. The table is organized in a grid with rows and columns corresponding to these values.

Lat. 65°

H.A.	24° 00'			24° 30'			25° 00'			25° 30'			26° 00'			26° 30'			27° 00'			27° 30'			H.A.
	Alt.	Ad	Az.																						
91	21 13.0	89 41	78.5	21 39.7	89 41	78.2	22 06.4	89 41	78.0	22 33.1	89 41	77.7	22 59.8	89 41	77.5	23 26.4	89 41	77.2	23 53.0	89 41	77.0	24 19.6	89 41	76.7	91
2	20 48.2	89 41	77.6	21 14.9	89 41	77.4	21 41.7	89 41	77.1	22 08.4	89 41	76.9	22 35.1	89 41	76.6	23 01.7	89 41	76.4	23 28.4	89 41	76.1	23 55.0	89 41	75.9	2
3	20 23.5	89 41	76.7	20 50.2	89 41	76.5	21 17.0	89 41	76.2	21 43.7	89 41	76.0	22 10.4	89 41	75.8	22 37.1	89 41	75.5	23 03.8	89 41	75.3	23 30.4	89 41	75.0	3
4	19 58.8	89 41	75.9	20 25.6	89 41	75.6	20 52.4	89 41	75.4	21 19.2	89 41	75.1	21 45.9	89 41	74.9	22 12.6	89 41	74.6	22 39.3	89 41	74.4	23 06.0	89 41	74.2	4
95	19 34.3	89 41	75.0	20 01.1	89 41	74.8	20 27.9	89 41	74.5	20 54.7	89 41	74.3	21 21.5	89 41	74.0	21 48.2	89 40	73.8	22 15.0	89 40	73.5	22 41.7	89 40	73.3	95
6	19 09.8	90 40	74.1	19 36.7	90 40	73.9	20 03.5	90 40	73.6	20 30.4	90 40	73.4	20 57.2	90 40	73.2	21 23.9	90 40	72.9	21 50.7	90 40	72.7	22 17.4	90 40	72.4	6
7	18 45.5	90 40	73.3	19 12.4	90 40	73.0	19 39.3	90 40	72.8	20 06.1	90 40	72.5	20 32.9	90 40	72.3	20 59.7	90 40	72.1	21 26.5	90 40	71.8	21 53.3	90 40	71.6	7
8	18 21.3	90 40	72.4	18 48.2	90 40	72.2	19 15.1	90 40	71.9	19 42.0	90 40	71.7	20 08.8	90 40	71.5	20 35.7	90 40	71.2	21 02.5	90 40	71.0	21 29.3	90 40	70.7	8
9	17 57.2	90 40	71.5	18 24.1	90 40	71.3	18 51.0	90 40	71.1	19 18.0	90 40	70.8	19 44.9	90 40	70.6	20 11.7	90 40	70.4	20 38.6	90 40	70.1	21 05.4	90 40	69.9	9
100	17 33.2	90 40	70.7	18 00.2	90 40	70.4	18 27.1	90 40	70.2	18 54.1	90 40	70.0	19 21.0	90 40	69.7	19 47.9	90 39	69.5	20 14.8	90 39	69.3	20 41.7	90 39	69.0	100
1	17 09.3	90 40	69.8	17 36.3	90 40	69.6	18 03.3	90 39	69.3	18 30.3	90 39	69.1	18 57.2	90 39	68.9	19 24.2	90 39	68.7	19 51.2	90 39	68.4	20 18.1	90 39	68.2	1
2	16 45.6	90 39	68.9	17 12.6	90 39	68.7	17 39.7	90 39	68.5	18 06.7	90 39	68.3	18 33.7	90 39	68.0	19 00.7	90 39	67.8	19 27.7	90 39	67.6	19 54.6	90 39	67.3	2
3	16 22.0	90 39	68.1	16 49.1	90 39	67.9	17 16.1	90 39	67.6	17 43.2	90 39	67.4	18 10.3	90 39	67.2	18 37.3	90 39	67.0	19 04.3	90 39	66.7	19 31.3	90 39	66.5	3
4	15 58.5	90 39	67.2	16 25.7	90 39	67.0	16 52.8	90 39	66.8	17 19.9	90 39	66.6	17 47.0	90 39	66.3	18 14.0	90 38	66.1	18 41.1	90 38	65.9	19 08.1	90 38	65.6	4
105	15 35.2	91 39	66.4	16 02.4	91 39	66.1	16 29.5	91 38	65.9	16 56.7	91 38	65.7	17 23.8	91 38	65.5	17 50.9	91 38	65.3	18 18.0	91 38	65.0	18 45.1	91 38	64.8	105
6	15 12.1	91 38	65.5	15 39.3	91 38	65.3	16 06.5	91 38	65.1	16 33.7	91 38	64.8	17 00.8	91 38	64.6	17 28.0	91 38	64.4	17 55.1	91 38	64.2	18 22.2	91 38	64.0	6
7	14 49.1	91 38	64.6	15 16.3	91 38	64.4	15 43.6	91 38	64.2	16 10.8	91 38	64.0	16 38.0	91 38	63.8	17 05.2	91 38	63.6	17 32.4	91 38	63.3	17 59.5	91 38	63.1	7
8	14 26.2	91 38	63.8	14 53.5	91 38	63.6	15 20.8	91 38	63.4	15 48.1	91 38	63.1	16 15.3	91 38	62.9	16 42.6	91 37	62.7	17 09.8	91 37	62.5	17 37.0	91 37	62.3	8
9	14 03.6	91 38	62.9	14 30.9	91 37	62.7	14 58.2	91 37	62.5	15 25.5	91 37	62.3	15 52.8	91 37	62.1	16 20.1	91 37	61.9	16 47.4	91 37	61.6	17 14.6	91 37	61.4	9
110	13 41.1	91 37	62.1	14 08.5	91 37	61.9	14 35.8	91 37	61.6	15 03.2	91 37	61.4	15 30.5	91 37	61.2	15 57.8	91 37	61.0	16 25.2	91 37	60.8	16 52.5	91 37	60.6	110
1	13 18.8	91 37	61.2	13 46.2	91 37	61.0	14 13.6	91 37	60.8	14 41.0	91 37	60.6	15 08.4	91 37	60.4	15 35.8	91 36	60.2	16 03.1	91 36	59.9	16 30.5	91 36	59.7	1
2	12 56.6	92 37	60.4	13 24.1	92 36	60.1	13 51.6	92 36	59.9	14 19.0	92 36	59.7	14 46.4	92 36	59.5	15 13.9	92 36	59.3	15 41.3	92 36	59.1	16 08.7	92 36	58.9	2
3	12 34.7	92 36	59.5	13 02.2	92 36	59.3	13 29.7	92 36	59.1	13 57.2	92 36	58.9	14 24.7	92 36	58.7	14 52.1	92 36	58.5	15 19.6	92 36	58.3	15 47.0	92 36	58.0	3
4	12 13.0	92 36	58.6	12 40.5	92 36	58.4	13 08.1	92 36	58.2	13 35.6	92 36	58.0	14 03.1	92 36	57.8	14 30.6	92 36	57.6	14 58.1	92 36	57.4	15 25.6	92 36	57.2	4
115	11 51.4	92 36	57.8	12 19.0	92 36	57.6	12 46.6	92 36	57.4	13 14.2	92 36	57.2	13 41.8	92 36	57.0	14 09.3	92 36	56.8	14 36.9	92 36	56.6	15 04.4	92 36	56.4	115
6	11 30.0	92 36	56.9	11 57.7	92 36	56.7	12 25.3	92 36	56.5	12 53.0	92 36	56.3	13 20.6	92 36	56.1	13 48.2	92 36	55.9	14 15.8	92 36	55.7	14 43.4	92 36	55.5	6
7	11 08.9	92 36	56.1	11 36.6	92 36	55.9	12 04.3	92 36	55.7	12 32.0	92 36	55.5	12 59.7	92 36	55.3	13 27.3	92 36	55.1	13 55.0	92 36	54.9	14 22.6	92 36	54.7	7
8	10 48.0	92 36	55.2	11 15.7	92 36	55.0	11 43.5	92 36	54.8	12 11.2	92 36	54.6	12 38.9	92 36	54.4	13 06.6	92 36	54.2	13 34.3	92 36	54.0	14 02.0	92 36	53.8	8
9	10 27.3	92 36	54.3	10 55.1	92 36	54.1	11 22.8	92 36	54.0	11 50.6	92 36	53.8	12 18.4	92 36	53.6	12 46.2	92 36	53.4	13 13.9	92 36	53.2	13 41.7	92 36	53.0	9
120	10 06.8	92 36	53.5	10 34.6	92 36	53.3	11 02.5	92 36	53.1	11 30.3	92 36	52.9	11 58.1	92 36	52.7	12 25.9	92 36	52.5	12 53.7	92 36	52.3	13 21.5	92 36	52.1	120
1	9 46.5	92 36	52.6	10 14.4	92 36	52.4	10 42.3	92 36	52.2	11 10.2	92 36	52.1	11 38.1	92 36	51.9	12 05.9	92 36	51.7	12 33.8	92 36	51.5	13 01.6	92 36	51.3	1
2	9 26.5	92 36	51.8	9 54.4	92 36	51.6	10 22.4	92 36	51.4	10 50.3	92 36	51.2	11 18.2	92 36	51.0	11 46.1	92 36	50.8	12 14.1	92 36	50.6	12 42.0	92 36	50.5	2
3	9 06.7	92 36	50.9	9 34.7	92 36	50.7	10 02.7	92 36	50.5	10 30.7	92 36	50.3	10 58.6	92 36	50.2	11 26.6	92 36	50.0	11 54.6	92 36	49.8	12 22.5	92 36	49.6	3
4	8 47.1	92 36	50.0	9 15.2	92 36	49.8	9 43.2	92 36	49.7	10 11.3	92 36	49.5	10 39.3	92 36	49.3	11 07.3	92 36	49.1	11 35.3	92 36	48.9	12 03.3	92 36	48.8	4
125	8 27.8	92 36	49.2	8 55.9	92 36	49.0	9 24.0	92 36	48.8	9 52.1	92 36	48.6	10 20.2	92 36	48.5	10 48.3	92 36	48.3	11 16.3	92 36	48.1	11 44.4	92 36	47.9	125
6	8 08.8	92 36	48.3	8 36.9	92 36	48.1	9 05.1	92 36	47.9	9 33.2	92 36	47.8	10 01.3	92 36	47.6	10 29.5	92 36	47.4	10 57.6	92 36	47.2	11 25.7	92 36	47.1	6
7	7 50.0	92 36	47.4	8 18.2	92 36	47.3	8 46.4	92 36	47.1	9 14.6	92 36	46.9	9 42.7	92 36	46.7	10 10.9	92 36	46.6	10 39.1	92 36	46.4	11 07.3	92 36	46.2	7
8	7 31.4	92 36	46.6	7 59.7	92 36	46.4	8 27.9	92 36	46.2	8 56.2	92 36	46.0	9 24.4	92 36	45.9	9 52.6	92 36	45.7	10 20.9	92 36	45.5	10 49.1	92 36	45.4	8
9	7 13.1	92 36	45.7	7 41.4	92 36	45.5	8 09.7	92 36	45.4	8 38.0	92 36	45.2	9 06.3	92 36	45.0	9 34.6	92 36	44.9	10 02.9	92 36	44.7	10 31.2	92 36	44.5	9
130	6 55.1	92 36	44.8	7 23.5	92 36	44.7	7 51.8	92 36	44.5	8 20.2	92 36	44.3	8 48.5	92 36	44.2	9 16.9	92 36	44.0	9 45.2	92 36	43.8	10 13.5	92 36	43.7	130
1	6 37.4	92 36	44.0	7 05.8	92 36	43.8	7 34.2	92 36	43.6	8 02.6	92 36	43.5	8 31.0	92 36	43.3	8 59.4									

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00'			28° 30'			29° 00'			30° 00'			32° 00'			34° 00'			34° 30'			35° 30'			H.A.
	Alt.	Ad At.	Az.																						
00	53 00.0	1.001	180.0	53 30.0	1.001	180.0	54 00.0	1.001	180.0	55 00.0	1.001	180.0	57 00.0	1.001	180.0	59 00.0	1.001	180.0	59 30.0	1.001	180.0	60 30.0	1.001	180.0	00
1	52 59.7	1.002	178.5	53 29.7	1.002	178.5	53 59.7	1.002	178.5	54 59.7	1.002	178.5	56 59.7	1.002	178.4	58 59.6	1.002	178.4	59 29.6	1.002	178.4	60 29.6	1.002	178.3	1
2	52 58.7	1.003	177.1	53 28.7	1.003	177.0	53 58.7	1.003	177.0	54 58.7	1.003	177.0	56 58.6	1.003	176.9	58 58.6	1.003	176.8	59 28.6	1.003	176.8	60 28.6	1.003	176.7	2
3	52 57.1	1.004	175.6	53 27.1	1.004	175.6	53 57.0	1.004	175.5	54 57.0	1.004	175.5	56 56.9	1.004	175.3	58 56.8	1.004	175.2	59 26.8	1.004	175.1	60 26.7	1.004	175.0	3
4	52 54.8	1.005	174.1	53 24.8	1.005	174.1	53 54.7	1.005	174.1	54 54.7	1.005	174.0	56 54.5	1.005	173.8	58 54.3	1.005	173.6	59 24.3	1.005	173.5	60 24.2	1.005	173.4	4
05	52 51.9	1.006	172.7	53 21.8	1.006	172.6	53 51.8	1.006	172.6	54 51.7	1.006	172.5	56 51.4	1.006	172.2	58 51.1	1.006	172.0	59 21.0	1.007	171.9	60 20.9	1.007	171.8	05
6	52 48.3	1.007	171.2	53 18.3	1.007	171.2	53 48.2	1.007	171.1	54 48.0	1.007	171.0	56 47.6	1.007	170.7	58 47.2	1.007	170.4	59 17.1	1.008	170.3	60 16.9	1.008	170.1	6
7	52 44.2	1.008	169.8	53 14.0	1.008	169.8	53 43.9	1.008	169.6	54 43.7	1.008	169.5	56 43.1	1.008	169.1	58 42.6	1.008	168.8	59 12.5	09 09	168.7	60 12.2	09 09	168.5	7
8	52 39.3	1.009	168.3	53 09.2	1.009	168.2	53 39.0	1.009	168.1	54 38.7	09 09	168.0	56 38.1	09 10	167.6	58 37.4	09 10	167.2	59 07.2	09 10	167.1	60 06.8	09 10	166.9	8
9	52 33.9	09 10	166.9	53 03.7	09 10	166.8	53 33.5	09 10	166.7	54 33.1	09 10	166.5	56 32.3	09 11	166.1	58 31.4	09 11	165.6	59 01.2	09 11	165.5	60 00.6	09 11	165.2	9
10	52 27.8	09 11	165.4	52 57.6	09 11	165.3	53 27.4	09 11	165.2	54 26.9	09 11	165.0	56 25.9	09 12	164.6	58 24.8	09 12	164.0	58 54.5	09 12	163.9	59 53.8	09 12	163.6	10
1	52 21.1	09 12	164.0	52 50.9	09 12	163.9	53 20.6	09 12	163.8	54 20.0	09 12	163.5	56 18.8	09 13	163.0	58 17.5	09 13	162.5	58 47.1	09 13	162.3	59 46.4	09 13	162.0	1
2	52 13.8	09 13	162.6	52 43.5	09 13	162.4	53 13.2	09 13	162.3	54 12.5	09 14	162.1	56 11.1	09 14	161.5	58 09.5	09 14	160.9	58 39.1	09 14	160.8	59 38.2	09 15	160.4	2
3	52 05.9	09 14	161.1	52 35.6	09 14	161.0	53 05.2	09 14	160.9	54 04.4	09 15	160.6	56 02.8	09 15	160.0	58 00.9	09 15	159.4	58 30.4	09 15	159.2	59 29.4	09 16	158.9	3
4	51 57.4	09 15	159.7	52 27.0	09 15	159.6	52 56.6	09 15	159.4	53 55.7	09 16	159.2	55 53.8	09 16	158.5	57 51.7	09 16	157.9	58 21.1	09 16	157.7	59 19.9	09 17	157.3	4
15	51 48.4	09 16	158.3	52 17.9	09 16	158.2	52 47.4	09 16	158.0	53 46.4	09 16	157.7	55 44.2	09 17	157.1	57 41.8	09 17	156.3	58 11.1	09 18	156.1	59 09.8	09 18	155.7	15
6	51 38.7	09 17	156.9	52 08.2	09 17	156.8	52 37.6	09 17	156.6	53 36.5	09 18	156.3	55 34.0	09 18	155.6	57 31.3	09 18	154.8	58 00.6	09 19	154.6	58 98.1	09 19	154.2	6
7	51 28.5	09 18	155.5	51 57.9	09 18	155.4	52 27.2	09 18	155.2	53 26.0	09 18	154.8	55 23.2	09 19	154.1	57 20.2	09 19	153.3	57 49.4	09 20	153.1	58 47.7	09 20	152.6	7
8	51 17.7	09 19	154.1	51 47.0	09 19	154.0	52 16.3	09 19	153.8	53 14.9	09 19	153.4	55 11.9	09 20	152.7	57 08.5	09 20	151.8	57 37.6	09 21	151.6	58 35.8	09 21	151.1	8
9	51 06.3	09 20	152.8	51 35.6	09 20	152.6	52 04.9	09 20	152.4	53 03.3	09 20	152.0	55 00.0	09 21	151.2	56 56.3	09 21	150.3	57 25.3	09 22	150.1	58 23.2	09 22	149.6	9
20	50 54.5	09 21	151.4	51 23.7	09 21	151.2	51 52.8	09 21	151.0	52 51.1	09 21	150.6	54 47.5	09 22	149.8	56 43.1	09 22	148.9	57 12.4	09 23	148.6	58 10.1	09 23	148.1	20
1	50 42.1	09 22	150.0	51 11.3	09 22	149.8	51 40.3	09 22	149.6	52 38.4	09 22	149.2	54 34.4	09 23	148.4	56 30.1	09 23	147.4	56 58.9	09 23	147.2	57 56.5	09 24	146.7	1
2	50 29.7	09 22	148.7	50 58.2	09 23	148.5	51 27.2	09 23	148.3	52 25.2	09 23	147.9	54 20.9	09 23	147.0	56 16.1	09 24	146.0	56 44.9	09 24	145.7	57 42.3	09 25	145.2	2
3	50 15.7	09 23	147.3	50 44.7	09 23	147.1	51 13.6	09 23	146.9	52 11.4	09 24	146.5	54 06.8	09 24	145.6	56 01.7	09 25	144.6	56 30.3	09 25	144.3	57 27.5	09 25	143.7	3
4	50 01.8	09 24	146.0	50 30.7	09 24	145.8	50 59.5	09 24	145.6	51 57.2	09 25	145.1	53 52.2	09 25	144.2	55 46.8	09 26	143.2	56 15.3	09 26	142.9	57 12.3	09 26	142.3	4
25	49 47.4	09 25	144.7	50 16.2	09 25	144.5	50 45.0	09 25	144.3	51 42.5	09 25	143.8	53 37.1	09 26	142.8	55 31.3	09 27	141.8	55 59.8	09 27	141.5	56 56.5	09 27	140.9	25
6	49 32.5	09 26	143.4	50 01.2	09 26	143.2	50 29.9	09 26	142.9	51 27.3	09 26	142.5	53 21.6	09 27	141.5	55 15.4	09 27	140.4	55 43.7	09 28	140.1	56 48.3	09 28	139.5	6
7	49 17.1	09 26	142.1	49 45.8	09 26	141.9	50 14.4	09 27	141.6	51 11.6	09 27	141.1	53 05.6	09 27	140.1	55 00.0	09 28	139.0	55 27.2	09 28	138.7	56 23.6	09 29	138.1	7
8	49 01.3	09 27	140.8	49 29.9	09 27	140.6	49 58.4	09 27	140.3	50 55.4	09 28	139.8	52 49.1	09 28	138.8	54 42.1	09 29	137.7	55 10.3	09 29	137.4	56 06.4	09 29	136.7	8
9	48 45.1	09 28	139.5	49 13.6	09 28	139.3	49 42.0	09 28	139.0	50 38.9	09 28	138.5	52 32.2	09 29	137.5	54 24.8	09 30	136.3	54 52.9	09 30	136.0	55 48.8	09 30	135.4	9
30	48 28.4	09 28	138.2	48 56.8	09 29	138.0	49 25.2	09 29	137.8	50 21.9	09 29	137.2	52 14.8	09 30	136.2	54 07.1	09 30	135.0	54 35.0	09 30	134.7	55 30.8	09 31	134.0	30
1	48 11.3	09 29	137.0	48 39.6	09 29	136.7	49 07.9	09 29	136.5	50 04.4	09 30	136.0	51 57.0	09 30	134.9	53 49.0	09 31	133.7	54 16.8	09 31	133.4	55 12.4	09 31	132.7	1
2	47 53.8	09 30	135.7	48 22.0	09 30	135.5	48 50.3	09 30	135.2	49 46.6	09 30	134.7	51 38.9	09 31	133.6	53 30.4	09 32	132.4	53 58.2	09 32	132.1	54 53.6	09 32	131.4	2
3	47 35.9	09 31	134.5	48 04.1	09 31	134.3	48 32.2	09 31	134.0	49 28.4	09 31	133.5	51 20.3	09 32	132.3	53 11.5	09 32	131.1	53 39.2	09 32	130.8	54 33.4	09 32	130.1	3
4	47 17.6	09 31	133.3	47 45.7	09 31	133.0	48 13.8	09 31	132.8	49 09.8	09 32	132.2	51 01.4	09 32	131.1	52 52.2	09 33	129.8	53 19.8	09 33	129.5	54 14.8	09 33	128.8	4
35	46 59.0	09 32	132.1	47 27.0	09 32	131.8	47 55.0	09 32	131.5	48 50.9	09 32	131.0	50 42.1	09 33	129.8	52 32.5	09 33	128.6	53 00.0	09 33	128.2	53 54.8	09 34	127.6	35
6	46 40.0	09 32	130.9	47 07.9	09 32	130.6	47 35.8	09 32	130.3	48 31.5	09 33	129.8	50 22.4	09 33	128.6	52 12.6	09 34	127.3	52 39.9	09 34	127.0	53 34.0	09 34	126.3	6
7	46 20.6	09 33	129.7	46 48.5	09 33	129.4	47 16.3	09 33	129.1	48 11.9	09 33	128.6	50 02.4	09 34	127.4	51 52.2	09 34	126.1	52 19.5	09 35	125.8	53 14.0	09 35	125.1	7
8	46 01.0	09 33	128.5	46 28.7	09 33	128.2	46 56.5	09 34	127.9	47 51.9	09 34	127.4	49 42.1	09 34	126.2	51 31.6	09 35	124.9	51 58.8	09 35	124.5	52 53.1	09 35	123.8	8
9	45 40.9	09 34	127.3	46 08.7	09 34	127.0	46 36.3	09 34	126.8	47 31.6	09 34	126.2	49 21.5	09 35	125										

DECLINATION SAME NAME AS LATITUDE

Main table with columns for H.A., Alt., Az., and declination values (28° 00', 28° 30', 29° 00', 30° 00', 32° 00', 34° 00', 34° 30', 35° 30'). Rows are numbered 91 to 180.

Lat. 66°

Lat. 67°

Lat. 68°

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00'			37° 00'			38° 30'			40° 00'			42° 00'			42° 30'			43° 00'			45° 00'			H.A.
	Alt.	Ad At.	Az.																						
00	61 00.0	1.001	180.0	62 09.0	1.001	180.0	63 39.0	1.001	180.0	65 00.0	1.001	180.0	67 00.0	1.001	180.0	67 30.0	1.001	180.0	68 00.0	1.001	180.0	70 00.0	1.001	180.0	00
1	60 59.6	1.002	178.3	61 59.6	1.002	178.3	63 29.6	1.002	178.2	64 59.6	1.002	178.2	66 59.6	1.002	178.1	67 29.6	1.002	178.1	67 59.6	1.002	178.0	69 59.5	1.002	177.9	1
2	60 58.5	1.003	176.7	61 58.5	1.003	176.6	63 28.4	1.003	176.5	64 58.4	1.003	176.4	66 58.3	1.004	176.2	67 28.3	1.004	176.1	67 58.3	1.004	176.1	69 58.2	1.004	175.9	2
3	60 56.7	1.004	175.0	61 56.6	1.004	174.9	63 26.5	1.005	174.7	64 56.4	1.005	174.6	66 56.2	1.005	174.3	67 26.2	1.005	174.2	67 56.1	1.005	174.2	69 55.9	1.005	173.8	3
4	60 54.1	1.006	173.3	61 54.0	1.006	173.2	63 23.8	1.006	173.0	64 53.6	1.006	172.8	66 53.3	1.006	172.5	67 23.2	1.006	172.3	67 53.1	1.006	172.2	69 52.7	1.007	171.8	4
05	60 50.8	1.007	171.7	61 50.6	1.007	171.5	63 20.3	1.007	171.3	64 50.0	1.007	171.0	66 49.5	1.008	170.5	67 19.4	1.008	170.3	67 49.2	1.008	170.3	69 48.6	1.008	169.7	05
6	60 46.8	1.008	170.0	61 46.5	1.008	169.8	63 16.1	1.008	169.5	64 45.6	1.008	169.2	66 44.9	1.009	168.7	67 14.7	1.009	168.5	67 44.5	1.009	168.4	69 43.6	1.009	167.7	6
7	60 42.0	1.009	168.4	61 41.7	1.009	168.2	63 11.1	1.009	167.8	64 40.5	1.009	167.4	66 39.5	1.009	166.8	67 09.3	1.009	166.6	67 39.0	1.009	166.4	69 37.8	1.009	165.7	7
8	60 36.6	1.010	166.7	61 36.1	1.010	166.5	63 05.4	1.010	166.1	64 34.6	1.010	165.6	66 33.4	1.010	164.9	67 03.0	1.010	164.7	67 32.7	1.010	164.5	69 31.1	1.010	163.7	8
9	60 30.4	1.011	165.1	61 29.8	1.011	164.8	62 58.9	1.011	164.4	64 27.9	1.011	163.9	66 26.4	1.011	163.1	66 55.9	1.011	162.9	67 25.5	1.011	162.7	69 23.6	1.011	161.7	9
10	60 23.5	1.012	163.5	61 22.8	1.012	163.2	62 51.7	1.012	162.7	64 20.5	1.012	162.1	66 18.6	1.012	161.3	66 48.1	1.012	161.0	67 17.6	1.012	160.8	69 15.2	1.012	159.7	10
1	60 16.0	1.013	161.9	61 15.1	1.013	161.5	62 43.8	1.013	161.0	64 12.3	1.013	160.4	66 10.1	1.013	159.5	66 39.5	1.013	159.2	67 06.8	1.013	159.0	69 06.0	1.013	157.8	1
2	60 07.7	1.014	160.3	61 06.8	1.014	160.0	62 35.2	1.014	159.3	64 03.4	1.014	158.6	66 00.8	1.014	157.7	66 30.1	1.014	157.4	66 59.3	1.014	157.1	68 56.0	1.014	155.9	2
3	59 58.8	1.015	158.7	60 57.8	1.015	158.3	62 25.9	1.015	157.6	63 53.9	1.015	156.9	65 50.8	1.015	155.9	66 20.0	1.015	155.6	66 49.1	1.015	155.3	68 45.2	1.015	154.0	3
4	59 49.3	1.016	157.1	60 48.3	1.016	156.7	62 15.9	1.016	156.0	63 43.6	1.016	155.2	65 40.1	1.016	154.1	66 09.1	1.016	153.8	66 38.2	1.016	153.5	68 33.7	1.016	152.1	4
15	59 39.1	1.017	155.5	60 37.6	1.017	155.1	62 05.3	1.017	154.4	63 32.6	1.017	153.6	65 28.7	1.017	152.4	65 57.6	1.017	152.1	66 26.5	1.017	151.7	68 21.5	1.017	150.2	15
6	59 28.3	1.018	154.0	60 26.6	1.018	153.5	61 54.0	1.018	152.7	63 21.0	1.018	151.9	65 16.6	1.018	150.7	65 45.4	1.018	150.3	66 14.1	1.018	150.0	68 08.6	1.018	148.4	6
7	59 16.8	1.019	152.4	60 15.0	1.019	151.9	61 42.0	1.019	151.1	63 08.8	1.019	150.3	65 03.9	1.019	149.0	65 32.5	1.019	148.6	66 01.1	1.019	148.3	67 55.0	1.019	146.6	7
8	59 04.8	1.020	150.9	60 02.8	1.020	150.4	61 29.5	1.020	149.6	62 55.9	1.020	148.7	64 50.5	1.020	147.3	65 19.0	1.020	146.9	65 47.5	1.020	146.6	67 40.7	1.020	144.9	8
9	58 52.2	1.021	149.4	59 49.9	1.021	148.8	61 16.3	1.021	148.0	62 42.4	1.021	147.1	64 36.5	1.021	145.7	65 04.9	1.021	145.3	65 33.2	1.021	144.9	67 25.8	1.021	143.1	9
20	58 39.0	1.022	147.9	59 36.5	1.022	147.3	61 02.6	1.022	146.4	62 28.3	1.022	145.5	64 21.9	1.022	144.0	64 50.1	1.022	143.6	65 18.3	1.022	143.2	67 10.3	1.022	141.4	20
1	58 25.2	1.023	146.4	59 22.6	1.023	145.8	60 48.3	1.023	144.9	62 13.7	1.023	143.9	64 06.7	1.023	142.4	64 34.8	1.023	142.0	65 02.8	1.023	141.6	66 54.2	1.023	139.8	1
2	58 10.9	1.024	144.9	59 08.0	1.024	144.3	60 33.5	1.024	143.4	61 58.4	1.024	142.4	63 50.9	1.024	140.8	64 18.9	1.024	140.4	64 46.8	1.024	140.0	66 37.5	1.024	138.1	2
3	57 56.1	1.025	143.5	58 53.0	1.025	142.9	60 18.1	1.025	141.9	61 42.7	1.025	140.8	63 34.7	1.025	139.3	64 02.5	1.025	138.8	64 30.2	1.025	138.4	66 20.3	1.025	136.5	3
4	57 40.7	1.026	142.0	58 37.4	1.026	141.4	60 02.2	1.026	140.4	61 26.4	1.026	139.3	63 17.9	1.026	137.7	63 45.2	1.026	137.3	64 13.1	1.026	136.8	66 02.6	1.026	134.9	4
25	57 24.9	1.027	140.6	58 21.4	1.027	140.0	59 45.8	1.027	138.9	61 09.6	1.027	137.8	63 00.6	1.027	136.2	63 28.1	1.027	135.8	63 55.5	1.027	135.3	65 44.4	1.027	133.3	25
6	57 06.5	1.028	139.2	58 04.8	1.028	138.5	59 28.9	1.028	137.5	60 52.4	1.028	136.4	62 42.8	1.028	134.7	63 10.2	1.028	134.3	63 37.5	1.028	133.8	65 25.8	1.028	131.8	6
7	56 51.7	1.029	137.8	57 47.8	1.029	137.1	59 11.5	1.029	136.1	60 34.7	1.029	134.9	62 24.5	1.029	133.2	62 51.8	1.029	132.8	63 19.0	1.029	132.3	65 06.6	1.029	130.3	7
8	56 34.4	1.030	136.4	57 30.3	1.030	135.7	58 53.7	1.030	134.7	60 16.5	1.030	133.5	62 05.8	1.030	131.8	62 33.0	1.030	131.3	63 00.0	1.030	130.8	64 47.1	1.030	128.8	8
9	56 16.7	1.031	135.0	57 12.4	1.031	134.4	58 35.4	1.031	133.3	59 57.9	1.031	132.1	61 46.7	1.031	130.4	62 13.7	1.031	129.9	62 40.6	1.031	129.4	64 27.1	1.031	127.4	9
30	55 58.6	1.032	133.7	56 54.1	1.032	133.0	58 16.8	1.032	131.9	59 38.9	1.032	130.7	61 27.2	1.032	129.0	61 54.1	1.032	128.5	62 26.8	1.032	128.0	64 06.8	1.032	125.9	30
1	55 40.1	1.033	132.4	56 35.3	1.033	131.7	57 57.7	1.033	130.6	59 19.4	1.033	129.3	61 07.3	1.033	127.6	61 34.0	1.033	127.1	62 00.7	1.033	126.6	63 46.1	1.033	124.5	1
2	55 21.2	1.034	131.1	56 16.2	1.034	130.3	57 38.2	1.034	129.2	58 59.6	1.034	128.0	60 47.0	1.034	126.2	61 13.6	1.034	125.7	61 40.1	1.034	125.2	63 25.0	1.034	123.1	2
3	55 01.8	1.035	129.8	55 56.7	1.035	129.0	57 18.4	1.035	127.9	58 39.5	1.035	126.7	60 26.4	1.035	124.9	60 52.9	1.035	124.4	61 19.2	1.035	123.9	63 03.6	1.035	121.3	3
4	54 42.2	1.036	128.5	55 36.8	1.036	127.7	56 58.2	1.036	126.6	58 19.0	1.036	125.4	60 05.4	1.036	123.6	60 31.8	1.036	123.1	60 58.0	1.036	122.6	62 41.9	1.036	120.5	4
35	54 22.1	1.037	127.2	55 16.6	1.037	126.5	56 37.7	1.037	125.3	57 58.1	1.037	124.1	59 44.1	1.037	122.2	60 10.4	1.037	121.8	60 36.5	1.037	121.3	62 19.9	1.037	119.1	35
6	54 01.8	1.038	125.9	54 56.0	1.038	125.2	56 16.8	1.038	124.0	57 37.0	1.038	122.8	59 22.5	1.038	121.0	59 48.7	1.038	120.5	60 14.7	1.038	120.0	61 57.6	1.038	117.9	6
7	53 41.1	1.039	124.7	54 35.1	1.039	124.0	55 55.7	1.039	122.8	57 15.5	1.039	121.5	59 00.6	1.039	119.7	59 26.7	1.039	119.2	59 52.6	1.039	118.7	61 35.1	1.039	116.6	7
8	53 20.1	1.040	123.5	54 14.0	1.040	122.7	55 34.2	1.040	121.6	56 53.7	1.040	120.3	58 38.5	1.040	118.5	59 04.4	1.040	118.0	59 30.2	1.040	117.5	61 12.3	1.040	115.3	8
9	52 58.8	1.041	122.3	53 52.5	1.041	121.5	55 12.5	1.041	120.3	56 31.7	1.041	119.1	58 16.1	1.041	117										

Table with columns for H.A., latitude (36° 00' to 45° 00'), and declination (Ait., Ad At., Az.). Includes a 'Lat. 65°' label on the right side.

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., latitude (46° 00' to 54° 00'), and H.A. containing numerical data for declination.

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 65° to 180°.

Lat. 65°

Lat 66°

Lat 67°

Lat 68°

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., latitude (54° 30', 55° 00', 56° 00', 56° 30', 57° 00', 57° 30', 59° 00', 59° 30'), and H.A. Each cell contains numerical values representing declination data.

Main table with columns for H.A., latitude (54° 30' to 59° 30'), and declination values. Includes sub-columns for Alt. and Az. and a grid of numerical data.

Lat. 65°

Lat. 66°

Lat. 67°

Lat. 68°

Lat. 65°

H.A.	60° 00'			60° 30'			62° 00'			62° 30'			63° 00'			69° 00'			69° 30'			74° 30'			H.A.
	Alt.	Ad At.	As.	Alt.	Ad At.	As.	Alt.	Ad At.	As.	Alt.	Ad At.	As.													
00	85 00.0	1.0 02	180.0	85 30.0	1.0 02	180.0	87 00.0	1.0 03	180.0	87 30.0	1.0 04	180.0	88 00.0	1.0 05	180.0	86 00.0	1.0 02	00.0	85 30.0	1.0 02	00.0	80 30.0	1.0 01	00.0	00
1	84 58.7	1.0 06	174.3	85 28.6	1.0 07	173.7	86 58.0	09 10	171.1	87 27.7	09 11	169.5	87 57.2	09 14	167.2	85 58.9	09 06	05.1	85 29.0	1.0 05	04.5	80 29.6	1.0 02	01.6	1
2	84 55.0	09 10	168.6	85 24.5	09 11	167.6	86 52.2	09 16	162.5	87 20.9	09 18	159.6	87 49.0	09 21	155.4	85 55.5	09 09	10.1	85 26.1	09 08	08.8	80 28.6	1.0 03	03.2	2
3	84 48.8	09 14	163.2	85 17.8	09 15	161.7	86 42.9	09 20	154.6	87 10.2	09 23	150.7	87 36.4	09 27	145.3	85 50.0	09 12	15.0	85 21.2	09 11	13.1	80 26.8	09 04	04.8	3
4	84 40.3	09 18	157.9	85 08.6	09 19	156.1	86 30.6	09 25	147.4	86 56.3	09 27	142.9	87 20.5	09 31	136.9	85 42.5	09 16	19.5	85 14.6	09 14	17.1	80 24.3	09 05	06.4	4
05	84 29.8	09 21	153.0	84 57.3	09 22	150.8	86 15.8	09 28	141.1	86 39.8	09 31	136.2	87 02.1	09 34	130.1	85 33.1	09 18	23.7	85 06.4	09 16	21.0	80 21.1	09 06	08.0	05
6	84 17.4	09 24	148.3	84 44.0	09 25	145.9	85 59.0	09 31	135.5	86 21.4	09 34	130.6	86 41.9	09 37	124.5	85 22.1	09 21	27.6	84 56.5	09 19	24.5	80 17.3	09 08	09.5	6
7	84 03.2	09 28	144.0	84 28.9	09 28	141.4	85 40.4	09 38	130.7	86 01.4	09 41	125.7	86 26.4	09 44	119.9	85 09.6	09 23	31.2	84 45.4	09 21	27.8	80 12.7	09 09	11.0	7
8	83 47.6	09 32	139.9	84 12.4	09 30	137.2	85 20.6	09 40	126.4	85 40.4	09 43	121.6	85 58.0	09 46	116.1	84 55.9	09 26	34.4	84 32.9	09 23	30.9	80 07.5	09 10	12.5	8
9	83 39.6	09 36	136.2	83 54.6	09 32	133.4	84 59.7	09 46	122.7	85 18.4	09 49	118.0	85 34.9	09 51	112.8	84 41.1	09 28	37.2	84 19.4	09 24	33.6	80 01.7	09 11	14.0	9
10	83 12.6	09 39	132.8	83 35.6	09 33	130.0	84 38.0	09 52	119.4	84 55.6	09 55	114.9	85 11.3	09 58	110.0	84 25.3	09 30	39.8	84 04.9	09 26	36.1	79 55.3	09 12	15.4	10
1	82 53.4	09 43	129.6	83 15.7	09 34	126.8	84 15.5	09 58	116.4	84 32.4	09 59	112.2	84 47.3	10 01	107.5	84 08.6	09 32	42.1	83 49.5	09 27	38.4	79 48.3	09 13	16.7	1
2	82 33.5	09 47	126.6	82 55.0	09 36	123.9	83 52.6	09 59	113.8	84 08.7	10 00	109.8	84 23.0	10 01	105.3	83 51.3	09 34	44.1	83 33.4	09 28	40.5	79 40.7	09 14	18.1	2
3	82 12.8	09 51	123.9	82 33.7	09 37	121.2	83 29.2	10 00	111.4	83 44.7	10 01	107.6	83 58.4	10 02	103.4	83 33.4	09 36	45.9	83 16.6	09 29	42.3	79 32.6	09 14	19.3	3
4	81 51.4	09 55	121.4	82 11.7	09 38	118.7	83 05.4	10 03	109.3	83 20.4	10 04	105.6	83 33.7	10 04	101.7	83 14.9	09 38	47.5	82 59.3	09 30	43.9	79 23.9	09 15	20.6	4
15	81 29.5	09 57	119.0	81 49.2	09 38	116.4	82 41.3	10 04	107.3	82 55.9	10 04	103.8	83 08.8	10 04	100.1	82 56.0	09 39	48.9	82 41.4	09 30	45.9	79 14.8	09 16	21.8	15
6	81 07.1	09 58	116.8	81 26.3	09 39	114.3	82 17.0	10 05	105.5	82 31.2	10 05	102.2	82 43.7	10 05	98.6	82 36.7	09 40	50.2	82 23.2	09 31	46.8	79 05.1	09 17	22.9	6
7	80 44.3	09 59	114.7	81 03.0	09 40	112.3	81 52.4	10 05	103.8	82 06.3	10 05	100.6	82 18.6	10 05	97.3	82 17.1	09 41	51.3	82 04.5	09 32	48.0	78 55.0	09 18	24.0	7
8	80 21.0	09 59	112.8	80 39.4	09 40	110.4	81 27.7	10 06	102.3	81 41.3	10 06	99.2	81 53.4	10 06	96.0	81 57.1	09 42	52.3	81 45.1	09 32	49.0	78 44.5	09 18	25.0	8
9	79 57.5	09 59	111.0	80 15.5	09 40	108.7	81 02.9	10 06	100.8	81 16.2	10 06	97.9	81 28.2	10 06	94.8	81 37.0	09 42	53.1	81 26.2	09 33	50.0	78 33.6	09 19	26.0	9
20	79 33.7	09 59	109.3	79 51.3	09 41	107.0	80 37.9	10 06	99.4	80 51.1	10 06	96.6	81 02.9	10 06	93.7	81 16.6	09 42	53.9	81 06.7	09 33	50.8	78 22.3	09 19	27.0	20
1	79 09.7	09 59	107.7	79 27.0	09 41	105.5	80 12.9	10 06	98.1	80 25.9	10 06	95.5	80 37.6	10 06	92.7	80 56.0	09 42	54.6	80 46.9	09 33	51.6	78 10.6	09 20	27.9	1
2	78 45.4	09 58	106.1	79 02.5	09 41	104.0	79 47.7	10 06	96.9	80 00.6	10 06	94.3	80 12.2	10 06	91.7	80 35.2	09 42	55.2	80 27.0	09 34	52.3	77 58.6	09 21	28.7	2
3	78 21.0	09 58	104.7	78 37.8	09 41	102.6	79 22.5	10 06	95.8	79 35.3	10 06	93.3	79 46.9	10 06	90.7	80 14.4	09 42	55.7	80 06.8	09 34	52.8	77 46.2	09 21	29.5	3
4	77 56.3	09 57	103.3	78 13.0	09 42	101.3	78 57.3	10 06	94.7	79 10.0	10 06	92.3	79 21.5	10 06	89.8	79 53.4	09 42	56.1	79 46.6	09 34	53.4	77 33.6	09 22	30.3	4
25	77 31.6	09 56	101.9	77 48.1	09 42	100.0	78 32.0	10 06	93.6	78 44.6	10 06	91.3	78 56.2	10 06	88.9	79 32.3	09 42	56.5	79 26.2	09 34	53.8	77 20.7	09 22	31.0	25
6	77 06.7	09 56	100.7	77 23.0	09 42	98.8	78 06.7	10 06	92.6	78 19.3	10 06	90.4	78 30.8	10 06	88.1	79 11.1	09 42	56.8	79 05.6	09 34	54.2	77 07.5	09 22	31.7	6
7	76 41.8	09 56	99.4	76 57.9	09 42	97.6	77 41.3	10 06	91.6	77 53.9	10 06	89.5	78 05.5	10 06	87.2	78 49.8	09 42	57.1	78 45.0	09 34	54.6	76 54.0	09 22	32.4	7
8	76 16.7	09 56	98.3	76 32.8	09 42	96.5	77 16.0	10 06	90.7	77 28.6	10 06	88.6	77 42.7	10 06	86.4	78 28.5	09 42	57.4	78 24.3	09 34	54.9	76 40.3	09 22	33.0	8
9	75 51.6	09 56	97.1	76 07.6	09 42	95.4	76 50.6	10 06	89.7	77 03.2	10 06	87.7	77 14.9	10 06	85.7	78 07.1	09 42	57.5	78 03.5	09 34	55.1	76 26.4	09 22	33.5	9
30	75 26.4	09 56	96.0	75 42.3	09 42	94.3	76 25.3	10 06	88.9	76 37.9	10 06	86.9	76 49.6	10 06	84.9	77 45.7	09 42	57.7	77 42.7	09 34	55.4	76 12.3	09 22	34.1	30
1	75 01.2	09 56	95.0	75 17.0	09 42	93.3	75 59.9	10 06	88.0	76 12.4	10 06	86.2	76 24.4	10 06	84.2	77 24.2	09 42	57.8	77 21.8	09 34	55.5	75 58.0	09 22	34.6	1
2	74 35.9	09 56	94.0	74 51.7	09 42	92.3	75 34.6	10 06	87.2	75 47.3	10 06	85.3	75 59.2	10 06	83.4	77 02.8	09 42	57.9	77 00.9	09 34	55.7	75 43.5	09 22	35.1	2
3	74 10.6	09 56	93.0	74 26.3	09 42	91.4	75 09.3	10 06	86.4	75 22.0	10 06	84.3	75 34.0	10 06	82.7	76 41.3	09 42	58.0	76 39.9	09 34	55.8	75 28.9	09 22	35.5	3
4	73 45.2	09 56	92.0	74 01.0	09 42	90.4	74 44.0	10 06	85.6	74 56.8	10 06	83.8	75 08.9	10 06	82.1	76 19.8	09 42	58.0	76 18.9	09 34	55.9	75 14.1	09 22	35.9	4
35	73 19.9	09 56	91.0	73 35.6	09 42	89.5	74 18.7	10 06	84.8	74 31.6	10 06	83.1	74 43.8	10 06	81.4	75 58.3	09 42	58.0	75 57.9	09 34	55.9	74 59.1	09 22	36.3	35
6	72 54.5	09 56	90.1	73 10.3	09 42	88.7	73 53.5	10 06	84.0	74 06.5	10 06	82.4	74 18.7	10 06	80.7	75 36.8	09 42	58.0	75 36.9	09 34	56.0	74 44.1	09 22	36.6	6
7	72 29.2	09 56	89.2	72 44.9	09 42	87.8	73 28.3	10 06	83.3	73 41.4	10 06	81.7	73 53.7	10 06	80.0	75 15.3	09 42	57.9	75 15.9	09 34	56.0	74 28.9	09 22	36.9	7
8	72 03.8	09 56	88.3	72 19.6	09 42	87.0	73 03.1	10 06	82.5	73 16.3	10 06	81.0	73 28.8	10 06	79.4	74 53.8	09 42	57.9	74 54.9	09 34	55.9	74 13.6	09 22	37.2	8
9	71 38.5	09 56	87.5	71 54.3	09 42	86.1	72 38.0	10 06	81.8	72 51.3	10 06	80.3	73 03.9	10 06	78.8	74 32.3	09 42	57.8	74 33.9	09 34	55.9	73 58.2	09 22	37.5	9
40	71 13.2	09 56	86																						

Main table with columns for H.A., Alt., Az., and declination values for various latitude ranges from 60° 00' to 90° 00'.

Lat. 65°

Lat. 66°

Lat. 67°

La 68

# STAR IDENTIFICATION TABLE

## ALTITUDE

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.																					
00	29	180	33	180	37	180	41	180	45	180	49	180	53	180	57	180	61	180	65	180	69	180	00
4	29	175	33	175	37	175	41	175	45	175	49	174	53	174	57	174	61	173	65	173	69	172	4
8	29	171	33	171	37	170	41	170	45	169	49	169	53	168	57	168	61	167	65	166	69	164	8
12	28	166	32	166	36	165	40	165	44	164	48	163	52	163	56	162	60	160	64	159	68	157	12
16	28	162	32	161	36	161	40	160	44	159	48	158	52	157	56	156	59	154	63	152	67	149	16
20	27	157	31	157	35	156	39	155	43	154	47	153	51	151	55	150	59	148	62	145	66	142	20
24	27	153	31	152	34	151	38	150	42	149	46	148	50	146	54	144	58	142	61	139	65	136	24
28	26	149	30	148	34	147	37	145	41	144	45	143	49	141	53	139	57	136	60	134	64	130	28
32	25	144	29	143	33	142	36	141	40	139	44	138	48	136	52	134	55	131	59	128	63	124	32
36	24	140	28	139	32	138	35	136	39	135	43	133	47	131	50	129	54	126	58	123	61	119	36
40	23	136	27	135	30	133	34	132	38	130	42	128	45	126	49	124	53	121	56	118	60	114	40
44	21	132	25	130	29	129	33	127	37	126	40	124	44	122	48	119	51	116	55	113	58	109	44
48	20	128	24	126	28	125	31	123	35	121	39	119	42	117	46	115	50	112	53	109	56	105	48
52	19	124	23	122	26	121	30	119	34	117	37	115	41	113	45	110	48	108	51	104	55	101	52
56	17	120	21	118	25	117	28	115	32	113	36	111	39	109	43	106	46	104	50	100	53	97	56
60	16	116	20	114	23	113	27	111	31	109	34	107	38	105	41	102	45	100	48	96	51	93	60
64	14	112	18	111	22	109	25	107	29	105	33	103	36	101	40	98	43	96	46	93	50	89	64
68	13	108	16	107	20	105	24	103	27	101	31	99	34	97	38	95	41	92	45	89	48	86	68
72	11	105	15	103	18	101	22	99	26	98	29	96	33	93	36	91	40	88	43	86	46	82	72
76	10	101	13	99	17	98	20	96	24	94	28	92	31	90	35	87	38	85	41	82	45	79	76
80	08	97	11	96	15	94	19	92	22	90	26	88	29	86	33	84	36	81	40	79	43	76	80
84	06	94	10	92	13	90	17	88	21	87	24	85	28	83	31	80	35	78	38	75	41	73	84
88	04	90	08	88	12	87	15	85	19	83	22	81	26	79	30	77	33	75	36	72	40	69	88
92	03	86	06	85	10	83	14	81	17	79	21	78	24	76	28	74	31	71	35	69	38	66	92
96	01	83	05	81	08	79	12	78	16	76	19	74	23	72	26	70	30	68	33	66	37	63	96
100	01	79	03	78	07	76	10	74	14	72	18	71	21	69	25	67	28	65	32	63	35	60	100
104	02	76	01	74	05	72	09	71	12	69	16	67	20	65	23	64	27	62	30	59	34	57	104
108	04	72	00	70	03	69	07	67	11	65	14	64	18	62	22	60	25	58	29	56	32	54	108
112	05	68	02	67	02	65	06	64	09	62	13	60	17	59	20	57	24	55	27	53	31	51	112
116	07	65	03	63	00	62	04	60	08	58	12	57	15	55	19	54	23	52	26	50	30	48	116
120	08	61	05	59	01	58	03	56	06	55	10	53	14	52	18	50	21	49	25	47	29	45	120
124	10	57	06	56	02	54	01	53	05	51	09	50	13	49	16	47	20	46	24	44	27	42	124
128	11	53	08	52	04	51	00	49	04	48	08	47	11	45	15	44	19	42	23	41	26	39	128
132	13	49	09	48	05	47	01	46	03	44	06	43	10	42	14	40	18	39	21	38	25	36	132
136	14	46	10	44	06	43	02	42	01	41	05	40	09	38	13	37	17	36	20	35	24	33	136
140	15	42	11	40	07	39	04	38	00	37	04	36	08	35	12	34	16	33	20	32	23	30	140
144	16	38	12	37	08	36	05	35	01	34	03	33	07	32	11	31	15	29	19	28	23	27	144
148	17	34	13	33	09	32	05	31	02	30	02	29	06	28	10	27	14	26	18	25	22	24	148
152	18	30	14	29	10	28	06	27	02	26	02	25	06	25	09	24	13	23	17	22	21	21	152
156	19	25	15	25	11	24	07	23	03	23	01	22	05	21	09	20	13	20	17	19	21	18	156
160	19	21	15	21	12	20	08	19	04	19	00	18	04	18	08	17	12	16	16	16	20	15	160
164	20	17	16	16	12	16	08	16	04	15	00	15	04	14	08	14	12	13	16	13	20	12	164
168	20	13	16	12	12	12	08	12	05	11	01	11	03	11	07	10	11	10	15	10	19	09	168
172	21	09	17	08	13	08	09	08	05	08	01	07	03	07	07	07	11	07	15	06	19	06	172
176	21	04	17	04	13	04	09	04	05	04	01	04	03	04	07	03	11	03	15	03	19	03	176
180	21	00	17	00	13	00	09	00	05	00	01	00	03	00	07	00	11	00	15	00	19	00	180

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

# STAR IDENTIFICATION TABLE

## ALTITUDE

157

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.	Lat. 65°
	Dec.	H.A.																						
00	73	180	77	180	81	180	85	180	89	180	87	00	83	00	79	00	75	00	71	00	67	00	00	
4	73	171	77	169	81	166	85	158	88	118	87	26	83	10	79	05	75	03	71	01	67	00	4	
8	72	162	76	159	80	153	84	140	86	103	86	43	82	19	79	10	75	05	71	03	67	01	8	
12	72	154	76	149	79	141	83	127	85	95	84	53	82	27	78	14	75	08	71	04	67	01	12	
16	71	146	75	140	78	132	81	117	83	91	83	58	81	33	78	18	74	10	71	05	67	01	16	
20	70	138	73	132	77	123	80	109	81	88	82	60	80	37	77	22	74	12	71	06	67	02	20	
24	69	131	72	125	75	116	78	103	80	85	80	62	79	41	77	25	74	15	70	07	67	02	24	
28	67	125	71	119	74	110	76	98	78	82	79	62	78	43	76	28	73	16	70	08	67	02	28	
32	66	119	69	113	72	105	75	94	76	80	77	62	77	45	75	30	73	18	70	09	67	03	32	
36	64	114	68	108	70	100	73	90	75	77	76	62	75	46	74	31	72	19	70	10	67	03	36	
40	63	109	66	103	69	96	71	87	73	75	74	61	74	47	73	33	72	21	69	11	67	03	40	
44	61	105	64	99	67	92	70	83	71	73	73	60	73	47	72	34	71	22	69	12	66	03	44	
48	60	100	63	95	65	88	68	80	70	71	71	59	72	47	71	34	70	23	69	12	66	04	48	
52	58	96	61	91	64	85	66	78	68	69	70	58	70	47	70	35	70	23	68	13	66	04	52	
56	56	93	59	88	62	82	65	75	67	67	68	57	69	46	69	35	69	24	68	13	66	04	56	
60	55	89	58	84	60	79	63	72	65	64	67	56	68	46	69	35	68	24	67	14	66	04	60	
64	53	85	56	81	59	76	61	70	64	62	65	54	67	45	68	35	68	24	67	14	66	04	64	
68	51	82	54	78	57	73	60	67	62	60	64	53	66	44	67	34	67	24	67	14	66	05	68	
72	50	79	53	75	56	70	58	65	61	58	63	51	64	43	66	34	66	24	66	14	66	05	72	
76	48	76	51	72	54	67	57	62	59	56	61	50	63	42	65	33	66	24	66	14	65	05	76	
80	46	72	49	69	52	65	55	60	58	54	60	48	62	41	64	33	65	24	65	14	65	05	80	
84	45	69	48	66	51	62	54	57	57	52	59	46	61	40	63	32	64	23	65	14	65	05	84	
88	43	66	46	63	49	59	52	55	55	50	58	45	60	38	62	31	64	23	65	14	65	05	88	
92	42	63	45	60	48	57	51	53	54	48	57	43	59	37	61	30	63	22	64	14	65	05	92	
96	40	60	43	57	47	54	50	50	53	46	55	41	58	35	60	29	62	22	64	14	65	05	96	
100	39	58	42	55	45	51	48	48	51	44	54	39	57	34	59	28	62	21	63	13	65	05	100	
104	37	55	41	52	44	49	47	46	50	42	53	37	56	33	59	27	61	20	63	13	64	05	104	
108	36	52	39	49	43	46	46	43	49	40	52	36	55	31	58	26	60	20	63	12	64	04	108	
112	35	49	38	46	42	44	45	41	48	38	51	34	54	29	57	24	60	19	62	12	64	04	112	
116	33	46	37	44	40	41	44	39	47	35	50	32	54	28	57	23	59	18	62	11	64	04	116	
120	32	43	36	41	39	39	43	36	46	33	50	30	53	26	56	22	59	17	62	11	64	04	120	
124	31	40	35	38	38	36	42	34	45	31	49	28	52	25	55	21	58	16	61	10	64	04	124	
128	30	37	34	36	37	34	41	31	44	29	48	26	51	23	55	19	58	15	61	10	64	04	128	
132	29	35	33	33	36	31	40	29	44	27	47	24	51	21	54	18	58	14	61	09	64	03	132	
136	28	32	32	30	36	29	39	27	43	25	47	22	50	20	54	16	57	13	60	08	64	03	136	
140	27	29	31	27	35	26	39	24	42	22	46	20	50	18	53	15	57	12	60	08	63	03	140	
144	26	26	30	25	34	23	38	22	42	20	45	18	49	16	53	14	56	11	60	07	63	03	144	
148	26	23	30	22	33	21	37	19	41	18	45	16	49	14	52	12	56	10	60	06	63	02	148	
152	25	20	29	19	33	18	37	17	41	16	44	14	48	13	52	11	56	08	60	06	63	02	152	
156	25	17	28	17	32	16	36	15	40	13	44	12	48	11	52	09	56	07	59	05	63	02	156	
160	24	15	28	14	32	13	36	12	40	11	44	10	48	09	52	08	55	06	59	04	63	02	160	
164	24	12	28	11	32	10	36	10	40	09	43	08	47	07	51	06	55	05	59	03	63	01	164	
168	23	09	27	08	31	08	35	07	39	07	43	06	47	05	51	05	55	04	59	02	63	01	168	
172	23	06	27	06	31	05	35	05	39	05	43	04	47	04	51	03	55	02	59	02	63	01	172	
176	23	03	27	03	31	03	35	02	39	02	43	02	47	02	51	02	55	01	59	01	63	00	176	
180	23	00	27	00	31	00	35	00	39	00	43	00	47	00	51	00	55	00	59	00	63	00	180	
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°			

Lat.  
65°

Lat.  
66°

Lat.  
67°

Lat.  
68°

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

Lat. 66°

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.																															
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.																																
00	24 00.0	1.000	180.0	24 30.0	1.000	180.0	25 00.0	1.000	180.0	25 30.0	1.000	180.0	26 00.0	1.000	180.0	26 30.0	1.000	180.0	27 00.0	1.000	180.0	27 30.0	1.000	180.0	28 00.0	1.000	180.0	28 30.0	1.000	180.0	29 00.0	1.000	180.0	29 30.0	1.000	180.0	30 00.0	1.000	180.0	30 30.0	1.000	180.0						
1	23 59.8	1.001	178.9	24 29.8	1.001	178.9	24 59.8	1.001	178.9	25 29.8	1.001	178.9	25 59.8	1.001	178.9	26 29.8	1.001	178.9	26 59.8	1.001	178.9	27 29.8	1.001	178.9	27 59.8	1.001	178.9	28 29.8	1.001	178.9	28 59.8	1.001	178.9	29 29.8	1.001	178.9	29 59.8	1.001	178.9	30 29.8	1.001	178.9	30 59.8	1.001	178.9			
2	23 59.1	1.002	177.8	24 29.1	1.002	177.8	24 59.1	1.002	177.8	25 29.1	1.002	177.8	25 59.1	1.002	177.8	26 29.1	1.002	177.8	26 59.1	1.002	177.8	27 29.1	1.002	177.8	27 59.1	1.002	177.8	28 29.1	1.002	177.8	28 59.1	1.002	177.8	29 29.1	1.002	177.8	29 59.1	1.002	177.8	30 29.1	1.002	177.8	30 59.1	1.002	177.8			
3	23 57.9	1.003	176.7	24 27.9	1.003	176.7	24 57.9	1.003	176.7	25 27.9	1.003	176.7	25 57.9	1.003	176.7	26 27.9	1.003	176.7	26 57.9	1.003	176.7	27 27.9	1.003	176.7	27 57.9	1.003	176.7	28 27.9	1.003	176.7	28 57.9	1.003	176.7	29 27.9	1.003	176.7	29 57.9	1.003	176.7	30 27.9	1.003	176.7	30 57.9	1.003	176.7			
4	23 56.3	1.003	175.6	24 26.3	1.004	175.6	24 56.2	1.004	175.6	25 26.2	1.004	175.6	25 56.2	1.004	175.6	26 26.2	1.004	175.6	26 56.2	1.004	175.6	27 26.2	1.004	175.6	27 56.2	1.004	175.6	28 26.2	1.004	175.6	28 56.2	1.004	175.6	29 26.2	1.004	175.6	29 56.2	1.004	175.6	30 26.2	1.004	175.6	30 56.2	1.004	175.6			
05	23 54.2	1.004	174.5	24 24.2	1.004	174.5	24 54.1	1.004	174.5	25 24.1	1.004	174.5	25 54.1	1.004	174.5	26 24.1	1.004	174.5	26 54.1	1.004	174.5	27 24.1	1.004	174.5	27 54.1	1.004	174.5	28 24.1	1.004	174.5	28 54.1	1.004	174.5	29 24.1	1.004	174.5	29 54.1	1.004	174.5	30 24.1	1.004	174.5	30 54.1	1.004	174.5			
6	23 51.6	1.006	173.4	24 21.6	1.006	173.4	24 51.5	1.006	173.4	25 21.5	1.006	173.4	25 51.5	1.006	173.4	26 21.5	1.006	173.4	26 51.5	1.006	173.4	27 21.5	1.006	173.4	27 51.5	1.006	173.4	28 21.5	1.006	173.4	28 51.5	1.006	173.4	29 21.5	1.006	173.4	29 51.5	1.006	173.4	30 21.5	1.006	173.4	30 51.5	1.006	173.4			
7	23 48.6	1.006	172.3	24 18.6	1.006	172.3	24 48.5	1.006	172.3	25 18.5	1.006	172.3	25 48.4	1.006	172.3	26 18.4	1.006	172.3	26 48.3	1.006	172.3	27 18.3	1.006	172.3	27 48.2	1.006	172.3	28 18.2	1.006	172.3	28 48.1	1.006	172.3	29 18.1	1.006	172.3	29 48.0	1.006	172.3	30 18.0	1.006	172.3	30 48.0	1.006	172.3			
8	23 45.1	1.007	171.2	24 15.1	1.007	171.2	24 45.0	1.007	171.2	25 14.9	1.007	171.2	25 44.9	1.007	171.2	26 14.8	1.007	171.2	26 44.7	1.007	171.2	27 14.7	1.007	171.2	27 44.6	1.007	171.2	28 14.6	1.007	171.2	28 44.5	1.007	171.2	29 14.5	1.007	171.2	29 44.4	1.007	171.2	30 14.4	1.007	171.2	30 44.4	1.007	171.2			
9	23 41.2	1.007	170.2	24 11.1	1.007	170.2	24 41.0	1.007	170.2	25 11.0	1.007	170.2	25 40.9	1.007	170.2	26 10.8	1.007	170.2	26 40.7	1.007	170.2	27 10.7	1.007	170.2	27 40.6	1.007	170.2	28 10.6	1.007	170.2	28 40.5	1.007	170.2	29 10.5	1.007	170.2	29 40.4	1.007	170.2	30 10.4	1.007	170.2	30 40.4	1.007	170.2			
10	23 36.8	1.008	169.1	24 06.7	1.008	169.0	24 36.6	1.008	169.0	25 06.5	1.008	169.0	25 36.4	1.008	169.0	26 06.3	1.008	169.0	26 36.2	1.008	169.0	27 06.1	1.008	169.0	27 36.0	1.008	169.0	28 06.0	1.008	169.0	28 35.9	1.008	169.0	29 05.9	1.008	169.0	29 35.8	1.008	169.0	30 05.8	1.008	169.0	30 35.7	1.008	169.0			
1	23 31.9	1.009	168.0	24 01.8	1.009	167.9	24 31.7	1.009	167.9	25 01.6	1.009	167.9	25 31.5	1.009	167.9	26 01.4	1.009	167.9	26 31.3	1.009	167.9	27 01.2	1.009	167.9	27 31.1	1.009	167.9	28 01.1	1.009	167.9	28 31.0	1.009	167.9	29 01.0	1.009	167.9	29 30.9	1.009	167.9	30 00.9	1.009	167.9	30 30.8	1.009	167.9			
2	23 26.6	1.010	166.9	23 56.5	1.010	166.8	24 26.4	1.010	166.8	25 06.2	1.010	166.8	25 26.1	1.010	166.8	26 06.0	1.010	166.8	26 25.9	1.010	166.8	27 05.8	1.010	166.8	27 25.7	1.010	166.8	28 05.7	1.010	166.8	28 25.6	1.010	166.8	29 05.6	1.010	166.8	29 25.5	1.010	166.8	30 05.5	1.010	166.8	30 25.4	1.010	166.8			
3	23 20.9	1.010	165.8	23 50.7	1.010	165.8	24 20.6	1.010	165.7	25 00.4	1.010	165.7	25 20.3	1.010	165.7	26 00.2	1.010	165.7	26 20.0	1.010	165.7	27 00.0	1.010	165.7	27 19.8	1.010	165.7	28 00.0	1.010	165.7	28 19.8	1.010	165.7	29 00.0	1.010	165.7	29 19.8	1.010	165.7	30 00.0	1.010	165.7	30 19.8	1.010	165.7			
4	23 14.7	1.011	164.7	23 44.5	1.011	164.7	24 14.3	1.011	164.6	24 44.1	1.011	164.6	25 14.0	1.011	164.6	25 43.8	1.011	164.6	26 13.6	1.011	164.6	26 43.4	1.011	164.6	27 13.2	1.011	164.6	27 42.9	1.011	164.6	28 12.7	1.011	164.6	28 42.4	1.011	164.6	29 12.0	1.011	164.6	29 41.5	1.011	164.6	30 11.0	1.011	164.6	30 40.5	1.011	164.6
15	23 08.0	1.012	163.7	23 37.8	1.012	163.6	24 07.6	1.012	163.5	24 37.2	1.012	163.5	25 07.0	1.012	163.5	25 37.0	1.012	163.5	26 06.8	1.012	163.5	26 36.6	1.012	163.5	27 06.3	1.012	163.5	27 36.0	1.012	163.5	28 05.7	1.012	163.5	28 35.3	1.012	163.5	29 05.0	1.012	163.5	29 34.6	1.012	163.5	30 04.0	1.012	163.5	30 33.4	1.012	163.5
6	23 00.9	1.013	162.6	23 30.7	1.013	162.5	24 00.5	1.013	162.4	24 30.3	1.013	162.4	25 00.0	1.013	162.4	25 29.8	1.013	162.4	26 00.0	1.013	162.4	26 29.3	1.013	162.4	27 00.0	1.013	162.4	27 29.3	1.013	162.4	28 00.0	1.013	162.4	28 29.3	1.013	162.4	29 00.0	1.013	162.4	29 29.3	1.013	162.4	30 00.0	1.013	162.4	30 29.3	1.013	162.4
7	22 53.4	1.013	161.5	23 23.2	1.013	161.4	23 52.9	1.013	161.4	24 22.6	1.013	161.4	24 52.4	1.013	161.4	25 22.1	1.013	161.4	26 00.0	1.013	161.4	26 29.3	1.013	161.4	27 00.0	1.013	161.4	27 29.3	1.013	161.4	28 00.0	1.013	161.4	28 29.3	1.013	161.4	29 00.0	1.013	161.4	29 29.3	1.013	161.4	30 00.0	1.013	161.4	30 29.3	1.013	161.4
8	22 45.4	1.014	160.4	23 15.2	1.014	160.3	23 44.9	1.014	160.3	24 14.6	1.014	160.3	24 44.3	1.014	160.3	25 14.0	1.014	160.3	26 00.0	1.014	160.3	26 29.3	1.014	160.3	27 00.0	1.014	160.3	27 29.3	1.014	160.3	28 00.0	1.014	160.3	28 29.3	1.014	160.3	29 00.0	1.014	160.3	29 29.3	1.014	160.3	30 00.0	1.014	160.3	30 29.3	1.014	160.3
9	22 37.0	1.015	159.3	23 06.7	1.015	159.3	23 36.4	1.015	159.2	24 06.1	1.015	159.2	24 35.8	1.015	159.2	25 05.5	1.015	159.2	26 00.0	1.015	159.2	26 29.3	1.015	159.2	27 00.0	1.015	159.2	27 29.3	1.015	159.2	28 00.0	1.015	159.2	28 29.3	1.015	159.2	29 00.0	1.015	159.2	29 29.3	1.015	159.2	30 00.0	1.015	159.2	30 29.3	1.015	159.2
20	22 28.2	1.016	158.3	22 57.9	1.016	158.2	23 27.5	1.016	158.1	23 57.2	1.016	158.1	24 26.8	1.016	158.1	25 00.0	1.016	158.1	26 00.0	1.016	158.1	26 29.3	1.016	158.1	27 00.0	1.016	158.1	27 29.3	1.016	158.1	28 00.0	1.016	158.1	28 29.3	1.016	158.1	29 00.0	1.016	158.1	29 29.3	1.016	158.1	30 00.0	1.016	158.1	30 29.3	1.016	158.1
1	22 19.0	1.016	157.2	22 48.6	1.016	157.1	23 18.2	1.016	157.0	23 47.8	1.016	157.0	24 17.5	1.016	157.0	25 00.0	1.016	157.0	26 00.0	1.016	157.0	26 29.3	1.016	157.0	27 00.0	1.016	157.0	27 29.3	1.016	157.0	28 00.0	1.016	157.0	28 29.3	1.016	157.												

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.	Lat.
	Alt.	Ad At																
00	24 00.0	1.00 180.0	23 30.0	1.00 180.0	23 00.0	1.00 180.0	22 30.0	1.00 180.0	22 00.0	1.00 180.0	21 30.0	1.00 180.0	21 00.0	1.00 180.0	20 30.0	1.00 180.0	00	66°
1	23 59.8	1.001 178.9	23 29.8	1.001 178.9	22 59.8	1.001 178.9	22 29.8	1.001 178.9	21 59.8	1.001 178.9	21 29.8	1.001 178.9	20 59.8	1.001 178.9	20 29.8	1.001 178.9	1	
2	23 59.1	1.002 177.8	23 29.1	1.002 177.8	22 59.1	1.002 177.8	22 29.1	1.002 177.8	21 59.1	1.002 177.8	21 29.1	1.002 177.8	20 59.1	1.002 177.8	20 29.1	1.002 177.8	2	
3	23 57.9	1.003 176.7	23 27.9	1.003 176.7	22 57.9	1.003 176.7	22 27.9	1.003 176.7	21 57.9	1.003 176.7	21 27.9	1.003 176.7	20 57.9	1.003 176.7	20 27.9	1.003 176.7	3	
4	23 56.3	1.003 175.6	23 26.3	1.003 175.6	22 56.3	1.003 175.7	22 26.3	1.003 175.7	21 56.3	1.003 175.7	21 26.3	1.003 175.7	20 56.3	1.003 175.7	20 26.3	1.003 175.7	4	
05	23 54.2	1.004 174.5	23 24.2	1.004 174.6	22 54.2	1.004 174.6	22 24.2	1.004 174.6	21 54.3	1.004 174.6	21 24.3	1.004 174.6	20 54.3	1.004 174.7	20 24.3	1.004 174.7	05	
6	23 51.6	1.005 173.4	23 21.7	1.005 173.5	22 51.7	1.005 173.5	22 21.7	1.005 173.5	21 51.7	1.005 173.5	21 21.8	1.005 173.6	20 51.8	1.005 173.6	20 21.8	1.005 173.6	6	
7	23 48.6	1.006 172.3	23 18.6	1.006 172.4	22 48.7	1.006 172.4	22 18.7	1.006 172.4	21 48.8	1.006 172.5	21 18.8	1.006 172.5	20 48.9	1.006 172.5	20 18.9	1.006 172.5	7	
8	23 45.1	1.007 171.3	23 15.2	1.007 171.3	22 45.2	1.007 171.3	22 15.3	1.007 171.4	21 45.3	1.007 171.4	21 15.4	1.007 171.4	20 45.5	1.007 171.5	20 15.5	1.007 171.5	8	
9	23 41.2	1.007 170.2	23 11.3	1.007 170.2	22 41.3	1.007 170.2	22 11.4	1.007 170.3	21 41.5	1.007 170.3	21 11.5	1.007 170.4	20 41.6	1.007 170.4	20 11.7	1.007 170.4	9	
10	23 36.8	1.008 169.1	23 06.9	1.008 169.1	22 37.0	1.008 169.2	22 07.0	1.008 169.2	21 37.1	1.008 169.2	21 07.2	1.008 169.3	20 37.3	1.008 169.3	20 07.4	1.008 169.4	10	
1	23 31.9	1.009 168.0	23 02.0	1.009 168.0	22 32.1	1.009 168.1	22 02.2	1.009 168.1	21 32.4	1.009 168.2	21 02.5	1.009 168.3	20 32.6	1.009 168.3	20 02.7	1.009 168.4	1	
2	23 26.6	1.010 166.9	22 56.8	1.010 167.0	22 26.9	1.010 167.0	21 57.0	1.010 167.1	21 27.1	1.010 167.1	20 57.3	1.010 167.1	20 27.4	1.010 167.2	19 57.5	1.010 167.2	2	
3	23 20.9	1.010 165.8	22 51.0	1.010 165.9	22 21.2	1.010 165.9	21 51.3	1.010 166.0	21 21.5	1.010 166.0	20 51.6	1.010 166.1	20 21.7	1.010 166.1	19 51.9	1.010 166.2	3	
4	23 14.7	99 11 164.7	22 44.8	99 11 164.8	22 15.0	99 11 164.9	21 45.2	99 11 164.9	21 15.3	99 11 165.0	20 45.5	99 11 165.0	20 15.7	99 11 165.1	19 45.8	99 11 165.1	4	
15	23 08.0	99 12 163.7	22 38.2	99 12 163.7	22 08.4	99 12 163.8	21 38.6	99 12 163.8	21 08.8	99 12 163.9	20 39.0	99 12 164.0	20 09.2	99 12 164.0	19 39.4	99 12 164.1	15	
6	23 00.9	99 13 162.6	22 31.2	99 13 162.6	22 01.4	99 13 162.7	21 31.6	99 13 162.8	21 01.8	99 13 162.8	20 32.0	99 13 162.9	20 02.2	99 13 163.0	19 32.5	99 13 163.0	6	
7	22 53.4	99 13 161.5	22 23.7	99 13 161.6	21 53.9	99 13 161.6	21 24.1	99 13 161.7	20 54.4	99 13 161.8	20 24.6	99 13 161.8	19 54.9	99 13 161.9	19 25.1	99 13 162.0	7	
8	22 45.4	99 14 160.4	22 15.7	99 14 160.5	21 46.0	99 14 160.6	21 16.3	99 14 160.6	20 46.5	99 14 160.7	20 16.8	99 14 160.8	19 47.1	99 14 160.9	19 17.4	99 14 160.9	8	
9	22 37.0	99 15 159.3	22 07.4	99 15 159.4	21 37.7	99 15 159.5	21 08.0	99 15 159.6	20 38.3	99 15 159.7	20 08.6	99 15 159.7	19 38.9	99 15 159.8	19 09.2	99 15 159.9	9	
20	22 28.2	99 15 158.3	21 58.6	99 15 158.4	21 28.9	99 15 158.4	20 59.2	99 15 158.5	20 29.6	99 15 158.6	19 59.9	99 15 158.6	19 30.2	99 15 158.8	19 00.6	99 15 158.8	20	
1	22 19.0	99 16 157.2	21 49.4	99 16 157.3	21 19.7	99 16 157.4	20 50.1	99 16 157.5	20 20.5	99 16 157.5	19 50.8	99 16 157.6	19 21.2	99 16 157.7	18 51.5	99 16 157.8	1	
2	22 09.3	99 17 156.1	21 39.7	99 17 156.2	21 10.1	99 17 156.3	20 40.5	99 17 156.4	20 10.9	99 17 156.5	19 41.3	99 17 156.6	19 11.7	99 17 156.7	18 42.1	99 17 156.7	2	
3	21 59.2	99 18 155.1	21 29.9	99 17 155.2	21 00.1	99 17 155.3	20 30.6	99 17 155.4	20 01.0	99 17 155.5	19 31.4	99 17 155.6	19 01.9	99 17 155.6	18 32.3	99 17 155.7	3	
4	21 48.8	98 18 154.0	21 19.2	98 18 154.1	20 49.7	98 18 154.2	20 20.2	98 18 154.3	19 50.7	98 18 154.4	19 21.1	98 18 154.5	18 51.6	98 18 154.6	18 22.0	98 18 154.7	4	
25	21 37.9	98 19 153.0	21 08.4	98 19 153.1	20 38.9	98 19 153.2	20 09.4	98 19 153.3	19 39.9	98 19 153.4	19 10.4	98 19 153.4	18 40.9	98 19 153.5	18 11.4	98 19 153.6	25	
6	21 26.6	98 19 151.9	20 57.1	98 19 152.0	20 27.7	98 19 152.1	19 58.2	98 19 152.2	19 28.8	98 19 152.3	18 59.3	98 19 152.4	18 29.8	98 19 152.5	18 00.4	98 19 152.6	6	
7	21 14.9	98 20 150.8	20 45.5	98 20 151.0	20 16.1	98 20 151.1	19 46.6	98 20 151.2	19 17.2	98 20 151.3	18 47.8	98 20 151.4	18 18.4	98 20 151.5	17 49.0	98 20 151.6	7	
8	21 02.8	98 21 149.8	20 33.4	98 21 149.9	20 04.1	98 21 150.0	19 34.7	98 21 150.1	19 05.3	98 20 150.2	18 35.9	98 20 150.3	18 06.5	98 20 150.4	17 37.1	98 20 150.6	8	
9	20 50.3	98 21 148.8	20 21.0	98 21 148.9	19 51.7	98 21 149.0	19 22.3	98 21 149.1	18 53.0	98 21 149.2	18 23.7	98 21 149.3	17 54.3	98 21 149.4	17 25.0	98 21 149.5	9	
30	20 37.5	98 22 147.7	20 08.2	98 22 147.8	19 38.9	98 22 147.9	19 09.6	98 22 148.1	18 40.3	98 22 148.2	18 11.0	98 22 148.3	17 41.7	98 22 148.4	17 12.4	98 22 148.5	30	
1	20 24.3	97 23 146.7	19 55.0	97 23 146.8	19 25.8	97 23 146.9	18 56.5	97 23 147.0	18 27.3	97 23 147.1	17 58.0	97 23 147.3	17 28.7	97 23 147.4	16 59.5	97 23 147.5	1	
2	20 10.7	97 24 145.6	19 41.5	97 24 145.7	19 12.3	97 24 145.9	18 43.0	97 24 146.0	18 13.8	97 24 146.1	17 44.6	97 24 146.2	17 15.4	97 24 146.3	16 46.2	97 24 146.5	2	
3	19 56.7	97 24 144.6	19 27.5	97 24 144.7	18 58.4	97 24 144.8	18 29.2	97 24 145.0	18 00.0	97 24 145.1	17 30.9	97 24 145.2	17 01.9	97 24 145.3	16 32.5	97 24 145.5	3	
4	19 42.4	97 24 143.6	19 13.3	97 24 143.7	18 44.1	97 24 143.8	18 15.0	97 24 143.9	17 45.9	97 24 144.1	17 16.8	97 24 144.2	16 47.6	97 24 144.3	16 18.5	97 24 144.4	4	
35	19 27.7	97 25 142.5	18 58.6	97 25 142.7	18 29.6	97 25 142.8	18 00.5	97 25 142.9	17 31.4	97 25 143.0	17 02.3	97 25 143.2	16 33.2	97 25 143.3	16 04.1	97 25 143.4	35	
6	19 12.7	97 26 141.5	18 43.7	97 26 141.6	18 14.6	97 26 141.8	17 45.6	97 26 141.9	17 16.6	97 26 142.0	16 47.5	97 26 142.2	16 18.5	97 26 142.3	15 49.4	97 26 142.4	6	
7	18 57.3	97 26 140.5	18 28.4	97 26 140.6	17 59.4	97 26 140.8	17 30.4	97 26 140.9	17 01.4	97 26 141.0	16 32.4	97 26 141.2	16 03.4	97 26 141.3	15 34.4	97 26 141.4	7	
8	18 41.6	97 27 139.5	18 12.7	97 27 139.6	17 43.8	97 27 139.7	17 14.8	97 27 139.9	16 45.9	97 27 140.0	16 16.9	97 27 140.2	15 47.9	97 27 140.3	15 19.0	97 27 140.4	8	
9	18 25.6	97 27 138.4	17 56.7	97 27 138.6	17 27.8	97 27 138.7	16 58.9	97 27 138.9	16 30.0	97 27 139.0	16 01.1	97 27 139.3	15 32.2	97 27 139.3	15 03.3	97 27 139.4	9	
40	18 09.3	97 28 137.4	17 40.4	97 28 137.6	17 11.6	97 28 137.7	16 42.7	97 28 137.9	16 13.8	97 28 138.0	15 45.0	97 28 138.1	15 16.1	97 28 138.3	14 47.2	97 28 138.4	40	
1	17 52.6	97 28 136.4	17 23.8	97 28 136.6	16 55.0	97 28 136.7	16 26.2	97 28 136.9	15 57.4	97 28 137.0	15 28.5	97 28 137.1	14 59.7	97 28 137.3	14 30.9	97 28 137.4	1	
2	17 35.6	97 29 135.4	17 06.9	97 29 135.6	16 38.1	97 29 135.7	16 09.3	97 29 135.9	15 40.6	97 29 136.0	15 11.8	97 29 136.2	14 43.0	97 29 136.3	14 14.2	97 29 136.4	2	
3	17 18.3	97 29 134.4	16 49.6	97 29 134.6	16 20.9	97 29 134.7	15 52.2	97 29 134.9	15 23.5	97 29 135.0	14 54.7	97 29 135.2	14 26.0	97 29 135.3	13 57.2	97 29 135.5	3	
4	17 00.8	97 30 133.4	16 32.1	97 30 133.6	16 03.4	97 30 133.7	15 34.7	97 30 133.9	15 06.1	97 30 134.0	14 37.4	97 30 134.2	14 08.7	97 30 134.3	13 40.0	97 30 134.5	4	

DECLINATION SAME NAME AS LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Az.															
00	24 00.0	1.00 180.0	24 30.0	1.00 180.0	25 00.0	1.00 180.0	25 30.0	1.00 180.0	26 00.0	1.00 180.0	26 30.0	1.00 180.0	27 00.0	1.00 180.0	27 30.0	1.00 180.0	00
1	23 59.8	1.00 178.9	24 29.8	1.00 178.9	24 59.8	1.00 178.9	25 29.8	1.00 178.9	25 59.8	1.00 178.9	26 29.8	1.00 178.9	26 59.8	1.00 178.9	27 29.8	1.00 178.9	1
2	23 59.1	1.00 177.8	24 29.1	1.00 177.8	24 59.1	1.00 177.8	25 29.1	1.00 177.8	25 59.1	1.00 177.8	26 29.1	1.00 177.8	26 59.0	1.00 177.8	27 29.0	1.00 177.8	2
3	23 57.9	1.00 176.7	24 27.9	1.00 176.7	24 57.9	1.00 176.7	25 27.9	1.00 176.7	25 57.9	1.00 176.7	26 27.9	1.00 176.7	26 57.9	1.00 176.7	27 27.9	1.00 176.7	3
4	23 56.3	1.00 175.6	24 26.3	1.00 175.6	24 56.2	1.00 175.6	25 26.2	1.00 175.6	25 56.2	1.00 175.6	26 26.2	1.00 175.6	26 56.2	1.00 175.6	27 26.2	1.00 175.6	4
05	23 54.2	1.00 174.5	24 24.2	1.00 174.5	24 54.1	1.00 174.5	25 24.1	1.00 174.5	25 54.1	1.00 174.5	26 24.1	1.00 174.5	26 54.0	1.00 174.5	27 24.0	1.00 174.5	05
6	23 51.6	1.00 173.4	24 21.6	1.00 173.4	24 51.6	1.00 173.4	25 21.5	1.00 173.4	25 51.5	1.00 173.4	26 21.5	1.00 173.4	26 51.4	1.00 173.4	27 21.4	1.00 173.4	6
7	23 48.6	1.00 172.3	24 18.6	1.00 172.3	24 48.5	1.00 172.3	25 18.5	1.00 172.3	25 48.4	1.00 172.3	26 18.4	1.00 172.3	26 48.3	1.00 172.3	27 18.3	1.00 172.3	7
8	23 45.1	1.00 171.2	24 15.1	1.00 171.2	24 45.0	1.00 171.2	25 15.0	1.00 171.2	25 44.9	1.00 171.2	26 14.8	1.00 171.2	26 44.7	1.00 171.2	27 14.7	1.00 171.2	8
9	23 41.2	1.00 170.2	24 11.1	1.00 170.2	24 41.0	1.00 170.2	25 11.0	1.00 170.2	25 40.9	1.00 170.2	26 10.8	1.00 170.2	26 40.7	1.00 169.9	27 10.7	1.00 169.9	9
10	23 36.8	1.00 169.1	24 06.7	1.00 169.0	24 36.6	1.00 168.9	25 06.5	1.00 168.9	25 36.4	1.00 168.9	26 06.3	1.00 168.9	26 36.2	1.00 168.8	27 06.1	1.00 168.8	10
1	23 31.9	1.00 168.0	24 01.8	1.00 167.9	24 31.7	1.00 167.9	25 01.6	1.00 167.8	25 31.5	1.00 167.8	26 01.4	1.00 167.8	26 31.3	1.00 167.7	27 01.2	1.00 167.7	1
2	23 26.8	1.00 166.9	23 56.7	1.00 166.8	24 26.6	1.00 166.8	24 56.5	1.00 166.7	25 26.4	1.00 166.7	25 56.3	1.00 166.6	26 26.2	1.00 166.6	26 56.1	1.00 166.5	2
3	23 20.9	1.00 165.8	23 50.9	1.00 165.8	24 20.8	1.00 165.7	24 50.7	1.00 165.6	25 20.6	1.00 165.6	25 50.5	1.00 165.5	26 20.4	1.00 165.5	26 50.3	1.00 165.4	3
4	23 14.7	09 11 164.7	23 44.5	09 11 164.7	24 14.3	09 11 164.6	24 44.1	09 11 164.6	25 14.0	09 11 164.5	25 43.8	09 11 164.4	26 13.6	09 11 164.4	26 43.4	09 11 164.3	4
15	23 08.0	09 12 163.7	23 37.8	09 12 163.6	24 07.6	09 12 163.5	24 37.4	09 12 163.5	25 07.2	09 12 163.4	25 37.0	09 12 163.3	26 06.8	09 12 163.3	26 36.6	09 12 163.2	15
6	23 00.9	09 13 162.6	23 30.7	09 13 162.5	24 00.5	09 13 162.4	24 30.3	09 13 162.4	25 00.0	09 13 162.3	25 29.8	09 13 162.2	25 59.6	09 13 162.2	26 29.3	09 13 162.1	6
7	22 53.4	09 13 161.5	23 23.2	09 13 161.4	23 52.9	09 13 161.4	24 22.6	09 13 161.3	24 52.4	09 13 161.2	25 22.1	09 14 161.1	25 51.9	09 14 161.1	26 21.6	09 14 161.0	7
8	22 45.4	09 14 160.4	23 15.2	09 14 160.3	23 44.9	09 14 160.3	24 14.6	09 14 160.2	24 44.3	09 14 160.1	25 14.0	09 14 160.0	25 43.7	09 14 160.0	26 13.4	09 14 159.9	8
9	22 37.0	09 15 159.3	23 06.7	09 15 159.3	23 36.4	09 15 159.2	24 06.1	09 15 159.1	24 35.8	09 15 159.0	25 05.5	09 15 158.9	25 35.1	09 15 158.9	26 04.8	09 15 158.8	9
20	22 28.2	09 16 158.3	22 57.9	09 16 158.2	23 27.5	09 16 158.1	23 57.2	09 16 158.0	24 26.8	09 16 157.9	24 56.5	09 16 157.9	25 26.1	09 16 157.8	25 55.8	09 16 157.7	20
1	22 19.0	09 16 157.2	22 48.6	09 16 157.1	23 18.2	09 16 157.0	23 47.8	09 16 156.9	24 17.5	09 16 156.9	24 47.1	09 16 156.8	25 16.7	09 16 156.7	25 46.3	09 16 156.6	1
2	22 09.3	09 17 156.1	22 38.9	09 17 156.0	23 08.5	09 17 155.9	23 38.1	09 17 155.9	24 07.7	09 17 155.8	24 37.2	09 17 155.7	25 06.8	09 17 155.6	25 36.4	09 17 155.5	2
3	21 59.2	09 18 155.1	22 28.8	09 18 155.0	22 58.4	09 18 154.9	23 27.9	09 18 154.8	23 57.4	09 18 154.7	24 27.0	09 18 154.6	24 56.5	09 18 154.5	25 26.1	09 18 154.4	3
4	21 48.8	09 18 154.0	22 18.3	09 18 153.9	22 47.8	09 18 153.8	23 17.3	09 18 153.7	23 46.8	09 18 153.6	24 16.3	09 18 153.5	24 45.8	09 18 153.4	25 15.3	09 18 153.3	4
25	21 37.9	09 19 153.0	22 07.3	09 19 152.9	22 36.8	09 19 152.8	23 06.3	09 19 152.7	23 35.8	09 19 152.6	24 05.2	09 19 152.5	24 34.7	09 19 152.4	25 04.1	09 19 152.3	25
6	21 26.6	09 20 151.9	21 56.0	09 20 151.8	22 25.4	09 20 151.7	22 54.9	09 20 151.6	23 24.3	09 20 151.5	23 53.7	09 20 151.4	24 23.2	09 20 151.3	24 52.6	09 20 151.2	6
7	21 14.9	09 20 150.8	21 44.3	09 20 150.7	22 13.7	09 20 150.6	22 43.1	09 20 150.5	23 12.5	09 20 150.4	23 41.9	09 20 150.3	24 11.2	09 21 150.2	24 40.6	09 21 150.1	7
8	21 02.8	09 21 149.8	21 32.2	09 21 149.7	22 01.5	09 21 149.6	22 30.9	09 21 149.5	23 00.2	09 21 149.4	23 29.6	09 21 149.2	23 58.9	09 21 149.1	24 28.2	09 21 149.0	8
9	20 50.3	09 21 148.8	21 19.6	09 21 148.6	21 49.0	09 21 148.5	22 18.3	09 21 148.4	22 47.6	09 21 148.3	23 16.9	09 21 148.2	23 46.2	09 21 148.1	24 15.5	09 21 147.9	9
30	20 37.5	09 22 147.7	21 06.8	09 22 147.6	21 36.0	09 22 147.5	22 05.3	09 22 147.4	22 34.6	09 22 147.2	23 03.8	09 22 147.1	23 33.1	09 22 147.0	24 02.3	09 22 146.9	30
1	20 24.3	09 23 146.7	20 53.5	09 23 146.5	21 22.7	09 23 146.4	21 52.0	09 23 146.3	22 21.2	09 23 146.2	22 50.4	09 23 146.1	23 19.6	09 23 146.0	23 48.8	09 23 145.8	1
2	20 10.7	09 23 145.6	20 39.9	09 23 145.5	21 09.0	09 23 145.4	21 38.2	09 23 145.3	22 07.4	09 23 145.1	22 36.6	09 23 144.9	23 05.8	09 23 144.8	23 34.9	09 23 144.8	2
3	19 56.7	09 24 144.6	20 25.9	09 24 144.5	20 55.0	09 24 144.3	21 24.1	09 24 144.2	21 53.3	09 24 144.1	22 22.4	09 24 144.0	22 51.5	09 24 143.8	23 20.6	09 24 143.7	3
4	19 42.4	09 24 143.6	20 11.5	09 24 143.4	20 40.6	09 24 143.3	21 09.7	09 24 143.2	21 38.8	09 24 143.0	22 07.9	09 24 142.9	22 36.9	09 24 142.8	23 06.0	09 24 142.6	4
35	19 27.7	09 25 142.5	19 56.8	09 25 142.4	20 25.8	09 25 142.3	20 54.9	09 25 142.1	21 23.9	09 25 142.0	21 53.0	09 25 141.9	22 22.0	09 25 141.7	22 51.0	09 25 141.6	35
6	19 12.7	09 26 141.5	19 41.7	09 26 141.4	20 10.7	09 26 141.2	20 39.7	09 26 141.1	21 08.7	09 26 141.0	21 37.7	09 26 140.8	22 06.7	09 26 140.7	22 35.7	09 26 140.5	6
7	18 57.3	09 26 140.5	19 26.3	09 26 140.3	19 55.3	09 26 140.2	20 24.2	09 26 140.1	20 53.2	09 26 139.9	21 22.1	09 26 139.8	21 51.1	09 26 139.6	22 20.0	09 26 139.5	7
8	18 41.6	09 27 139.5	19 10.6	09 27 139.3	19 39.5	09 27 139.2	20 08.4	09 27 139.0	20 37.3	09 27 138.9	21 06.2	09 27 138.8	21 35.1	09 27 138.6	22 04.0	09 27 138.5	8
9	18 25.6	09 27 138.4	18 54.5	09 27 138.3	19 23.4	09 27 138.2	19 52.2	09 27 138.0	20 21.1	09 28 137.9	20 50.0	09 28 137.7	21 18.8	09 28 137.6	21 47.7	09 28 137.4	9
40	18 09.3	09 28 137.4	18 38.1	09 28 137.3	19 06.9	09 28 137.1	19 35.8	09 28 137.0	20 04.6	09 28 136.8	20 33.4	09 28 136.7	21 02.2	09 28 136.5	21 31.0	09 28 136.4	40
1	17 52.6	09 28 136.4	18 21.4	09 28 136.3	18 50.2	09 28 136.1	19 19.0	09 28 136.0	19 47.7	09 28 135.8	20 16.5	09 28 135.7	20 45.2	09 28 135.5	21 14.0	09 28 135.4	1
2	17 35.6	09 29 135.4	18 04.4	09 29 135.3	18 33.1	09 29 135.1	19 01.8	09 29 135.0	19 30.6	09 29 134.8	19 59.3	09 29 134.7	20 28.0	09 29 134.5	20 56.7	09 29 134.3	2
3	17 18.3	09 29 134.4	17 47.0	09 29 134.3	18 15.7	09 29 134.1	18 44.4	09 29 134.0	19 13.1	09 29 133.8	19 41.8	09 29 133.6	20 10.4	09 29 133.5	20 39.1	09 29 133.3	3
4	17 00.8	09 30 133.4	17 29.4	09 30 133.3	17 58.1	09 30 133.1	18 26.7	09 30 132.9	18 55.3	09 30 132.8	19 24.0	09 30 132.6	19 52.6	09 30 132.5	20 21.2	09 30 132.3	4
45	16 42.9	09 30 132.4	17 11.5	09 30 132.3	17 40.1	09 30 132.1	18 08.7	09 30 131.9	18 37.3	09 31 131.8	19 05.9	09 31 131.6	19 34.4	09 31 131.5	20 03.0	09 31 131.3	45
6	16 24.7	09 31 131.4	16 53.3	09 31 131.3	17 21.8	09 31 1											

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Ad At															
00	24 00.0	1.00 180.0	23 30.0	1.00 180.0	23 00.0	1.00 180.0	22 30.0	1.00 180.0	22 00.0	1.00 180.0	21 30.0	1.00 180.0	21 00.0	1.00 180.0	20 30.0	1.00 180.0	00
1	23 59.8	1.00 178.9	23 29.8	1.00 178.9	22 59.8	1.00 178.9	22 29.8	1.00 178.9	21 59.8	1.00 178.9	21 29.8	1.00 178.9	20 59.8	1.00 178.9	20 29.8	1.00 178.9	1
2	23 59.1	1.00 177.8	23 29.1	1.00 177.8	22 59.1	1.00 177.8	22 29.1	1.00 177.8	21 59.1	1.00 177.8	21 29.1	1.00 177.8	20 59.1	1.00 177.8	20 29.1	1.00 177.8	2
3	23 57.9	1.00 176.7	23 27.9	1.00 176.7	22 57.9	1.00 176.7	22 27.9	1.00 176.8	21 57.9	1.00 176.8	21 27.9	1.00 176.8	20 58.0	1.00 176.8	20 28.0	1.00 176.8	3
4	23 56.3	1.00 175.6	23 26.3	1.00 175.6	22 56.3	1.00 175.7	22 26.3	1.00 175.7	21 56.3	1.00 175.7	21 26.3	1.00 175.7	20 56.4	1.00 175.7	20 26.4	1.00 175.7	4
05	23 54.2	1.00 174.5	23 24.2	1.00 174.6	22 54.2	1.00 174.6	22 24.2	1.00 174.6	21 54.3	1.00 174.6	21 24.3	1.00 174.6	20 54.3	1.00 174.7	20 24.3	1.00 174.7	05
6	23 51.6	1.00 173.4	23 21.7	1.00 173.5	22 51.7	1.00 173.5	22 21.7	1.00 173.5	21 51.7	1.00 173.5	21 21.8	1.00 173.6	20 51.8	1.00 173.6	20 21.8	1.00 173.6	6
7	23 48.6	1.00 172.3	23 18.6	1.00 172.4	22 48.7	1.00 172.4	22 18.7	1.00 172.4	21 48.8	1.00 172.5	21 18.8	1.00 172.5	20 48.9	1.00 172.5	20 18.9	1.00 172.5	7
8	23 45.1	1.00 171.3	23 15.2	1.00 171.3	22 45.2	1.00 171.3	22 15.3	1.00 171.4	21 45.3	1.00 171.4	21 15.4	1.00 171.4	20 45.5	1.00 171.5	20 15.5	1.00 171.5	8
9	23 41.2	1.00 170.2	23 11.3	1.00 170.2	22 41.3	1.00 170.2	22 11.4	1.00 170.3	21 41.5	1.00 170.3	21 11.5	1.00 170.4	20 41.6	1.00 170.4	20 11.7	1.00 170.4	9
10	23 36.8	1.00 169.1	23 06.9	1.00 169.1	22 37.0	1.00 169.2	22 07.0	1.00 169.2	21 37.1	1.00 169.2	21 07.2	1.00 169.3	20 37.3	1.00 169.3	20 07.4	1.00 169.4	10
1	23 31.9	1.00 168.0	23 02.0	1.00 168.0	22 32.1	1.00 168.1	22 02.1	1.00 168.1	21 32.1	1.00 168.2	21 02.5	1.00 168.2	20 32.6	1.00 168.3	20 02.7	1.00 168.3	1
2	23 26.6	1.00 166.9	22 56.8	1.00 167.0	22 26.9	1.00 167.0	22 02.0	1.00 167.1	21 27.1	1.00 167.1	21 02.4	1.00 167.2	20 27.7	1.00 167.2	19 57.5	1.00 167.2	2
3	23 20.9	1.00 165.8	22 51.0	1.00 165.9	22 21.2	1.00 165.9	21 51.3	1.00 166.0	21 21.5	1.00 166.0	21 01.6	1.00 166.1	20 21.7	1.00 166.1	19 51.9	1.00 166.2	3
4	23 14.7	09 11 164.7	22 44.8	09 11 164.8	22 15.0	09 11 164.9	21 45.2	09 11 164.9	21 15.3	09 11 165.0	20 45.5	09 11 165.0	20 15.7	09 11 165.1	19 45.8	09 11 165.1	4
15	23 08.0	09 12 163.7	22 38.2	09 12 163.7	22 08.4	09 12 163.8	21 38.6	09 12 163.8	21 08.8	09 12 163.9	20 39.0	09 12 164.0	20 09.2	09 12 164.0	19 39.4	09 12 164.1	15
6	23 00.9	09 13 162.6	22 31.2	09 12 162.6	22 01.4	09 12 162.7	21 31.6	09 12 162.8	21 01.8	09 12 162.8	20 32.0	09 12 162.9	20 02.2	09 12 163.0	19 32.5	09 12 163.0	6
7	22 53.4	09 13 161.5	22 23.7	09 13 161.6	21 53.9	09 13 161.6	21 24.1	09 13 161.7	20 54.4	09 13 161.8	20 24.6	09 13 161.8	19 54.9	09 13 161.9	19 25.1	09 13 162.0	7
8	22 45.4	09 14 160.4	22 15.7	09 14 160.5	21 46.0	09 14 160.6	21 16.3	09 14 160.6	20 46.5	09 14 160.7	20 16.8	09 14 160.8	19 47.1	09 14 160.9	19 17.4	09 14 160.9	8
9	22 37.0	09 15 159.3	22 07.0	09 15 159.4	21 37.7	09 15 159.5	21 08.0	09 15 159.6	20 38.3	09 15 159.7	20 08.6	09 15 159.8	19 38.9	09 15 159.8	19 09.2	09 15 159.9	9
20	22 28.2	09 15 158.3	21 58.6	09 15 158.4	21 28.9	09 15 158.4	20 59.2	09 15 158.5	20 29.6	09 15 158.6	19 59.9	09 15 158.7	19 30.2	09 15 158.8	19 00.6	09 15 158.8	20
1	22 19.0	09 16 157.2	21 49.4	09 16 157.3	21 19.7	09 16 157.4	20 50.1	09 16 157.5	20 20.5	09 16 157.6	19 50.8	09 16 157.7	19 21.2	09 16 157.7	18 51.5	09 16 157.8	1
2	22 09.3	09 17 156.1	21 39.7	09 17 156.2	21 10.1	09 17 156.3	20 40.5	09 17 156.4	20 10.9	09 17 156.5	19 41.3	09 17 156.6	19 11.7	09 17 156.7	18 42.1	09 17 156.7	2
3	21 59.2	09 18 155.1	21 29.7	09 17 155.2	21 00.1	09 17 155.3	20 30.6	09 17 155.4	20 01.0	09 17 155.4	19 31.4	09 17 155.5	19 01.9	09 17 155.6	18 32.3	09 17 155.7	3
4	21 48.8	09 18 154.0	21 19.2	09 18 154.1	20 49.7	09 18 154.2	20 20.2	09 18 154.3	19 59.7	09 18 154.4	19 21.1	09 18 154.5	18 51.6	09 18 154.6	18 22.0	09 18 154.7	4
25	21 37.9	09 19 153.0	21 08.4	09 19 153.1	20 38.9	09 19 153.2	20 09.4	09 19 153.3	19 39.9	09 19 153.4	19 10.4	09 19 153.4	18 40.9	09 19 153.5	18 11.4	09 19 153.6	25
6	21 26.6	09 19 151.9	20 57.1	09 19 152.0	20 27.7	09 19 152.1	19 58.2	09 19 152.2	19 28.8	09 19 152.3	18 59.3	09 19 152.4	18 29.8	09 19 152.5	18 00.4	09 19 152.6	6
7	21 14.9	09 20 150.8	20 45.5	09 20 151.0	20 16.1	09 20 151.1	19 46.6	09 20 151.2	19 17.2	09 20 151.3	18 47.8	09 20 151.4	18 18.4	09 20 151.5	17 49.0	09 20 151.6	7
8	21 02.8	09 21 149.8	20 33.4	09 21 149.9	20 04.1	09 21 150.0	19 34.7	09 21 150.1	19 05.3	09 21 150.2	18 35.9	09 21 150.3	18 06.5	09 21 150.4	17 37.1	09 21 150.6	8
9	20 50.3	09 21 148.8	20 21.0	09 21 148.9	19 51.7	09 21 149.0	19 22.3	09 21 149.1	18 53.0	09 21 149.2	18 23.7	09 21 149.3	17 54.3	09 21 149.4	17 25.0	09 21 149.5	9
30	20 37.5	09 22 147.7	20 08.2	09 22 147.8	19 38.9	09 22 147.9	19 09.6	09 22 148.1	18 40.3	09 22 148.2	18 11.0	09 22 148.3	17 41.7	09 22 148.4	17 12.4	09 22 148.5	30
1	20 24.3	09 23 146.7	19 55.0	09 23 146.8	19 25.8	09 23 146.9	18 56.5	09 23 147.0	18 27.3	09 23 147.1	17 58.0	09 23 147.3	17 28.7	09 23 147.4	16 59.5	09 23 147.5	1
2	20 10.7	09 23 145.6	19 41.5	09 23 145.7	19 12.3	09 23 145.9	18 43.0	09 23 146.0	18 13.8	09 23 146.1	17 44.6	09 23 146.2	17 15.4	09 23 146.3	16 46.2	09 23 146.5	2
3	19 56.7	09 24 144.6	19 27.5	09 24 144.7	18 58.4	09 24 144.8	18 29.2	09 24 145.0	18 00.0	09 24 145.1	17 30.9	09 24 145.2	17 01.7	09 24 145.3	16 32.5	09 24 145.5	3
4	19 42.4	09 24 143.6	19 13.3	09 24 143.7	18 44.1	09 24 143.8	18 15.0	09 24 143.9	17 45.9	09 24 144.1	17 16.8	09 24 144.2	16 47.6	09 24 144.3	16 18.5	09 24 144.4	4
35	19 27.7	09 25 142.5	18 58.6	09 25 142.7	18 29.6	09 25 142.8	18 00.5	09 25 142.9	17 31.4	09 25 143.0	17 02.3	09 25 143.2	16 33.2	09 25 143.3	16 04.1	09 25 143.4	35
6	19 12.7	09 26 141.5	18 43.7	09 26 141.6	18 14.6	09 26 141.8	17 45.6	09 26 141.9	17 16.6	09 26 142.0	16 47.5	09 26 142.2	16 18.5	09 26 142.3	15 49.4	09 26 142.4	6
7	18 57.3	09 26 140.5	18 28.4	09 26 140.6	17 59.4	09 26 140.8	17 30.4	09 26 140.9	17 01.4	09 26 141.0	16 32.4	09 26 141.2	16 03.4	09 26 141.3	15 34.4	09 26 141.4	7
8	18 41.6	09 27 139.5	18 12.7	09 27 139.6	17 43.8	09 27 139.7	17 14.8	09 27 139.9	16 45.9	09 27 140.0	16 16.9	09 27 140.2	15 47.9	09 27 140.3	15 19.0	09 27 140.4	8
9	18 25.6	09 27 138.4	17 56.7	09 27 138.6	17 27.8	09 27 138.7	16 58.9	09 27 138.9	16 30.0	09 27 139.0	16 01.1	09 27 139.1	15 32.2	09 27 139.3	15 03.3	09 27 139.4	9
40	18 09.3	09 28 137.4	17 40.4	09 28 137.6	17 11.6	09 28 137.7	16 42.7	09 28 137.9	16 13.8	09 28 138.0	15 45.0	09 28 138.1	15 16.1	09 28 138.3	14 47.2	09 28 138.4	40
1	17 52.6	09 28 136.4	17 23.8	09 28 136.6	16 55.0	09 28 136.7	16 26.2	09 28 136.9	15 57.4	09 28 137.0	15 28.5	09 28 137.1	14 59.7	09 28 137.3	14 30.9	09 28 137.4	1
2	17 35.6	09 29 135.4	17 06.9	09 29 135.6	16 38.1	09 29 135.7	16 09.3	09 29 135.9	15 40.6	09 29 136.0	15 11.8	09 29 136.2	14 43.0	09 29 136.3	14 14.2	09 29 136.4	2
3	17 18.3	09 29 134.4	16 49.9	09 29 134.6	16 20.9	09 29 134.7	15 52.2	09 29 134.9	15 23.5	09 29 135.0	14 54.7	09 29 135.2	14 26.0	09 29 135.3	13 57.2	09 29 135.5	3
4	17 00.8	09 30 133.4	16 32.1	09 30 133.6	16 03.4	09 30 133.7	15 34.7	09 30 133.9	15 06.1	09 30 134.0	14 37.4	09 30 134.2	14 08.7	09 30 134.3	13 40.0	09 30 134.5	4
45	16 42.9	09 30 132.4	16 14.3	09 30 132.6	15 45.6	09 30 132.7	15 17.0	09 30 132.9	14 48.4	09 30 133.0	14 19.7	09 30 133.2	13 51.1	09 30 133.3	13 22.4	09 30 133.5	45
6	16 24.7	09 31 131.4	15 56.1	09 31 131.6													

Lat. 66°

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.															
00	28 00.0	1.00 180.0	28 30.0	1.00 180.0	29 00.0	1.00 180.0	29 30.0	1.00 180.0	30 00.0	1.00 180.0	30 30.0	1.00 180.0	31 00.0	1.00 180.0	31 30.0	1.00 180.0	00
1	27 59.8	1.001 178.9	28 29.8	1.001 178.9	28 59.8	1.001 178.9	29 29.8	1.001 178.9	29 59.8	1.001 178.9	30 29.8	1.001 178.8	30 59.8	1.001 178.8	31 29.8	1.001 178.8	1
2	27 59.0	1.002 177.7	28 29.0	1.002 177.7	28 59.0	1.002 177.7	29 29.0	1.002 177.7	29 59.0	1.002 177.7	30 29.0	1.002 177.7	30 59.0	1.002 177.7	31 29.0	1.002 177.7	2
3	27 57.8	1.003 176.6	28 27.8	1.003 176.6	28 57.8	1.003 176.6	29 27.8	1.003 176.6	29 57.8	1.003 176.6	30 27.8	1.003 176.5	30 57.8	1.003 176.5	31 27.8	1.003 176.5	3
4	27 56.2	1.004 175.5	28 26.1	1.004 175.5	28 56.1	1.004 175.4	29 26.1	1.004 175.4	29 56.1	1.004 175.4	30 26.1	1.004 175.4	30 56.1	1.004 175.4	31 26.0	1.004 175.4	4
05	27 54.0	1.004 174.4	28 24.0	1.004 174.3	28 53.9	1.004 174.3	29 23.9	1.004 174.3	29 53.9	1.004 174.3	30 23.9	1.004 174.2	30 53.8	1.005 174.2	31 23.8	1.005 174.2	05
6	27 51.4	1.005 173.2	28 21.3	1.005 173.2	28 51.3	1.005 173.2	29 21.2	1.005 173.1	29 51.2	1.005 173.1	30 21.2	1.005 173.1	30 51.1	1.005 173.1	31 21.1	1.005 173.0	6
7	27 48.2	1.006 172.1	28 18.2	1.006 172.1	28 48.1	1.006 172.0	29 18.1	1.006 172.0	29 48.0	1.006 172.0	30 18.0	1.006 171.9	30 47.9	1.006 171.9	31 17.9	1.006 171.9	7
8	27 44.6	1.007 171.0	28 14.6	1.007 170.9	28 44.5	1.007 170.9	29 14.5	1.007 170.9	29 44.4	1.007 170.8	30 14.3	1.007 170.8	30 44.3	1.007 170.8	31 14.2	1.007 170.7	8
9	27 40.6	1.008 169.9	28 10.5	1.008 169.8	28 40.4	1.008 169.8	29 10.3	1.008 169.7	29 40.3	1.008 169.7	30 10.2	1.008 169.6	30 40.1	1.008 169.6	31 10.0	1.008 169.6	9
10	27 36.0	1.008 168.7	28 05.9	1.008 168.7	28 35.9	1.008 168.6	29 05.8	1.008 168.6	29 35.7	1.008 168.5	30 05.6	1.008 168.5	30 35.5	1.008 168.5	31 05.4	1.008 168.4	10
1	27 31.0	1.009 167.6	28 00.9	1.009 167.6	28 30.8	1.009 167.5	29 00.7	1.009 167.5	29 30.6	1.009 167.4	30 00.5	1.009 167.4	30 30.3	1.009 167.3	31 00.2	1.009 167.2	1
2	27 25.6	1.010 166.5	27 55.4	1.010 166.4	28 25.3	1.010 166.3	28 55.2	1.010 166.3	29 25.0	1.010 166.2	29 54.9	1.010 166.2	30 24.7	1.010 166.2	30 54.6	1.010 166.1	2
3	27 19.6	09 11 165.4	27 49.5	09 11 165.3	28 19.3	09 11 165.3	28 49.2	09 11 165.2	29 19.0	09 11 165.1	29 48.8	09 11 165.1	30 18.7	09 11 165.0	30 48.5	09 11 164.9	3
4	27 13.2	09 11 164.3	27 43.1	09 11 164.2	28 12.9	09 12 164.1	28 42.7	09 12 164.1	29 12.5	09 12 164.0	29 42.3	09 12 163.9	30 12.1	09 12 163.9	30 41.9	09 12 163.8	4
15	27 06.4	09 12 163.1	27 36.2	09 12 163.1	28 06.0	09 12 162.9	28 35.8	09 12 162.9	29 05.5	09 12 162.9	29 35.3	09 12 162.8	30 05.1	09 12 162.7	30 34.9	09 12 162.7	15
6	26 59.1	09 13 162.0	27 28.8	09 13 162.0	27 58.6	09 13 161.9	28 28.4	09 13 161.8	28 58.1	09 13 161.7	29 27.9	09 13 161.7	29 57.6	09 13 161.6	30 27.4	09 13 161.5	6
7	26 51.3	09 14 160.9	27 21.1	09 14 160.8	27 50.8	09 14 160.8	28 20.5	09 14 160.7	28 50.2	09 14 160.6	29 20.0	09 14 160.5	29 49.7	09 14 160.5	30 19.4	09 14 160.4	7
8	26 43.1	09 14 159.8	27 12.8	09 14 159.7	27 42.5	09 15 159.7	28 12.2	09 15 159.6	28 41.9	09 15 159.5	29 11.6	09 15 159.4	29 41.3	09 15 159.3	30 11.0	09 15 159.2	8
9	26 34.5	09 15 158.7	27 04.2	09 15 158.6	27 33.8	09 15 158.5	28 03.5	09 15 158.5	28 33.1	09 15 158.4	29 02.8	09 15 158.3	29 32.4	09 15 158.2	30 02.1	09 15 158.1	9
20	26 25.4	09 16 157.6	26 55.0	09 16 157.5	27 24.7	09 16 157.4	27 54.3	09 16 157.3	28 23.9	09 16 157.3	28 53.5	09 16 157.2	29 23.2	09 16 157.1	29 52.8	09 16 157.0	20
1	26 15.9	09 17 156.5	26 45.5	09 17 156.4	27 15.1	09 17 156.3	27 44.7	09 17 156.2	28 14.3	09 17 156.1	28 43.9	09 17 156.0	29 13.4	09 17 155.9	29 43.0	09 17 155.9	1
2	26 06.0	09 17 155.4	26 35.5	09 17 155.3	27 05.1	09 17 155.2	27 34.6	09 17 155.1	28 04.2	09 18 155.0	28 33.7	09 18 154.9	29 03.3	09 18 154.8	29 32.8	09 18 154.7	2
3	25 55.6	09 18 154.3	26 25.1	09 18 154.2	26 54.6	09 18 154.1	27 24.2	09 18 154.0	27 53.7	09 18 153.9	28 23.2	09 18 153.8	28 52.7	09 18 153.7	29 22.2	09 18 153.6	3
4	25 44.8	09 19 153.2	26 14.3	09 19 153.1	26 43.8	09 19 153.0	27 13.2	09 19 152.9	27 42.7	09 19 152.8	28 12.2	09 19 152.7	28 41.7	09 19 152.6	29 11.1	09 19 152.5	4
25	25 33.6	09 19 152.0	26 03.0	09 19 152.0	26 32.5	09 20 151.9	27 01.9	09 20 151.8	27 31.4	09 20 151.7	28 00.8	09 20 151.6	28 30.2	09 20 151.5	29 09.6	09 20 151.4	25
6	25 22.0	09 20 151.1	25 51.4	09 20 150.9	26 20.8	09 20 150.8	26 50.2	09 20 150.7	27 19.6	09 20 150.6	27 49.0	09 20 150.5	28 18.4	09 20 150.4	28 47.7	09 20 150.3	6
7	25 10.0	09 21 150.0	25 39.3	09 21 149.9	26 09.7	09 21 149.7	26 38.1	09 21 149.6	27 07.4	09 21 149.5	27 36.8	09 21 149.4	28 06.1	09 21 149.3	28 35.4	09 21 149.2	7
8	24 57.6	09 21 148.9	25 26.9	09 21 148.8	25 56.2	09 21 148.7	26 25.5	09 21 148.6	26 54.8	09 21 148.5	27 24.1	09 21 148.4	27 53.4	09 21 148.2	28 22.7	09 21 148.1	8
9	24 44.8	09 22 147.8	25 14.1	09 22 147.7	25 43.3	09 22 147.6	26 12.6	09 22 147.5	26 41.9	09 22 147.3	27 11.1	09 22 147.2	27 40.4	09 22 147.1	28 09.6	09 22 147.0	9
30	24 31.6	09 23 146.8	25 00.8	09 23 146.6	25 30.1	09 23 146.5	25 59.3	09 23 146.4	26 28.5	09 23 146.3	26 57.7	09 23 146.1	27 26.9	09 23 146.0	27 56.1	09 23 145.9	30
1	24 18.0	09 23 145.7	24 47.2	09 23 145.6	25 16.4	09 23 145.4	25 45.6	09 23 145.3	26 14.7	09 24 145.2	26 43.9	09 24 145.0	27 13.1	09 24 144.9	27 42.2	09 24 144.8	1
2	24 04.1	09 24 144.6	24 33.2	09 24 144.5	25 02.4	09 24 144.4	25 31.5	09 24 144.2	25 00.6	09 24 144.1	25 29.7	09 24 144.0	26 58.9	09 24 143.8	27 28.0	09 24 143.7	2
3	23 49.8	09 24 143.6	24 18.9	09 24 143.4	24 48.0	09 24 143.3	25 17.0	09 24 143.2	25 46.1	09 24 143.0	26 15.2	09 24 142.9	26 44.3	09 24 142.7	27 13.3	09 24 142.6	3
4	23 35.1	09 25 142.5	24 04.1	09 25 142.4	24 33.2	09 25 142.2	25 02.2	09 25 142.1	25 31.3	09 25 142.0	26 00.3	09 25 141.8	26 29.3	09 25 141.7	26 58.0	09 25 141.5	4
35	23 20.1	09 26 141.5	23 49.1	09 26 141.3	24 18.1	09 26 141.2	24 47.1	09 26 141.0	25 16.1	09 26 140.9	25 45.0	09 26 140.7	26 14.0	09 26 140.6	26 43.0	09 26 140.5	35
6	23 04.7	09 26 140.4	23 33.6	09 26 140.3	24 02.6	09 26 140.1	24 31.5	09 26 140.0	25 00.5	09 27 139.8	25 29.4	09 27 139.7	25 58.3	09 27 139.5	26 27.3	09 27 139.4	6
7	22 48.9	09 27 139.4	23 17.9	09 27 139.2	23 46.8	09 27 139.1	24 15.7	09 27 138.9	24 44.6	09 27 138.8	25 13.5	09 27 138.6	25 42.3	09 27 138.5	26 11.2	09 27 138.3	7
8	22 32.9	09 27 138.3	23 01.8	09 27 138.2	23 30.6	09 27 138.0	23 59.5	09 27 137.9	24 28.3	09 28 137.7	24 57.2	09 28 137.6	25 26.0	09 28 137.4	25 54.8	09 28 137.3	8
9	22 16.5	09 28 137.3	22 45.3	09 28 137.1	23 14.1	09 28 137.0	23 42.9	09 28 136.8	24 11.7	09 28 136.7	24 40.5	09 28 136.5	25 09.3	09 28 136.4	25 38.1	09 28 136.2	9
40	21 59.8	09 28 136.2	22 28.6	09 28 136.1	22 57.3	09 29 135.9	23 26.1	09 29 135.8	23 54.8	09 29 135.6	24 23.6	09 29 135.5	24 52.3	09 29 135.3	25 21.0	09 29 135.2	40
1	21 42.7	09 29 135.2	22 11.5	09 29 135.1	22 40.2	09 29 134.9	23 08.9	09 29 134.7	23 37.6	09 29 134.6	24 06.3	09 29 134.4	24 35.0	09 29 134.3	25 03.7	09 29 134.1	1
2	21 25.4	09 29 134.2	21 54.1	09 30 134.0	22 22.8	09 30 133.9	22 51.4	09 30 133.7	23 20.1	09 30 133.6	23 48.7	09 30 133.4	24 17.4	09 30 133.2	24 46.0	09 30 133.1	2
3	21 07.7	09 30 133.2	21 36.4	09 30 133.0	22 05.0	09 30 132.8	22 33.6	09 30 132.7	23 02.2	09 30 132.5	23 30.8	09 30 132.4	23 59.4	09 30 132.2	24 28.0	09 30 132.0	3
4	20 49.8	09 30 132.1	21 18.4	09 30 132.0	21 47.0	09 31 131.8	22 15.1	09 31 131.7	22 43.1	09 31 131.5	23 12.7	09 31 131.3	23 41.2	09 31 131.2	24 09.7	09 31 131.0	4
45	20 31.6	09 31 131.1	21 00.1	09 31 131.0	21 28.6	09 31 130.8	21 57.2	09 31 130.6	22 25.7	09 31 130.5	22 54.2	09 31 130.3	23 22.7	09 31			

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 66°

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.															
00	20 00.0	1.00 180.0	19 30.0	1.00 180.0	19 00.0	1.00 180.0	18 30.0	1.00 180.0	18 00.0	1.00 180.0	17 30.0	1.00 180.0	17 00.0	1.00 180.0	16 30.0	1.00 180.0	00
1	19 59.8	1.00 178.9	19 29.8	1.00 178.9	18 59.8	1.00 178.9	18 29.8	1.00 179.0	17 59.8	1.00 179.0	17 29.8	1.00 179.0	16 59.8	1.00 179.0	16 29.8	1.00 179.0	1
2	19 59.1	1.00 177.9	19 29.1	1.00 177.9	18 59.1	1.00 177.9	18 29.1	1.00 177.9	17 59.1	1.00 177.9	17 29.1	1.00 177.9	16 59.1	1.00 177.9	16 29.1	1.00 177.9	2
3	19 58.0	1.00 176.8	19 28.0	1.00 176.8	18 58.0	1.00 176.8	18 28.0	1.00 176.9	17 58.0	1.00 176.9	17 28.0	1.00 176.9	16 58.0	1.00 176.9	16 28.0	1.00 176.9	3
4	19 56.4	1.00 175.8	19 26.4	1.00 175.8	18 56.4	1.00 175.8	18 26.4	1.00 175.8	17 56.4	1.00 175.8	17 26.4	1.00 175.8	16 56.4	1.00 175.8	16 26.4	1.00 175.8	4
05	19 54.4	1.00 174.7	19 24.4	1.00 174.7	18 54.4	1.00 174.7	18 24.4	1.00 174.8	17 54.4	1.00 174.8	17 24.4	1.00 174.8	16 54.4	1.00 174.8	16 24.4	1.00 174.8	05
6	19 51.9	1.00 173.6	19 21.9	1.00 173.7	18 51.9	1.00 173.7	18 22.0	1.00 173.7	17 52.0	1.00 173.7	17 22.0	1.00 173.8	16 52.1	1.00 173.8	16 22.1	1.00 173.8	6
7	19 48.9	1.00 172.6	19 19.0	1.00 172.6	18 49.0	1.00 172.6	18 19.1	1.00 172.7	17 49.1	1.00 172.7	17 19.1	1.00 172.7	16 49.2	1.00 172.7	16 19.2	1.00 172.8	7
8	19 45.6	1.00 171.5	19 15.6	1.00 171.5	18 45.7	1.00 171.6	18 15.7	1.00 171.6	17 45.8	1.00 171.6	17 15.8	1.00 171.7	16 45.9	1.00 171.7	16 15.9	1.00 171.7	8
9	19 41.7	1.00 170.5	19 11.8	1.00 170.5	18 41.9	1.00 170.5	18 11.9	1.00 170.6	17 42.0	1.00 170.6	17 12.1	1.00 170.6	16 42.1	1.00 170.7	16 12.2	1.00 170.7	9
10	19 37.5	1.00 169.4	19 07.6	1.00 169.4	18 37.6	1.00 169.5	18 07.7	1.00 169.5	17 37.8	1.00 169.6	17 07.9	1.00 169.6	16 38.0	1.00 169.6	16 08.1	1.00 169.7	10
1	19 32.8	1.00 168.3	19 02.9	1.00 168.4	18 33.0	1.00 168.5	18 03.1	1.00 168.5	17 33.2	1.00 168.5	17 03.3	1.00 168.6	16 33.4	1.00 168.6	16 03.5	1.00 168.6	1
2	19 27.6	1.00 167.3	18 57.7	1.00 167.3	18 27.9	1.00 167.4	17 58.0	1.00 167.4	17 28.1	1.00 167.5	16 58.2	1.00 167.5	16 28.3	1.00 167.5	15 58.4	1.00 167.6	2
3	19 22.0	1.00 166.2	18 52.2	1.00 166.3	18 22.3	1.00 166.3	17 52.5	1.00 166.4	17 22.6	1.00 166.4	16 52.7	1.00 166.5	16 22.9	1.00 166.5	15 53.0	1.00 166.6	3
4	19 16.0	1.00 165.2	18 46.2	1.00 165.2	18 16.3	1.00 165.3	17 46.5	1.00 165.4	17 16.7	1.00 165.4	16 46.8	1.00 165.5	16 17.0	1.00 165.5	15 47.1	1.00 165.6	4
15	19 09.6	1.00 164.1	18 39.7	1.00 164.2	18 09.9	1.00 164.3	17 40.1	1.00 164.3	17 10.3	1.00 164.4	16 40.5	1.00 164.4	16 10.7	1.00 164.5	15 40.8	1.00 164.5	15
6	19 02.7	1.00 163.1	18 32.9	1.00 163.2	18 03.1	1.00 163.2	17 33.3	1.00 163.3	17 03.5	1.00 163.3	16 33.7	1.00 163.4	16 03.9	1.00 163.5	15 34.1	1.00 163.5	6
7	18 55.4	1.00 162.0	18 25.6	1.00 162.1	17 55.8	1.00 162.2	17 26.1	1.00 162.2	16 56.3	1.00 162.3	16 26.5	1.00 162.4	15 56.8	1.00 162.4	15 27.0	1.00 162.5	7
8	18 47.6	1.00 161.0	18 17.9	1.00 161.1	17 48.2	1.00 161.1	17 18.4	1.00 161.2	16 48.7	1.00 161.3	16 18.9	1.00 161.3	15 49.2	1.00 161.4	15 19.4	1.00 161.5	8
9	18 39.5	1.00 160.0	18 09.8	1.00 160.0	17 40.1	1.00 160.1	17 10.3	1.00 160.2	16 40.6	1.00 160.2	16 10.9	1.00 160.3	15 41.2	1.00 160.4	15 11.5	1.00 160.5	9
20	18 30.9	1.00 158.9	18 01.2	1.00 159.0	17 31.5	1.00 159.1	17 01.9	1.00 159.1	16 32.2	1.00 159.2	16 02.5	1.00 159.3	15 32.8	1.00 159.4	15 03.1	1.00 159.4	20
1	18 21.9	1.00 157.9	17 52.3	1.00 158.0	17 22.6	1.00 158.0	16 53.0	1.00 158.1	16 23.3	1.00 158.2	15 53.7	1.00 158.3	15 24.0	1.00 158.3	14 54.4	1.00 158.4	1
2	18 12.5	1.00 156.8	17 42.9	1.00 156.9	17 13.3	1.00 157.0	16 43.7	1.00 157.1	16 14.0	1.00 157.2	15 44.4	1.00 157.3	15 14.8	1.00 157.3	14 45.2	1.00 157.4	2
3	18 02.7	1.00 155.8	17 33.1	1.00 155.9	17 03.5	1.00 156.0	16 34.0	1.00 156.1	16 04.4	1.00 156.1	15 34.8	1.00 156.2	15 05.2	1.00 156.3	14 35.6	1.00 156.4	3
4	17 52.5	1.00 154.8	17 23.0	1.00 154.9	16 53.4	1.00 154.9	16 23.9	1.00 155.0	15 54.3	1.00 155.1	15 24.8	1.00 155.2	14 55.2	1.00 155.3	14 25.9	1.00 155.4	4
25	17 41.9	1.00 153.7	17 12.4	1.00 153.8	16 42.9	1.00 153.9	16 13.4	1.00 154.0	15 43.8	1.00 154.1	15 14.3	1.00 154.2	14 44.8	1.00 154.3	14 15.3	1.00 154.4	25
6	17 30.9	1.00 152.7	17 01.4	1.00 152.8	16 32.0	1.00 152.9	16 02.5	1.00 153.0	15 33.0	1.00 153.1	15 03.5	1.00 153.2	14 34.0	1.00 153.3	14 04.5	1.00 153.4	6
7	17 19.5	1.00 151.7	16 50.1	1.00 151.8	16 20.6	1.00 151.9	15 51.2	1.00 152.0	15 21.8	1.00 152.1	14 52.3	1.00 152.2	14 22.9	1.00 152.3	13 53.4	1.00 152.4	7
8	17 07.7	1.00 150.7	16 38.4	1.00 150.8	16 09.0	1.00 150.9	15 39.6	1.00 151.0	15 10.1	1.00 151.1	14 40.7	1.00 151.2	14 11.3	1.00 151.3	13 41.9	1.00 151.4	8
9	16 55.6	1.00 149.6	16 26.2	1.00 149.7	15 56.9	1.00 149.8	15 27.5	1.00 150.0	14 58.2	1.00 150.1	14 28.8	1.00 150.2	13 59.4	1.00 150.3	13 30.0	1.00 150.4	9
30	16 43.1	1.00 148.6	16 13.8	1.00 148.7	15 44.4	1.00 148.8	15 15.1	1.00 148.9	14 45.8	1.00 149.1	14 16.5	1.00 149.2	13 47.1	1.00 149.3	13 17.8	1.00 149.4	30
1	16 30.2	1.00 147.6	16 00.9	1.00 147.7	15 31.6	1.00 147.8	15 02.3	1.00 147.9	14 33.1	1.00 148.0	14 03.8	1.00 148.2	13 34.5	1.00 148.3	13 05.2	1.00 148.4	1
2	16 16.9	1.00 146.6	15 47.7	1.00 146.7	15 18.4	1.00 146.8	14 49.2	1.00 146.9	14 20.0	1.00 147.0	13 50.7	1.00 147.2	13 21.5	1.00 147.3	12 52.2	1.00 147.4	2
3	16 03.3	1.00 145.6	15 34.1	1.00 145.7	15 04.9	1.00 145.8	14 35.7	1.00 145.9	14 06.5	1.00 146.0	13 37.3	1.00 146.2	13 08.1	1.00 146.3	12 38.9	1.00 146.4	3
4	15 49.3	1.00 144.6	15 20.2	1.00 144.7	14 51.0	1.00 144.8	14 21.9	1.00 144.9	13 52.7	1.00 145.1	13 23.5	1.00 145.2	12 54.4	1.00 145.3	12 25.2	1.00 145.4	4
35	15 35.0	1.00 143.6	15 05.9	1.00 143.7	14 36.8	1.00 143.8	14 07.7	1.00 143.9	13 38.5	1.00 144.1	13 09.4	1.00 144.2	12 40.3	1.00 144.3	12 11.2	1.00 144.4	35
6	15 20.3	1.00 142.6	14 51.3	1.00 142.7	14 22.2	1.00 142.8	13 53.1	1.00 142.9	13 24.1	1.00 143.1	12 55.0	1.00 143.2	12 25.9	1.00 143.3	11 56.8	1.00 143.4	6
7	15 05.3	1.00 141.6	14 36.3	1.00 141.7	14 07.3	1.00 141.8	13 38.3	1.00 141.9	13 09.2	1.00 142.1	12 40.2	1.00 142.2	12 11.1	1.00 142.3	11 42.5	1.00 142.5	7
8	14 50.0	1.00 140.6	14 21.0	1.00 140.7	13 52.0	1.00 140.8	13 23.0	1.00 141.0	12 54.1	1.00 141.1	12 25.1	1.00 141.2	11 56.1	1.00 141.3	11 27.1	1.00 141.5	8
9	14 34.3	1.00 139.6	14 05.4	1.00 139.7	13 36.5	1.00 139.8	13 07.5	1.00 140.0	12 38.6	1.00 140.1	12 09.6	1.00 140.2	11 40.7	1.00 140.3	11 11.7	1.00 140.5	9
40	14 18.3	1.00 138.6	13 49.4	1.00 138.7	13 20.6	1.00 138.8	12 51.7	1.00 139.0	12 22.8	1.00 139.1	11 53.8	1.00 139.3	11 24.9	1.00 139.4	10 56.0	1.00 139.5	40
1	14 02.0	1.00 137.6	13 33.2	1.00 137.7	13 04.3	1.00 137.9	12 35.5	1.00 138.0	12 06.6	1.00 138.1	11 37.8	1.00 138.3	11 08.9	1.00 138.4	10 40.0	1.00 138.6	1
2	13 45.4	1.00 136.6	13 16.6	1.00 136.7	12 47.8	1.00 136.9	12 19.0	1.00 137.0	11 50.2	1.00 137.2	11 21.4	1.00 137.3	10 52.5	1.00 137.4	10 23.7	1.00 137.6	2
3	13 28.5	1.00 135.6	12 59.7	1.00 135.8	12 31.0	1.00 135.9	12 02.2	1.00 136.0	11 33.4	1.00 136.2	11 04.7	1.00 136.3	10 35.9	1.00 136.5	10 07.1	1.00 136.6	3
4	13 11.3	1.00 134.6	12 42.6	1.00 134.8	12 13.8	1.00 134.9	11 45.1	1.00 135.1	11 16.4	1.00 135.2	10 47.7	1.00 135.4	10 18.9	1.00 135.5	9 50.2	1.00 135.7	4
45	12 53.8	1.00 133.6	12 25.1	1.00 133.8	11 56.4	1.00 133.9	11 27.7	1.00 134.1	10 59.1	1.00 134.2	10 30.4	1.00 134.4	10 01.7	1.00 134.5	9 33.0	1.00 134.7	45
6	12 36.0	1.00 132.7	12 07.3	1.00 132.8	11 38.7	1.00 133.0	11 10.1	1.00 133.1	10 41.4	1.00 133.3	10 12.8	1.00 133.4	9 44.1	1.00 133.6	9 15.5	1.00 133.7	6
7	12 17.9	1.00 131.7	11 49														

Lat. 66°

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.
	Alt.	Az.															
00	36 00.0	1.00 180.0	36 30.0	1.00 180.0	37 00.0	1.00 180.0	37 30.0	1.00 180.0	38 00.0	1.00 180.0	38 30.0	1.00 180.0	39 00.0	1.00 180.0	39 30.0	1.00 180.0	00
1	35 59.7	1.001 178.8	36 29.7	1.001 178.8	36 59.7	1.001 178.8	37 29.7	1.001 178.8	37 59.7	1.001 178.8	38 29.7	1.001 178.8	38 59.7	1.001 178.8	39 29.7	1.001 178.8	1
2	35 59.0	1.002 177.6	36 29.0	1.002 177.6	36 59.0	1.002 177.6	37 29.0	1.002 177.5	37 59.0	1.002 177.5	38 28.9	1.002 177.5	38 58.9	1.002 177.5	39 28.9	1.002 177.5	2
3	35 57.7	1.003 176.4	36 27.7	1.003 176.4	36 57.7	1.003 176.3	37 27.7	1.003 176.3	37 57.7	1.003 176.3	38 27.6	1.003 176.3	38 57.6	1.003 176.3	39 27.6	1.003 176.3	3
4	35 55.9	1.004 175.2	36 25.9	1.004 175.1	36 55.9	1.004 175.1	37 25.9	1.004 175.1	37 55.8	1.004 175.1	38 25.8	1.004 175.1	38 55.8	1.004 175.1	39 25.8	1.004 175.1	4
05	35 53.6	1.005 174.0	36 23.5	1.005 173.9	36 53.5	1.005 173.9	37 23.5	1.005 173.9	37 53.5	1.005 173.8	38 23.4	1.005 173.8	38 53.4	1.005 173.8	39 23.4	1.005 173.8	05
6	35 50.7	1.006 172.8	36 20.7	1.006 172.7	36 50.7	1.006 172.7	37 20.6	1.006 172.7	37 50.6	1.006 172.6	38 20.5	1.006 172.6	38 50.5	1.006 172.6	39 20.4	1.006 172.5	6
7	35 47.4	1.007 171.5	36 17.4	1.007 171.5	36 47.3	1.007 171.5	37 17.2	1.007 171.4	37 47.2	1.007 171.4	38 17.1	1.007 171.4	38 47.1	1.007 171.3	39 17.0	1.007 171.3	7
8	35 43.6	1.007 170.3	36 13.5	1.007 170.3	36 43.4	1.007 170.3	37 13.4	1.007 170.2	37 43.3	1.007 170.2	38 13.2	1.007 170.1	38 43.1	1.007 170.1	39 13.0	1.007 170.0	8
9	35 39.2	1.008 169.1	36 09.1	1.008 169.1	36 39.0	1.008 169.0	37 09.0	1.008 169.0	37 38.9	1.008 168.9	38 08.8	1.008 168.9	38 38.7	1.008 168.8	39 08.6	1.008 168.8	9
10	35 34.1	1.009 167.9	36 04.3	1.009 167.9	36 34.2	1.009 167.8	37 04.0	1.009 167.8	37 33.9	1.009 167.7	38 03.8	1.009 167.7	38 33.7	1.009 167.6	39 03.6	1.009 167.6	10
1	35 29.0	1.010 166.7	35 58.9	1.010 166.7	36 28.8	1.010 166.6	36 58.6	1.010 166.6	37 28.5	1.010 166.5	37 58.3	1.010 166.4	38 28.2	1.010 166.4	38 58.0	1.010 166.3	1
2	35 23.9	09 11 165.6	35 53.0	09 11 165.5	36 22.9	09 11 165.4	36 52.7	09 11 165.4	37 22.5	09 11 165.3	37 52.4	09 11 165.2	38 22.2	09 11 165.2	38 52.0	09 11 165.1	2
3	35 16.9	09 11 164.3	35 46.7	09 11 164.3	36 16.5	09 11 164.2	36 46.3	09 11 164.2	37 16.1	09 11 164.1	37 45.9	09 11 164.0	38 15.7	09 11 163.9	38 45.5	09 11 163.9	3
4	35 10.0	09 12 163.2	35 39.8	09 12 163.1	36 09.6	09 12 163.0	36 39.4	09 12 162.9	37 09.1	09 12 162.9	37 38.9	09 12 162.8	38 08.7	09 12 162.7	38 38.4	09 12 162.6	4
15	35 02.7	09 13 162.0	35 32.5	09 13 161.9	36 02.2	09 13 161.8	36 32.0	09 13 161.7	37 01.7	09 13 161.7	37 31.5	09 13 161.6	38 01.2	09 13 161.5	38 30.9	09 13 161.4	15
6	34 55.0	09 14 160.8	35 24.7	09 14 160.7	35 54.4	09 14 160.6	36 24.1	09 14 160.5	36 53.8	09 14 160.5	37 23.5	09 14 160.4	37 53.2	09 14 160.3	38 22.9	09 14 160.2	6
7	34 46.7	09 15 159.6	35 16.4	09 15 159.5	35 46.1	09 15 159.4	36 15.7	09 15 159.3	36 45.4	09 15 159.3	37 15.1	09 15 159.2	37 44.7	09 15 159.1	38 14.4	09 15 159.0	7
8	34 38.0	09 15 158.4	35 07.6	09 15 158.4	35 37.2	09 15 158.3	36 06.9	09 15 158.2	36 36.5	09 15 158.1	37 06.1	09 15 158.0	37 35.8	09 15 157.9	38 05.4	09 15 157.8	8
9	34 28.8	09 16 157.3	34 58.4	09 16 157.2	35 28.0	09 16 157.1	35 57.6	09 16 157.0	36 27.2	09 16 156.9	36 56.8	09 16 156.8	37 26.3	09 16 156.7	37 55.9	09 16 156.6	9
20	34 19.1	09 17 156.1	34 48.7	09 17 156.0	35 18.2	09 17 155.9	35 47.8	09 17 155.8	36 17.4	09 17 155.7	36 46.9	09 17 155.6	37 16.4	09 17 155.5	37 46.0	09 17 155.4	20
1	34 09.0	09 18 154.9	34 38.5	09 18 154.8	35 08.0	09 18 154.7	35 37.6	09 18 154.6	36 07.1	09 18 154.5	36 36.6	09 18 154.4	37 06.1	09 18 154.3	37 35.6	09 18 154.2	1
2	33 58.4	09 18 153.8	34 27.9	09 18 153.7	34 57.4	09 18 153.6	35 26.9	09 18 153.4	35 56.3	09 18 153.3	36 25.8	09 18 153.2	36 55.3	09 18 153.1	37 24.7	09 18 153.0	2
3	33 47.4	09 19 152.6	34 16.9	09 19 152.5	34 46.3	09 19 152.4	35 15.7	09 19 152.3	35 45.2	09 19 152.1	36 14.6	09 19 152.0	36 44.0	09 20 151.9	37 13.4	09 20 151.8	3
4	33 36.0	09 20 151.5	34 05.4	09 20 151.3	34 34.8	09 20 151.2	35 04.2	09 20 151.1	35 33.5	09 20 151.0	36 02.9	09 20 150.9	36 32.3	09 20 150.7	37 01.6	09 20 150.6	4
25	33 24.1	09 20 150.3	33 53.5	09 21 150.2	34 22.8	09 21 150.1	34 52.2	09 21 149.9	35 21.5	09 21 149.8	35 50.8	09 21 149.7	36 20.1	09 21 149.6	36 49.4	09 21 149.4	25
6	33 11.8	09 21 149.2	33 41.1	09 21 149.0	34 10.4	09 21 148.9	34 39.7	09 21 148.8	35 09.0	09 22 148.7	35 38.3	09 22 148.5	36 07.5	09 22 148.4	36 36.8	09 22 148.2	6
7	32 59.1	09 22 148.0	33 28.4	09 22 147.9	33 57.6	09 22 147.8	34 26.9	09 22 147.6	34 56.1	09 22 147.5	35 25.3	09 22 147.4	35 54.5	09 22 147.2	36 23.7	09 22 147.1	7
8	32 46.0	09 23 146.9	33 15.2	09 23 146.8	33 44.4	09 23 146.6	34 13.6	09 23 146.5	34 42.8	09 23 146.3	35 12.0	09 23 146.2	35 41.1	09 23 146.1	36 10.3	09 23 145.9	8
9	32 32.5	09 23 145.8	33 01.6	09 23 145.6	33 30.8	09 23 145.5	33 59.9	09 23 145.3	34 29.1	09 24 145.2	34 58.2	09 24 145.1	35 27.3	09 24 144.9	35 56.4	09 24 144.8	9
30	32 18.5	09 24 144.6	32 47.6	09 24 144.5	33 16.8	09 24 144.4	33 45.8	09 24 144.2	34 14.9	09 24 144.1	34 44.0	09 24 143.9	35 13.1	09 24 143.8	35 42.1	09 24 143.6	30
1	32 04.2	09 24 143.5	32 33.3	09 24 143.4	33 02.3	09 24 143.2	33 31.4	09 24 143.1	34 00.9	09 24 142.9	34 29.4	09 24 142.8	34 58.4	09 24 142.6	35 27.4	09 24 142.5	1
2	31 49.5	09 24 142.4	32 18.5	09 24 142.3	32 47.5	09 24 142.1	33 16.5	09 24 142.0	33 45.5	09 24 141.8	34 14.5	09 24 141.6	34 43.0	09 24 141.5	35 12.4	09 24 141.3	2
3	31 34.4	09 24 141.3	32 03.4	09 24 141.1	32 32.4	09 24 141.0	33 01.3	09 24 140.8	33 30.2	09 24 140.7	33 59.1	09 24 140.5	34 28.0	09 24 140.3	34 56.9	09 24 140.2	3
4	31 19.0	09 24 140.2	31 47.9	09 24 140.0	32 16.8	09 24 139.9	32 45.7	09 24 139.7	33 14.6	09 24 139.6	33 43.4	09 24 139.4	34 12.3	09 24 139.2	34 41.1	09 24 139.1	4
35	31 03.2	09 27 139.1	31 32.1	09 27 138.9	32 00.9	09 27 138.8	32 29.7	09 27 138.6	32 58.6	09 27 138.4	33 27.4	09 27 138.3	33 56.2	09 27 138.1	34 25.0	09 27 137.9	35
6	30 47.0	09 28 138.0	31 15.8	09 28 137.8	31 44.6	09 28 137.7	32 13.4	09 28 137.5	32 42.2	09 28 137.3	33 11.0	09 28 137.2	33 39.7	09 28 137.0	34 08.4	09 28 136.8	6
7	30 30.5	09 28 136.9	30 59.3	09 28 136.7	31 28.0	09 28 136.6	31 56.8	09 28 136.4	32 25.5	09 28 136.2	32 54.2	09 28 136.1	33 22.9	09 28 135.9	33 51.6	09 28 135.7	7
8	30 13.7	09 29 135.8	30 42.4	09 29 135.6	31 11.1	09 29 135.5	31 39.8	09 29 135.3	32 08.4	09 29 135.1	32 37.1	09 29 135.0	33 05.7	09 29 134.8	33 34.3	09 29 134.6	8
9	29 56.5	09 29 134.7	30 25.2	09 29 134.6	30 53.8	09 29 134.4	31 22.4	09 29 134.2	31 51.1	09 30 134.0	32 19.7	09 30 133.9	32 48.2	09 30 133.7	33 16.8	09 30 133.5	9
40	29 39.0	09 30 133.7	30 07.6	09 30 133.5	30 36.2	09 30 133.3	31 04.8	09 30 133.1	31 33.4	09 30 133.0	32 01.9	09 30 132.8	32 30.4	09 30 132.6	32 58.9	09 30 132.4	40
1	29 21.2	09 30 132.6	29 49.8	09 30 132.4	30 18.3	09 30 132.2	30 46.8	09 30 132.1	31 15.3	09 31 131.9	31 43.8	09 31 131.7	32 12.3	09 31 131.5	32 40.8	09 31 131.3	1
2	29 03.1	09 31 131.5	29 31.6	09 31 131.3	30 00.1	09 31 131.2	30 28.6	09 31 131.0	30 57.0	09 31 130.8	31 25.5	09 31 130.6	31 53.9	09 31 130.4	32 22.3	09 31 130.2	2
3	28 44.7	09 31 130.5	29 13.1	09 31 130.3	29 41.6	09 31 130.1	30 10.0	09 31 129.9	30 38.4	09 32 129.7	31 06.8	09 32 129.5	31 35.2	09 32 129.3	32 03.5	09 32 129.2	3
4	28 26.0	09 32 129.4	28 54.4	09 32 129.2	29 22.7	09 32 129.0	29 51.1	09 32 128.8	30 19.5	09 32 128.7	30 47.8	09 32 128.5	31 16.1	09 32 128.3	31 44.4	09 32 128.1	4
45	28 07.0	09 32 128.3	28 35.3	09 32 128.2	29 03.7	09 32 128.0	29 32.0	09 32 127.8	30 00.3	09 32 127.6	30 28.6	09 32 127.4	30 56.8				

Table with columns for H.A., Alt., Az., and declination values for latitudes 12° 00' to 15° 30'.

Lat. 66°

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and declination values for latitudes 12° 00' to 15° 30'.

Lat. 67°

Lat. 68°

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and declination values (16° 00', 16° 30', 17° 00', 17° 30', 18° 00', 18° 30', 19° 00', 19° 30'). Rows are numbered 00 to 90.

Lat. 66°

Table with columns for H.A., Alt., Az., and declination values (16° 00', 16° 30', 17° 00', 17° 30', 18° 00', 18° 30', 19° 00', 19° 30').

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and declination values (16° 00', 16° 30', 17° 00', 17° 30', 18° 00', 18° 30', 19° 00', 19° 30').

Lat. 66°

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.
	Alt.	Az.															
00	44 00.0	1.00 180.0	44 30.0	1.00 180.0	45 00.0	1.00 180.0	45 30.0	1.00 180.0	46 00.0	1.00 180.0	46 30.0	1.00 180.0	47 00.0	1.00 180.0	47 30.0	1.00 180.0	00
1	43 59.7	1.001 178.7	44 29.7	1.001 178.7	44 59.7	1.001 178.7	45 29.7	1.001 178.7	45 59.7	1.001 178.7	46 29.7	1.001 178.7	46 59.7	1.001 178.7	47 29.7	1.001 178.7	1
2	43 58.9	1.002 177.4	44 28.9	1.002 177.4	44 58.9	1.002 177.4	45 28.9	1.002 177.3	45 58.9	1.002 177.3	46 28.9	1.002 177.3	46 58.9	1.002 177.3	47 28.9	1.002 177.3	2
3	43 57.5	1.003 176.1	44 27.5	1.003 176.1	44 57.5	1.003 176.0	45 27.5	1.003 176.0	45 57.4	1.003 176.0	46 27.4	1.003 176.0	46 57.4	1.003 176.0	47 27.4	1.003 175.9	3
4	43 55.6	1.004 174.8	44 25.5	1.004 174.8	44 55.5	1.004 174.7	45 25.5	1.004 174.7	45 55.5	1.004 174.7	46 25.4	1.004 174.6	46 55.4	1.004 174.6	47 25.4	1.004 174.6	4
05	43 53.1	1.005 173.5	44 23.0	1.005 173.4	44 53.0	1.005 173.4	45 22.9	1.005 173.4	45 52.9	1.005 173.3	46 22.9	1.005 173.3	46 52.8	1.005 173.3	47 22.8	1.005 173.2	05
6	43 50.0	1.006 172.2	44 20.0	1.006 172.1	44 49.9	1.006 172.1	45 19.8	1.006 172.0	45 49.8	1.006 172.0	46 19.7	1.006 172.0	46 49.7	1.006 171.9	47 19.6	1.006 171.9	6
7	43 46.4	1.007 170.9	44 16.3	1.007 170.8	44 46.3	1.007 170.8	45 16.2	1.007 170.7	45 46.1	1.007 170.7	46 16.0	1.007 170.6	46 46.0	1.007 170.6	47 15.9	1.007 170.5	7
8	43 42.3	1.008 169.6	44 12.2	1.008 169.5	44 42.1	1.008 169.5	45 12.0	1.008 169.4	45 41.9	1.008 169.4	46 11.8	1.008 169.3	46 41.7	1.008 169.2	47 11.6	1.008 169.2	8
9	43 37.6	1.009 168.3	44 07.5	1.009 168.2	44 37.3	1.009 168.2	45 07.2	1.009 168.1	45 37.1	1.009 168.0	46 07.0	1.009 168.0	46 36.8	1.009 167.9	47 06.7	1.009 167.8	9
10	43 32.4	1.010 167.0	44 02.2	1.010 166.9	44 32.1	1.010 166.8	45 01.9	1.010 166.8	45 31.8	1.010 166.7	46 01.6	1.010 166.6	46 31.5	1.010 166.6	47 01.3	1.010 166.5	10
1	43 26.6	1.011 165.7	43 56.4	1.011 165.6	44 26.2	1.011 165.6	44 56.1	1.011 165.5	45 25.9	1.011 165.4	45 55.7	1.011 165.3	46 25.5	1.011 165.2	46 55.3	1.011 165.2	1
2	43 20.3	1.012 164.4	43 50.1	1.012 164.3	44 19.9	1.012 164.3	44 49.7	1.012 164.2	45 19.5	1.012 164.1	45 49.2	1.012 164.0	46 19.0	1.012 163.9	46 48.8	1.012 163.8	2
3	43 13.5	1.013 163.1	43 43.2	1.013 163.0	44 13.0	1.013 163.0	44 42.8	1.013 162.9	45 12.5	1.013 162.8	45 42.2	1.013 162.7	46 12.0	1.013 162.6	46 41.7	1.013 162.5	3
4	43 06.1	1.014 161.9	43 35.9	1.014 161.8	44 05.6	1.014 161.7	44 35.3	1.014 161.6	45 05.0	1.014 161.5	45 34.7	1.014 161.4	46 04.0	1.014 161.3	46 34.1	1.014 161.2	4
15	42 58.3	1.014 160.6	43 28.0	1.014 160.5	43 57.7	1.014 160.4	44 27.3	1.014 160.3	44 57.0	1.014 160.2	45 26.7	1.014 160.1	45 56.3	1.014 160.0	46 26.0	1.014 159.9	15
6	42 49.9	1.015 159.3	43 19.6	1.015 159.2	43 49.2	1.015 159.1	44 18.8	1.015 159.0	44 48.5	1.015 158.9	45 18.1	1.015 158.8	45 47.7	1.015 158.7	46 17.3	1.015 158.6	6
7	42 41.1	1.016 158.1	43 10.7	1.016 157.9	43 40.3	1.016 157.8	44 09.8	1.016 157.7	44 39.4	1.016 157.6	45 09.0	1.016 157.5	45 38.6	1.016 157.4	46 08.1	1.016 157.2	7
8	42 31.7	1.016 156.8	43 01.2	1.016 156.7	43 30.8	1.016 156.6	44 00.3	1.016 156.5	44 29.9	1.016 156.4	44 59.4	1.016 156.3	45 28.9	1.016 156.1	45 58.4	1.016 155.9	8
9	42 21.8	1.017 155.5	42 51.3	1.017 155.4	43 20.8	1.017 155.3	43 50.3	1.017 155.2	44 19.8	1.017 155.0	44 49.3	1.017 154.9	45 18.8	1.017 154.8	45 48.2	1.017 154.6	9
20	42 11.5	1.018 154.3	42 40.9	1.018 154.2	43 10.4	1.018 154.0	43 39.8	1.018 153.9	44 09.3	1.018 153.8	44 38.7	1.018 153.6	45 08.1	1.018 153.5	45 37.5	1.018 153.4	20
1	42 00.7	1.019 153.0	42 30.1	1.019 152.9	42 59.5	1.019 152.8	43 28.9	1.019 152.6	43 58.2	1.019 152.5	44 27.6	1.019 152.4	44 57.0	1.019 152.2	45 26.3	1.019 152.1	1
2	41 49.4	1.020 151.8	42 18.7	1.020 151.7	42 48.1	1.020 151.5	43 17.4	1.020 151.4	43 46.7	1.020 151.2	44 16.1	1.020 151.1	44 45.4	1.020 150.9	45 14.7	1.020 150.8	2
3	41 37.6	1.020 150.6	42 06.9	1.020 150.4	42 36.2	1.020 150.3	43 05.5	1.020 150.1	43 34.8	1.020 150.0	44 04.0	1.020 149.8	44 33.3	1.020 149.7	45 02.5	1.020 149.5	3
4	41 25.4	1.021 149.4	41 54.9	1.021 149.2	42 23.9	1.021 149.1	42 53.1	1.021 148.9	43 22.3	1.021 148.7	43 51.5	1.021 148.6	44 20.7	1.021 148.4	44 49.9	1.021 148.3	4
25	41 12.7	1.022 148.1	41 41.9	1.022 148.0	42 11.1	1.022 147.8	42 40.3	1.022 147.7	43 09.5	1.022 147.5	43 38.6	1.022 147.3	44 07.7	1.022 147.2	44 36.9	1.022 147.0	25
6	40 59.6	1.023 146.9	41 28.8	1.023 146.8	41 57.9	1.023 146.6	42 27.0	1.023 146.4	42 56.1	1.023 146.3	43 25.2	1.023 146.1	43 54.3	1.023 145.9	44 23.3	1.023 145.8	6
7	40 46.1	1.024 145.7	41 15.2	1.024 145.6	41 44.3	1.024 145.4	42 13.3	1.024 145.2	42 42.4	1.024 145.1	43 11.4	1.024 144.9	43 40.4	1.024 144.7	44 09.4	1.024 144.5	7
8	40 32.1	1.024 144.5	41 01.2	1.024 144.4	41 30.2	1.024 144.2	41 59.2	1.024 144.0	42 28.2	1.024 143.8	42 57.1	1.024 143.7	43 26.1	1.024 143.5	43 55.0	1.024 143.3	8
9	40 17.8	1.025 143.3	40 46.7	1.025 143.2	41 15.7	1.025 143.0	41 44.6	1.025 142.8	42 13.6	1.025 142.6	42 42.5	1.025 142.4	43 11.4	1.025 142.3	43 40.2	1.025 142.1	9
30	40 03.0	1.026 142.1	40 31.9	1.026 142.0	41 00.8	1.026 141.8	41 29.7	1.026 141.6	41 58.5	1.026 141.4	42 27.4	1.026 141.2	42 56.2	1.026 141.0	43 25.0	1.026 140.9	30
1	39 47.8	1.026 141.0	40 16.7	1.026 140.8	40 45.5	1.026 140.6	41 14.3	1.026 140.4	41 43.1	1.026 140.2	42 11.9	1.026 140.0	42 40.7	1.026 139.8	43 09.4	1.026 139.6	1
2	39 32.2	1.027 139.8	40 01.0	1.027 139.6	40 29.8	1.027 139.4	40 58.6	1.027 139.2	41 27.3	1.027 139.0	41 56.0	1.027 138.8	42 24.7	1.027 138.6	42 53.4	1.027 138.4	2
3	39 16.3	1.027 138.6	39 45.0	1.027 138.4	40 13.8	1.027 138.2	40 42.5	1.027 138.0	41 11.1	1.027 137.9	41 39.8	1.027 137.7	42 08.4	1.027 137.5	42 37.1	1.027 137.3	3
4	39 00.0	1.028 137.5	39 28.7	1.028 137.3	39 57.3	1.028 137.1	40 26.0	1.028 136.9	40 54.6	1.028 136.7	41 23.2	1.028 136.5	41 51.7	1.028 136.3	42 20.3	1.028 136.1	4
35	38 43.3	1.028 136.3	39 11.9	1.028 136.1	39 40.5	1.028 135.9	40 09.1	1.028 135.7	40 37.6	1.028 135.5	41 06.2	1.028 135.3	41 34.7	1.028 135.1	42 03.2	1.028 134.9	35
6	38 26.3	1.029 135.2	38 54.8	1.029 135.0	39 23.4	1.029 134.8	39 51.9	1.029 134.6	40 20.4	1.029 134.4	40 48.9	1.029 134.1	41 17.3	1.029 133.9	41 45.7	1.029 133.7	6
7	38 08.9	1.029 134.0	38 37.4	1.029 133.8	39 05.9	1.029 133.6	39 34.3	1.029 133.4	40 02.8	1.029 133.2	40 31.2	1.029 133.0	40 59.6	1.029 132.8	41 27.9	1.029 132.6	7
8	37 51.2	1.030 132.9	38 19.6	1.030 132.7	38 48.0	1.030 132.5	39 16.4	1.030 132.3	39 44.8	1.030 132.1	40 13.2	1.030 131.8	40 41.5	1.030 131.6	41 09.8	1.030 131.4	8
9	37 33.1	1.031 131.8	38 01.5	1.031 131.6	38 29.9	1.031 131.3	38 58.2	1.031 131.1	39 26.5	1.031 130.9	39 54.8	1.031 130.7	40 23.1	1.031 130.5	40 51.3	1.031 130.3	9
40	37 14.8	1.032 130.6	37 43.1	1.032 130.4	38 11.4	1.032 130.2	38 39.7	1.032 130.0	39 07.9	1.032 129.8	39 36.2	1.032 129.6	40 04.4	1.032 129.4	40 32.5	1.032 129.1	40
1	36 56.1	1.032 129.5	37 24.4	1.032 129.3	37 52.6	1.032 129.1	38 20.8	1.032 128.9	38 49.0	1.032 128.7	39 17.2	1.032 128.5	39 45.3	1.032 128.2	40 13.5	1.032 128.0	1
2	36 37.1	1.033 128.4	37 05.3	1.033 128.2	37 33.5	1.033 128.0	38 01.7	1.033 127.8	38 29.8	1.033 127.6	38 57.9	1.033 127.3	39 26.0	1.033 127.1	39 54.1	1.033 126.9	2
3	36 17.9	1.034 127.3	36 46.0	1.034 127.1	37 14.1	1.034 126.9	37 42.3	1.034 126.7	38 10.3	1.034 126.5	38 38.4	1.034 126.2	39 06.4	1.034 126.0	39 34.4	1.034 125.8	3
4	35 58.3	1.035 126.2	36 26.4	1.035 126.0	36 54.5	1.035 125.8	37 22.5	1.035 125.6	37 50.6	1.035 125.4	38 18.6	1.035 125.1	38 46.5	1.035 124.9	39 14.5	1.035 124.7	4
45	35 38.5	1.035 125.2	36 06.5	1.035 124.9	36 34.6	1.035 124.7	37 02.6	1.035 124.5	37 30.5	1.035 124.3	37 58.5	1.035 124.0	38 26.4				

23° 30'	
Alt.	Az.
47 30.0	1.00 180.0
47 29.7	1.00 178.6
47 28.8	1.00 177.3
47 27.4	1.00 175.9
47 25.4	1.00 174.6
47 22.8	1.00 173.2
47 19.6	1.00 171.9
47 15.9	1.00 170.5
47 11.6	1.00 169.2
47 06.7	1.00 167.8
47 01.3	99 10 166.5
46 55.3	99 11 165.2
46 48.8	99 12 163.8
46 41.7	99 13 162.5
46 34.1	99 14 161.2
46 26.0	99 14 159.9
46 17.3	99 15 158.5
46 08.1	99 16 157.2
45 58.4	99 17 155.9
45 48.2	99 18 154.6
45 37.5	99 19 153.4
45 26.3	99 19 152.1
45 14.7	99 20 150.8
45 02.5	99 21 149.5
44 49.9	99 22 148.3
44 36.9	99 22 147.0
44 23.3	99 23 145.8
44 09.4	99 24 144.5
43 55.0	99 25 143.3
43 40.2	99 26 142.1
43 25.0	99 26 140.9
43 09.4	99 27 139.6
42 53.4	99 28 138.4
42 37.1	99 28 137.3
42 20.3	99 29 136.1
42 03.2	99 29 134.9
41 45.7	99 30 133.7
41 27.9	99 30 132.6
41 09.8	99 31 131.4
40 51.3	99 31 130.3
40 32.5	99 32 129.1
40 13.5	99 32 128.0
39 54.1	99 33 126.9
39 34.4	99 33 125.8
39 14.5	99 34 124.7
38 54.3	99 34 123.6
38 33.8	99 34 122.5
38 13.1	99 35 121.4
37 52.2	99 35 120.3
37 31.0	99 36 119.2
37 09.6	99 36 118.2
36 48.0	99 37 117.1
36 26.1	99 37 116.1
36 04.1	99 37 115.0
35 41.9	99 37 114.0
35 19.5	99 38 113.0
34 57.0	99 38 111.9
34 34.3	99 38 110.9
34 11.4	99 38 109.9
33 48.4	99 39 108.9
33 25.2	99 39 107.9
33 01.9	99 39 106.9
32 38.5	99 39 105.9
32 15.0	99 39 104.9
31 51.4	99 40 104.0
31 27.6	99 40 103.0
31 03.8	99 40 102.0
30 39.9	99 40 101.1
30 15.9	99 40 100.1
29 51.9	99 40 99.2
29 27.7	99 40 98.2
29 03.6	99 40 97.3
28 39.3	99 40 96.3
28 15.0	99 41 95.4
27 50.7	99 41 94.5
27 26.4	99 41 93.5
27 02.0	99 41 92.6
26 37.6	99 41 91.7
26 13.2	99 41 90.8
25 48.8	99 41 89.9
25 24.4	99 41 88.9
25 00.0	99 41 88.0
24 35.6	99 41 87.1
24 11.3	99 41 86.2
23 46.9	99 41 85.3
23 22.6	99 40 84.4
22 58.4	99 40 83.5
22 34.1	99 40 82.6
22 09.8	99 40 81.7
21 85.5	99 40 80.8
20 61.2	99 40 79.9
20 36.9	99 40 79.0
20 12.6	99 40 78.1
19 88.3	99 40 77.2
19 64.0	99 40 76.3
19 39.7	99 40 75.4
19 15.4	99 40 74.5
18 91.1	99 40 73.6
18 66.8	99 40 72.7
18 42.5	99 40 71.8
18 18.2	99 40 70.9
17 93.9	99 40 70.0
17 69.6	99 40 69.1
17 45.3	99 40 68.2
17 21.0	99 40 67.3
16 96.7	99 40 66.4
16 72.4	99 40 65.5
16 48.1	99 40 64.6
16 23.8	99 40 63.7
16 00.0	99 40 62.8
15 76.2	99 40 61.9
15 52.4	99 40 61.0
15 28.6	99 40 60.1
15 04.8	99 40 59.2
14 81.0	99 40 58.3
14 57.2	99 40 57.4
14 33.4	99 40 56.5
14 09.6	99 40 55.6
13 85.8	99 40 54.7
13 62.0	99 40 53.8
13 38.2	99 40 52.9
13 14.4	99 40 52.0
12 90.6	99 40 51.1
12 66.8	99 40 50.2
12 43.0	99 40 49.3
12 19.2	99 40 48.4
11 95.4	99 40 47.5
11 71.6	99 40 46.6
11 47.8	99 40 45.7
11 24.0	99 40 44.8
11 00.2	99 40 43.9
10 76.4	99 40 43.0
10 52.6	99 40 42.1
10 28.8	99 40 41.2
10 05.0	99 40 40.3
9 81.2	99 40 39.4
9 57.4	99 40 38.5
9 33.6	99 40 37.6
9 9.8	99 40 36.7
8 46.0	99 40 35.8
8 22.2	99 40 34.9
7 98.4	99 40 34.0
7 74.6	99 40 33.1
7 50.8	99 40 32.2
7 27.0	99 40 31.3
7 03.2	99 40 30.4
6 79.4	99 40 29.5
6 55.6	99 40 28.6
6 31.8	99 40 27.7
6 08.0	99 40 26.8
5 84.2	99 40 25.9
5 60.4	99 40 25.0
5 36.6	99 40 24.1
5 12.8	99 40 23.2
4 89.0	99 40 22.3
4 65.2	99 40 21.4
4 41.4	99 40 20.5
4 17.6	99 40 19.6
3 93.8	99 40 18.7
3 70.0	99 40 17.8
3 46.2	99 40 16.9
3 22.4	99 40 16.0
2 98.6	99 40 15.1
2 74.8	99 40 14.2
2 51.0	99 40 13.3
2 27.2	99 40 12.4
2 03.4	99 40 11.5
1 79.6	99 40 10.6
1 55.8	99 40 9.7
1 32.0	99 40 8.8
1 08.2	99 40 7.9
8 44.4	99 40 7.0
8 20.6	99 40 6.1
7 96.8	99 40 5.2
7 73.0	99 40 4.3
7 49.2	99 40 3.4
7 25.4	99 40 2.5
7 01.6	99 40 1.6
6 77.8	99 40 0.7
6 54.0	99 40 0.0
6 30.2	99 40 0.0
6 06.4	99 40 0.0
5 82.6	99 40 0.0
5 58.8	99 40 0.0
5 35.0	99 40 0.0
5 11.2	99 40 0.0
4 87.4	99 40 0.0
4 63.6	99 40 0.0
4 39.8	99 40 0.0
4 16.0	99 40 0.0
3 92.2	99 40 0.0
3 68.4	99 40 0.0
3 44.6	99 40 0.0
3 20.8	99 40 0.0
2 97.0	99 40 0.0
2 73.2	99 40 0.0
2 49.4	99 40 0.0
2 25.6	99 40 0.0
2 01.8	99 40 0.0
1 78.0	99 40 0.0
1 54.2	99 40 0.0
1 30.4	99 40 0.0
1 06.6	99 40 0.0
8 42.8	99 40 0.0
8 19.0	99 40 0.0
7 95.2	99 40 0.0
7 71.4	99 40 0.0
7 47.6	99 40 0.0
7 23.8	99 40 0.0
7 00.0	99 40 0.0
6 76.2	99 40 0.0
6 52.4	99 40 0.0
6 28.6	99 40 0.0
6 04.8	99 40 0.0
5 81.0	99 40 0.0
5 57.2	99 40 0.0
5 33.4	99 40 0.0
5 09.6	99 40 0.0
4 85.8	99 40 0.0
4 62.0	99 40 0.0
4 38.2	99 40 0.0
4 14.4	99 40 0.0
3 90.6	99 40 0.0
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2 95.4	99 40 0.0
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2 24.0	99 40 0.0
2 00.2	99 40 0.0
1 76.4	99 40 0.0
1 52.6	99 40 0.0
1 28.8	99 40 0.0
1 05.0	99 40 0.0
8 41.2	99 40 0.0
8 17.4	99 40 0.0
7 93.6	99 40 0.0
7 69.8	99 40 0.0
7 46.0	99 40 0.0
7 22.2	99 40 0.0
6 98.4	99 40 0.0
6 74.6	99 40 0.0
6 50.8	99 40 0.0
6 27.0	99 40 0.0
6 03.2	99 40 0.0
5 79.4	99 40 0.0
5 55.6	99 40 0.0
5 31.8	99 40 0.0
5 08.0	99 40 0.0
4 84.2	99 40 0.0
4 60.4	99 40 0.0
4 36.6	99 40 0.0
4 12.8	99 40 0.0
3 89.0	99 40 0.0
3 65.2	99 40 0.0
3 41.4	99 40 0.0
3 17.6	99 40 0.0
2 93.8	99 40 0.0
2 70.0	99 40 0.0
2 46.2	99 40 0.0
2 22.4	99 40 0.0
1 98.6	99 40 0.0
1 74.8	99 40 0.0
1 51.0	99 40 0.0
1 27.2	99 40 0.0
1 03.4	99 40 0.0
8 39.6	99 40 0.0
8 15.8	99 40 0.0
7 92.0	99 40 0.0
7 68.2	99 40 0.0
7 44.4	99 40 0.0
7 20.6	99 40 0.0
6 96.8	99 40 0.0
6 73.0	99 40 0.0
6 49.2	99 40 0.0
6 25.4	99 40 0.0
6 01.6	99 40 0.0
5 77.8	99 40 0.0
5 54.0	99 40 0.0
5 30.2	99 40 0.0
5 06.4	99 40 0.0
4 82.6	99 40 0.0
4 58.8	99 40 0.0
4 35.0	99 40 0.0
4 11.2	99 40 0.0
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3 63.6	99 40 0.0
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3 16.0	99 40 0.0
2 92.2	99 40 0.0
2 68.4	99 40 0.0
2 44.6	99 40 0.0
2 20.8	99 40 0.0
1 97.0	99 40 0.0
1 73.2	99 40 0.0
1 49.4	99 40 0.0
1 25.6	99 40 0.0
1 01.8	99 40 0.0
8 38.0	99 40 0.0
8 14.2	99 40 0.0
7 90.4	99 40 0.0
7 66.6	99 40 0.0
7 42.8	99 40 0.0
7 19.0	99 40 0.0
6 95.2	99 40 0.0
6 71.4	99 40 0.0
6 47.6	99 40 0.0
6 23.8	99 40 0.0
6 00.0	99 40 0.0
5 76.2	99 40 0.0
5 52.4	99 40 0.0
5 28.6	99 40 0.0
5 04.8	99 40 0.0
4 81.0	99 40 0.0
4 57.2	99 40 0.0
4 33.4	99 40 0.0
4 09.6	99 40 0.0
3 85.8	99 40 0.0
3 62.0	99 40 0.0
3 38.2	99 40 0.0
3 14.4	99 40 0.0
2 90.6	99 40 0.0
2 66.8	99 40 0.0
2 43.0	99 40 0.0
2 19.2	99 40 0.0
1 95.4	99 40 0.0
1 71.6	99 40 0.0
1 47.8	99 40 0.0
1 24.0	99 40 0.0
1 00.2	99 40 0.0
8 36.4	99 40 0.0
8 12.6	99 40 0.0
7 88.8	99 40 0.0
7 65.0	99 40 0.0
7 41.2	99 40 0.0
7 17.4	99 40 0.0
6 93.6	99 40 0.0
6 69.8	99 40 0.0
6 46.0	99 40 0.0
6 22.2	99 40 0.0
5 98.4	99 40 0.0
5 74.6	99 40 0.0
5 50.8	99 40 0.0
5 27.0	99 40 0.0
5 03.2	99 40 0.0
4 79.4	99 40 0.0
4 55.6	99 40 0.0
4 31.8	99 40 0.0
4 08.0	99 40 0.0
3 84.2	99 40 0.0
3 60.4	99 40 0.0
3 36.6	99 40 0.0
3 12.8	99 40 0.0
2 89.0	99 40 0.0
2 65.2	99 40 0.0
2 41.4	99 40 0.0
2 17.6	99 40 0.0
1 93.8	99 40 0.0
1 70.0	99 40 0.0
1 46.2	99 40 0.0
1 22.4	99 40 0.0
9 3.0	99 40 0.0
9 39.2	99 40 0.0
9 15.4	99 40 0.0
8 91.6	99 40 0.0
8 67.8	99 40 0.0
8 44.0	99 40 0.0
8 20.2	99 40 0.0
7 96.4	99 40 0.0
7 72.6	99 40 0.0
7 48.8	99 40 0.0
7 25.0	99 40 0.0
7 01.2	99 40 0.0
6 77.4	99 40 0.0
6 53.6	99 40 0.0
6 29.8	99 40 0.0
6 06.0	99 40 0.0
5 82.2	99 40 0.0
5 58.4	99 40 0.0
5 34.6	99 40 0.0
5 10.8	99 40 0.0
4 87.0	99 40 0.0
4 63.2	99 40 0.0
4 39.4	99 40 0.0
4 15.6	99 40 0.0
3 91.8	99 40 0.0
3 68.0	99 40 0.0
3 44.2	99 40 0.0
3 20.4	99 40 0.0
2 96.6	99 40 0.0
2 72.8	99 40 0.0
2 49.0	99 40 0.0
2 25.2	99 40 0.0
2 01.4	99 40 0.0
1 77.6	99 40 0.0

DECLINATION SAME NAME AS LATITUDE

Lat. 66°	H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.
		Alt.	Ad At															
	00	48 00.0	1.00 180.0	48 30.0	1.00 180.0	49 00.0	1.00 180.0	49 30.0	1.00 180.0	50 00.0	1.00 180.0	50 30.0	1.00 180.0	51 00.0	1.00 180.0	51 30.0	1.00 180.0	00
	1	47 59.7	1.01 178.6	48 29.7	1.01 178.6	48 59.7	1.01 178.6	49 29.7	1.01 178.6	49 59.7	1.02 178.6	50 29.7	1.02 178.6	50 59.7	1.02 178.6	51 29.7	1.02 178.6	1
	2	47 58.8	1.02 177.3	48 28.8	1.02 177.3	48 58.8	1.02 177.3	49 28.8	1.02 177.3	49 58.8	1.02 177.3	50 28.8	1.02 177.3	50 58.8	1.02 177.3	51 28.8	1.02 177.3	2
	3	47 57.4	1.03 175.9	48 27.4	1.03 175.9	48 57.4	1.03 175.9	49 27.3	1.03 175.8	49 57.3	1.03 175.8	50 27.3	1.03 175.8	50 57.3	1.04 175.8	51 27.3	1.04 175.7	3
	4	47 55.4	1.04 174.5	48 25.3	1.04 174.5	48 55.3	1.04 174.5	49 25.3	1.04 174.4	49 55.2	1.04 174.4	50 25.2	1.04 174.4	50 55.2	1.04 174.3	51 25.2	1.06 174.3	4
	05	47 52.7	1.05 173.2	48 22.7	1.05 173.1	48 52.7	1.05 173.1	49 22.6	1.05 173.1	49 52.6	1.05 173.1	50 22.5	1.05 173.0	50 52.5	1.05 172.9	51 22.4	1.05 172.9	05
	6	47 49.6	1.06 171.8	48 19.5	1.06 171.8	48 49.4	1.06 171.7	49 19.4	1.06 171.7	49 49.3	1.06 171.6	50 19.2	1.06 171.6	50 49.2	1.06 171.5	51 19.1	1.07 171.5	6
	7	47 45.8	1.07 170.5	48 15.7	1.07 170.4	48 45.6	1.07 170.4	49 15.6	1.07 170.3	49 45.5	1.07 170.2	50 15.4	1.07 170.2	50 45.3	1.07 170.1	51 15.2	1.08 170.1	7
	8	47 41.5	1.08 169.1	48 11.4	1.08 169.0	48 41.3	1.08 169.0	49 11.1	1.08 168.9	49 41.0	1.08 168.9	50 10.9	1.08 168.8	50 40.8	1.08 168.7	51 10.7	1.08 168.6	8
	9	47 36.6	1.09 167.8	48 06.4	1.09 167.7	48 36.3	1.09 167.6	49 06.2	1.09 167.5	49 36.0	1.09 167.5	50 05.9	1.09 167.4	50 35.7	1.09 167.3	51 05.6	1.09 167.2	9
	10	47 31.1	1.10 166.4	48 01.0	1.10 166.3	48 30.8	1.10 166.3	49 00.6	1.10 166.2	49 30.4	1.10 166.1	50 00.3	1.10 166.0	50 30.1	1.10 165.9	50 59.9	1.10 165.8	10
	1	47 25.1	1.11 165.1	47 54.9	1.11 165.0	48 24.7	1.11 164.9	48 54.5	1.11 164.8	49 24.3	1.11 164.7	49 54.1	1.11 164.6	50 23.9	1.11 164.5	50 53.6	1.11 164.4	1
	2	47 18.6	1.12 163.7	47 48.3	1.12 163.6	48 18.1	1.12 163.5	48 47.8	1.12 163.4	49 17.6	1.12 163.3	49 47.3	1.12 163.2	50 17.1	1.12 163.1	50 46.8	1.12 163.0	2
	3	47 11.5	1.13 162.4	47 41.2	1.13 162.3	48 10.9	1.13 162.2	48 40.6	1.13 162.1	49 10.3	1.13 162.0	49 40.0	1.13 161.9	50 09.7	1.13 161.8	50 39.4	1.13 161.7	3
	4	47 03.8	1.14 161.1	47 33.5	1.14 161.0	48 03.2	1.14 160.9	48 32.8	1.14 160.7	49 02.5	1.14 160.6	49 32.2	1.14 160.5	50 01.8	1.14 160.4	50 31.4	1.14 160.3	4
	15	46 55.6	1.15 159.7	47 25.3	1.15 159.6	47 54.9	1.15 159.5	48 24.5	1.15 159.4	48 54.1	1.15 159.3	49 23.7	1.15 159.2	49 53.3	1.15 159.0	50 22.9	1.15 158.9	15
	6	46 46.9	1.16 158.4	47 16.5	1.16 158.3	47 46.1	1.16 158.2	48 15.7	1.16 158.1	48 45.2	1.16 157.9	49 14.8	1.16 157.8	49 44.3	1.16 157.7	50 13.9	1.16 157.5	6
	7	46 37.7	1.17 157.1	47 07.2	1.17 157.0	47 36.7	1.17 156.9	48 06.3	1.17 156.7	48 35.8	1.17 156.6	49 05.3	1.17 156.5	49 34.8	1.17 156.3	50 04.3	1.17 156.2	7
	8	46 27.9	1.18 155.8	46 57.4	1.18 155.7	47 26.9	1.18 155.5	47 56.4	1.18 155.4	48 25.8	1.18 155.3	48 55.3	1.18 155.1	49 24.7	1.18 155.0	49 54.2	1.18 154.8	8
	9	46 17.7	1.19 154.5	46 47.1	1.19 154.4	47 16.5	1.19 154.2	47 46.0	1.19 154.1	48 15.4	1.19 153.9	48 44.8	1.19 153.8	49 14.1	1.19 153.6	49 43.5	1.19 153.5	9
	20	46 06.9	1.20 153.2	46 36.3	1.20 153.1	47 05.7	1.20 152.9	47 35.0	1.20 152.8	48 04.4	1.20 152.6	48 33.7	1.20 152.5	49 03.0	1.20 152.3	49 32.4	1.20 152.1	20
	1	45 55.7	1.20 151.9	46 25.0	1.20 151.8	46 54.3	1.20 151.6	47 23.6	1.20 151.5	47 52.9	1.20 151.3	48 22.2	1.20 151.1	48 51.4	1.20 151.0	49 20.7	1.20 150.8	1
	2	45 43.9	1.20 150.6	46 13.2	1.20 150.5	46 42.5	1.20 150.3	47 11.7	1.20 150.2	47 40.9	1.20 150.0	48 10.2	1.20 149.8	48 39.4	1.20 149.7	49 08.5	1.20 149.5	2
	3	45 31.7	1.21 149.4	46 01.0	1.21 149.2	46 30.2	1.21 149.0	46 59.3	1.21 148.9	47 28.5	1.21 148.7	47 57.7	1.21 148.5	48 26.8	1.21 148.3	48 55.9	1.21 148.2	3
	4	45 19.1	1.22 148.1	45 48.2	1.22 147.9	46 17.4	1.22 147.8	46 46.5	1.22 147.6	47 15.6	1.22 147.4	47 44.7	1.22 147.2	48 13.7	1.22 147.0	48 42.8	1.22 146.9	4
	25	45 06.0	1.23 146.8	45 35.0	1.23 146.7	46 04.1	1.23 146.5	46 33.2	1.23 146.3	47 02.2	1.23 146.1	47 31.2	1.23 145.9	48 00.2	1.23 145.8	48 29.2	1.23 145.6	25
	6	44 52.4	1.23 145.6	45 21.4	1.23 145.4	45 50.4	1.23 145.2	46 19.4	1.23 145.0	46 48.4	1.23 144.9	47 17.3	1.23 144.7	47 46.3	1.23 144.5	48 15.2	1.23 144.3	6
	7	44 38.4	1.23 144.3	45 07.3	1.23 144.2	45 36.3	1.23 144.0	46 05.2	1.23 143.8	46 34.1	1.23 143.6	47 03.0	1.23 143.4	47 31.9	1.23 143.2	48 00.7	1.23 143.0	7
	8	44 23.9	1.23 143.1	44 52.8	1.23 142.9	45 21.7	1.23 142.7	45 50.6	1.23 142.5	46 19.4	1.23 142.3	46 48.2	1.23 142.1	47 17.0	1.23 141.9	47 45.8	1.23 141.7	8
	9	44 09.1	1.23 141.9	44 37.9	1.23 141.7	45 06.7	1.23 141.5	45 35.5	1.23 141.3	46 04.3	1.23 141.1	46 33.1	1.23 140.9	47 01.8	1.23 140.7	47 30.5	1.23 140.5	9
	30	43 53.8	1.24 140.7	44 22.6	1.24 140.5	44 51.3	1.24 140.3	45 20.1	1.24 140.1	45 48.8	1.24 139.9	46 17.5	1.24 139.6	46 46.1	1.24 139.4	47 14.7	1.24 139.2	30
	1	43 38.1	1.24 139.4	44 06.9	1.24 139.2	44 35.5	1.24 139.0	45 04.2	1.24 138.8	45 32.8	1.24 138.6	46 01.5	1.24 138.4	46 30.0	1.24 138.2	47 07.8	1.24 138.0	1
	2	43 22.1	1.24 138.2	43 50.7	1.24 138.0	44 19.3	1.24 137.8	44 47.9	1.24 137.6	45 16.5	1.24 137.4	45 45.1	1.24 137.2	46 13.6	1.24 137.0	46 42.1	1.24 136.7	2
	3	43 05.6	1.24 137.0	43 34.3	1.24 136.8	44 02.8	1.24 136.6	44 31.3	1.24 136.4	44 59.7	1.24 136.2	45 28.3	1.24 136.0	45 56.7	1.24 135.7	46 25.2	1.24 135.5	3
	4	42 48.8	1.25 135.9	43 17.2	1.25 135.6	43 45.8	1.25 135.4	44 14.3	1.25 135.2	44 42.7	1.25 135.0	45 11.1	1.25 134.8	45 39.5	1.25 134.5	46 07.9	1.25 134.3	4
	35	42 31.7	1.25 134.7	43 00.1	1.25 134.5	43 28.5	1.25 134.2	43 56.9	1.25 134.0	44 25.3	1.25 133.8	44 53.6	1.25 133.6	45 21.9	1.25 133.3	45 50.2	1.25 133.1	35
	6	42 14.1	1.25 133.5	42 42.5	1.25 133.3	43 10.9	1.25 133.1	43 39.2	1.25 132.8	44 07.5	1.25 132.6	44 35.8	1.25 132.4	45 04.0	1.25 132.1	45 32.2	1.25 131.9	6
	7	41 56.3	1.25 132.3	42 24.6	1.25 132.1	42 52.9	1.25 131.9	43 21.1	1.25 131.7	43 49.4	1.25 131.4	44 17.6	1.25 131.2	44 45.8	1.25 131.0	45 13.9	1.25 130.7	7
	8	41 38.1	1.25 131.1	42 06.3	1.25 130.9	42 34.5	1.25 130.7	43 02.7	1.25 130.5	43 30.9	1.25 130.3	43 59.1	1.25 130.0	44 27.2	1.25 129.8	44 55.2	1.25 129.5	8
	9	41 19.5	1.25 130.0	41 47.7	1.25 129.8	42 15.9	1.25 129.6	42 44.0	1.25 129.3	43 12.1	1.25 129.1	43 40.2	1.25 128.9	44 08.2	1.25 128.6	44 36.3	1.25 128.4	9
	40	41 00.7	1.26 128.8	41 28.8	1.26 128.6	41 56.9	1.26 128.4	42 25.0	1.26 128.2	42 53.0	1.26 128.0	43 21.1	1.26 127.7	43 49.0	1.26 127.5	44 17.0	1.26 127.2	40
	1	40 41.6	1.26 127.8	41 09.6	1.26 127.5	41 37.7	1.26 127.3	42 05.7	1.26 127.1	42 33.7	1.26 126.8	43 01.6	1.26 126.6	43 29.5	1.26 126.3	43 57.4	1.26 126.1	1
	2	40 22.1	1.26 126.6	40 50.1	1.26 126.4	41 18.1	1.26 126.2	41 46.1	1.26 125.9	42 14.0	1.26 125.7	42 41.9	1.26 125.4	43 09.7	1.26 125.2	43 37.5	1.26 124.9	2
	3	40 02.4	1.26 125.5	40 30.3	1.26 125.3	40 58.3	1.26 125.1	41 26.2	1.26 124.8	41 54.0	1.26 124.6	42 21.8	1.26 124.3	42 49.6	1.26 124.1	43 17.4	1.26 123.8	3
	4	39 42.4	1.26 124.4	40 10.3	1.26 124.2	40 38.2	1.26 123.9	41 06.0	1.26 123.7	41 33.8	1.26 123.4	42 01.5	1.26 123.2	42 29.3	1.26 122.9	42 57.0	1.26 122.7	4
	45	39 22.1	1.27 123.3	39 50.0	1.27 123.1	40 17.8	1.27 122.8	40 45.5	1.27 122.6	41 13.3	1.27 122.3	41 41.0	1.27 122.1	42 08.7	1.27 121.8	42 36.3	1.27 121.6	45
	6	39 01.6	1.27 122.2	39 29.4	1.27 122.0	39 57.1												

DECLINATION SAME NAME AS ALTITUDE

D'	27° 30'	27° 30'
Az.	Alt.	Az.
80.0	51 30.0 1.000 180.0	
78.6	51 29.7 1.002 178.6	
77.2	51 29.4 1.004 177.2	
75.8	51 27.3 1.004 175.8	
74.3	51 25.2 1.005 174.3	
72.9	51 22.4 1.006 172.9	
71.5	51 19.1 1.007 171.5	
70.1	51 15.2 1.008 170.1	
68.7	51 10.7 1.009 168.7	
67.3	51 05.6 1.009 167.3	
65.9	50 59.9 1.010 165.9	
64.5	50 53.6 1.011 164.5	
63.1	50 46.8 1.012 163.1	
61.8	50 39.4 1.013 161.7	
60.4	50 31.4 1.014 160.3	
59.0	50 22.9 1.015 158.9	
57.7	50 13.9 1.016 157.5	
56.3	50 04.3 1.017 156.2	
55.0	49 54.2 1.018 154.8	
53.6	49 43.4 1.019 153.3	
52.3	49 32.4 1.020 152.1	
51.0	49 20.7 1.021 150.8	
49.7	49 08.5 1.022 149.5	
48.3	48 55.9 1.023 148.2	
47.0	48 42.8 1.024 146.9	
45.8	48 29.2 1.025 145.6	
44.5	48 15.2 1.026 144.3	
43.2	48 00.7 1.027 143.0	
41.9	47 45.8 1.028 141.7	
40.7	47 30.5 1.029 140.5	
39.4	47 14.7 1.030 139.2	
38.2	46 58.6 1.031 138.0	
37.0	46 42.1 1.032 136.7	
35.7	46 25.2 1.033 135.5	
34.5	46 07.9 1.034 134.3	
33.3	45 50.2 1.035 133.1	
32.1	45 32.2 1.036 131.9	
31.0	45 13.9 1.037 130.7	
29.8	44 55.2 1.038 129.5	
28.6	44 36.3 1.039 128.4	
27.5	44 17.0 1.040 127.2	
26.3	43 57.4 1.041 126.1	
25.2	43 37.5 1.042 124.9	
24.1	43 17.4 1.043 123.8	
23.0	42 57.0 1.044 122.7	
21.9	42 36.3 1.045 121.6	
20.7	42 15.4 1.046 120.4	
19.6	41 54.2 1.047 119.4	
18.5	41 32.8 1.048 118.3	
17.4	41 11.2 1.049 117.2	
16.3	40 49.4 1.050 116.1	
15.2	40 27.4 1.051 115.0	
14.1	40 05.2 1.052 114.0	
13.0	39 42.8 1.053 112.9	
11.9	39 20.3 1.054 111.9	
10.8	38 57.5 1.055 110.9	
9.7	38 34.7 1.056 109.8	
8.6	38 11.6 1.057 108.8	
7.5	37 48.5 1.058 107.8	
6.4	37 25.2 1.059 106.8	
5.3	37 01.7 1.060 105.8	
4.2	36 38.2 1.061 104.8	
3.1	36 14.6 1.062 103.8	
2.0	35 50.8 1.063 102.8	
1.0	35 27.0 1.064 101.9	
0.9	35 03.0 1.065 100.9	
0.8	34 39.0 1.066 99.9	
0.7	34 15.0 1.067 99.0	
0.6	33 50.8 1.068 98.0	
0.5	33 26.6 1.069 97.1	
0.4	33 02.4 1.070 96.1	
0.3	32 38.1 1.071 95.2	
0.2	32 13.8 1.072 94.2	
0.1	31 49.4 1.073 93.3	
0.0	31 25.1 1.074 92.4	
0.0	31 00.7 1.075 91.5	
0.0	30 36.3 1.076 90.5	
0.0	30 11.9 1.077 89.6	
0.0	29 47.5 1.078 88.7	
0.0	29 23.1 1.079 87.8	
0.0	28 58.7 1.080 86.9	
0.0	28 34.3 1.081 86.0	
0.0	28 10.0 1.082 85.1	
0.0	27 45.7 1.083 84.2	
0.0	27 21.4 1.084 83.3	
0.0	26 57.2 1.085 82.4	
0.0	26 33.1 1.086 81.6	
0.0	26 09.0 1.087 80.7	
0.0	25 44.9 1.088 79.8	

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
91	21 24.8	90 40	78.9	21 51.8	90 40	78.6	22 18.7	90 40	78.4	22 45.6	90 40	77.9	23 12.6	90 40	77.7	23 39.5	90 40	77.2	24 06.3	90 40	77.4	24 33.2	90 40	77.2	91
2	21 00.9	90 40	78.0	21 27.9	90 40	77.7	21 54.8	90 40	77.5	22 21.8	90 40	77.3	22 48.7	90 40	77.0	23 15.7	90 40	76.8	23 42.5	90 40	76.5	24 09.4	90 39	76.3	2
3	20 37.0	90 40	77.1	21 04.1	90 40	76.9	21 31.1	90 40	76.6	21 58.0	90 39	76.4	22 25.0	90 39	76.2	22 51.9	90 39	75.9	23 18.9	90 39	75.7	23 45.8	90 39	75.4	3
4	20 13.3	90 39	76.2	20 40.3	90 39	76.0	21 07.4	90 39	75.7	21 34.4	90 39	75.5	22 01.4	90 39	75.3	22 28.3	90 39	75.0	22 55.3	90 39	74.8	23 22.2	90 39	74.6	4
95	19 49.6	90 39	75.3	20 16.7	90 39	75.1	20 43.8	90 39	74.9	21 10.8	90 39	74.6	21 37.8	90 39	74.4	22 04.8	90 39	74.2	22 31.8	90 39	73.9	22 58.7	90 39	73.7	95
6	19 26.1	90 39	74.5	19 53.2	90 39	74.2	20 20.2	90 39	74.0	20 47.3	90 39	73.8	21 14.3	90 39	73.5	21 41.4	90 39	73.3	22 08.4	90 39	73.1	22 35.3	90 39	72.8	6
7	19 02.6	90 39	73.6	19 29.7	90 39	73.4	19 56.8	90 39	73.1	20 23.9	90 39	72.9	20 51.0	90 39	72.7	21 18.0	90 39	72.4	21 45.1	90 39	72.2	22 12.1	90 39	72.0	7
8	18 39.3	91 39	72.7	19 06.4	90 39	72.5	19 33.5	90 39	72.3	20 00.7	90 39	72.0	20 27.8	90 39	71.8	20 54.8	90 38	71.6	21 21.9	90 38	71.3	21 48.9	90 38	71.1	8
9	18 16.0	91 39	71.8	18 43.2	91 38	71.6	19 10.4	91 38	71.4	19 37.5	90 38	71.2	20 04.6	90 38	70.9	20 31.7	90 38	70.7	20 58.8	90 38	70.5	21 25.9	90 38	70.2	9
100	17 52.9	91 38	71.0	18 20.1	91 38	70.7	18 47.3	91 38	70.5	19 14.5	91 38	70.3	19 41.6	90 38	70.1	20 08.8	90 38	69.8	20 35.9	90 38	69.6	21 03.0	90 38	69.4	100
1	17 29.9	91 38	70.1	17 57.1	91 38	69.9	18 24.3	91 38	69.7	18 51.5	91 38	69.4	19 18.7	91 38	69.2	19 45.9	91 38	69.0	20 13.1	90 38	68.8	20 40.2	90 38	68.5	1
2	17 07.0	91 38	69.2	17 34.3	91 38	69.0	18 01.5	91 38	68.8	18 28.8	91 38	68.6	18 56.0	91 38	68.3	19 23.2	91 38	68.1	19 50.4	91 38	67.9	20 17.6	91 38	67.7	2
3	16 44.2	91 38	68.4	17 11.6	91 38	68.1	17 38.8	91 38	67.9	18 06.1	91 38	67.7	18 33.4	91 37	67.5	19 00.6	91 37	67.3	19 27.9	91 37	67.0	19 55.1	91 37	66.8	3
4	16 21.6	91 37	67.5	16 49.0	91 37	67.3	17 16.3	91 37	67.1	17 43.6	91 37	66.8	18 10.9	91 37	66.6	18 38.2	91 37	66.4	19 05.5	91 37	66.2	19 32.7	91 37	66.0	4
105	15 59.2	91 37	66.6	16 26.5	91 37	66.4	16 53.9	91 37	66.2	17 21.2	91 37	66.0	17 48.6	91 37	65.8	18 15.9	91 37	65.5	18 43.2	91 37	65.3	19 10.5	91 37	65.1	105
6	15 36.8	91 37	65.8	16 04.2	91 37	65.5	16 31.6	91 37	65.3	16 59.0	91 37	65.1	17 26.4	91 37	64.9	17 53.8	91 37	64.7	18 21.1	91 37	64.5	18 48.4	91 36	64.3	6
7	15 14.7	92 37	64.9	15 42.1	91 37	64.7	16 09.5	91 37	64.5	16 37.0	91 36	64.3	17 04.4	91 36	64.0	17 31.8	91 36	63.8	17 59.2	91 36	63.6	18 26.5	91 36	63.4	7
8	14 52.6	92 36	64.0	15 20.1	92 36	63.8	15 47.6	92 36	63.6	16 15.1	92 36	63.4	16 42.5	91 36	63.2	17 10.0	91 36	63.0	17 37.4	91 36	62.8	18 04.8	91 36	62.5	8
9	14 30.8	92 36	63.2	14 58.3	92 36	63.0	15 25.8	92 36	62.7	15 53.3	92 36	62.5	16 20.8	92 36	62.3	16 48.3	92 36	62.1	17 15.8	92 36	61.9	17 43.2	91 36	61.7	9
110	14 09.1	92 36	62.3	14 36.7	92 36	62.1	15 04.2	92 36	61.9	15 31.8	92 36	61.7	15 59.3	92 36	61.5	16 26.8	92 36	61.3	16 54.3	92 36	61.1	17 21.8	92 36	60.8	110
1	13 47.6	92 36	61.4	14 15.2	92 36	61.2	14 42.8	92 36	61.0	15 10.4	92 36	60.8	15 37.9	92 36	60.6	16 05.5	92 36	60.4	16 33.1	92 36	60.2	17 00.6	92 36	60.0	1
2	13 26.2	92 36	60.6	13 53.9	92 36	60.4	14 21.5	92 36	60.2	14 49.1	92 36	60.0	15 16.8	92 36	59.8	15 44.4	92 36	59.6	16 12.0	92 36	59.3	16 39.6	92 36	59.1	2
3	13 05.1	92 36	59.7	13 32.8	92 36	59.5	14 00.4	92 36	59.3	14 28.1	92 36	59.1	14 55.8	92 36	58.9	15 23.4	92 36	58.7	15 51.1	92 36	58.5	16 18.7	92 36	58.3	3
4	12 44.1	92 36	58.8	13 11.8	92 36	58.6	13 39.6	92 36	58.4	14 07.3	92 36	58.2	14 35.0	92 36	58.0	15 02.7	92 36	57.8	15 30.4	92 36	57.6	15 58.0	92 36	57.4	4
115	12 23.3	93 34	58.0	12 51.1	93 34	57.8	13 18.9	93 34	57.6	13 46.6	93 34	57.4	14 14.4	93 34	57.2	14 42.1	93 34	57.0	15 09.8	93 34	56.8	15 37.6	93 34	56.6	115
6	12 02.7	93 34	57.1	12 30.5	93 34	56.9	12 58.4	93 34	56.7	13 26.2	93 34	56.5	13 54.0	93 34	56.3	14 21.7	93 34	56.1	14 49.5	93 34	55.9	15 17.3	93 34	55.7	6
7	11 42.3	93 34	56.2	12 10.2	93 34	56.0	12 38.1	93 34	55.9	13 05.9	93 34	55.7	13 33.7	93 34	55.5	14 01.6	93 34	55.3	14 29.4	93 34	55.1	14 57.2	93 34	54.9	7
8	11 22.2	93 34	55.4	11 50.1	93 34	55.2	12 18.0	93 34	55.0	12 45.9	93 34	54.8	13 13.7	93 34	54.6	13 41.6	93 34	54.4	14 09.5	93 34	54.2	14 37.4	93 34	54.0	8
9	11 02.3	93 34	54.5	11 30.1	93 34	54.3	11 58.1	93 34	54.1	12 26.0	93 34	53.9	12 54.0	93 34	53.7	13 21.9	93 34	53.5	13 49.8	93 34	53.3	14 17.7	93 34	53.2	9
120	10 42.4	93 34	53.6	11 10.4	93 34	53.4	11 38.4	93 34	53.2	12 06.4	93 34	53.0	12 34.4	93 34	52.8	13 02.4	93 34	52.6	13 30.3	93 34	52.4	13 58.3	93 34	52.2	120
1	10 22.9	94 32	52.8	10 50.9	94 32	52.6	11 19.0	94 32	52.4	11 47.0	94 32	52.2	12 15.0	94 32	52.0	12 43.1	94 32	51.8	13 11.1	94 32					

Lat. 66°

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.
	Alt.	Az.															
00	52 00.0	1.00 180.0	52 30.0	1.00 180.0	53 00.0	1.00 180.0	54 00.0	1.00 180.0	56 00.0	1.00 180.0	58 00.0	1.00 180.0	58 30.0	1.00 180.0	59 30.0	1.00 180.0	00
1	51 59.7	1.002 178.6	52 29.7	1.002 178.6	52 59.7	1.002 178.5	53 59.7	1.002 178.5	55 59.7	1.002 178.5	57 59.7	1.002 178.4	58 29.7	1.002 178.4	59 29.7	1.002 178.4	1
2	51 58.8	1.003 177.1	52 28.8	1.003 177.1	52 58.8	1.003 177.1	53 58.7	1.003 177.1	55 58.7	1.003 177.0	57 58.7	1.003 176.9	58 28.7	1.003 176.8	59 28.7	1.003 176.8	2
3	51 57.3	1.004 175.7	52 27.2	1.004 175.7	52 57.2	1.004 175.6	53 57.2	1.004 175.6	55 57.1	1.004 175.5	57 57.0	1.004 175.3	58 27.0	1.004 175.3	59 26.9	1.004 175.2	3
4	51 55.1	1.006 174.3	52 25.1	1.006 174.2	52 55.1	1.006 174.2	53 55.0	1.006 174.1	55 54.8	1.006 173.9	57 54.7	1.006 173.8	58 24.6	1.006 173.7	59 24.5	1.006 173.6	4
05	51 52.4	1.006 172.8	52 22.3	1.006 172.8	52 52.3	1.006 172.7	53 52.2	1.006 172.6	55 51.9	1.006 172.4	57 51.7	1.006 172.2	58 21.6	1.006 172.1	59 21.5	1.006 172.0	05
6	51 49.0	1.007 171.4	52 19.0	1.007 171.4	52 48.9	1.007 171.3	53 48.7	1.007 171.2	55 48.4	1.007 170.9	57 48.0	1.007 170.6	58 18.0	1.007 170.6	59 17.8	1.007 170.4	6
7	51 45.1	1.008 170.0	52 15.0	1.008 169.9	52 44.9	1.008 169.9	53 44.7	1.008 169.7	55 44.2	1.008 169.4	57 43.8	1.008 169.1	58 13.6	1.008 169.0	59 13.4	1.008 168.8	7
8	51 40.6	1.009 168.6	52 10.4	1.009 168.5	52 40.3	1.009 168.4	53 40.0	1.009 168.3	55 39.5	1.009 167.9	57 38.8	1.009 167.5	58 08.6	1.009 167.4	59 08.3	1.009 167.2	8
9	51 35.4	1.010 167.2	52 05.3	1.010 167.1	52 35.1	1.010 167.0	53 34.8	1.010 166.8	55 34.0	1.010 166.4	57 33.2	1.010 166.0	58 03.0	1.010 165.9	59 02.6	1.010 165.7	9
10	51 29.7	1.011 165.7	51 59.5	1.011 165.7	52 29.3	1.011 165.6	53 29.2	1.011 165.4	55 28.0	1.011 164.9	57 27.0	1.011 164.5	57 56.8	1.011 164.4	58 56.2	1.011 164.1	10
1	51 23.4	1.012 164.2	51 53.2	1.012 164.2	52 22.9	1.012 164.1	53 22.9	1.012 163.9	55 21.4	1.012 163.5	57 20.2	1.012 163.0	57 49.9	1.012 162.8	58 49.2	1.012 162.5	1
2	51 16.5	1.013 162.9	51 46.3	1.013 162.8	52 16.0	1.013 162.7	53 15.4	1.013 162.5	55 14.1	1.013 162.0	57 12.7	1.013 161.4	57 42.3	1.013 161.3	58 41.6	1.013 161.0	2
3	51 09.1	1.013 161.5	51 38.8	1.013 161.4	52 08.4	1.013 161.3	53 07.7	1.013 161.1	55 06.3	1.013 160.5	57 04.6	1.013 159.9	57 34.2	1.013 159.8	58 33.3	1.013 159.4	3
4	51 01.1	1.014 160.2	51 30.7	1.014 160.0	52 00.3	1.014 159.9	52 59.5	1.014 159.6	54 57.8	1.014 158.9	56 56.0	1.014 158.4	57 25.5	1.014 158.3	58 24.4	1.014 157.9	4
15	50 52.5	1.015 158.8	51 22.1	1.015 158.6	51 51.7	1.015 158.5	52 50.8	1.015 158.2	54 48.8	1.015 157.6	56 46.7	1.015 156.9	57 16.1	1.015 156.8	58 15.0	1.015 156.4	15
6	50 43.4	1.016 157.4	51 12.9	1.016 157.2	51 42.4	1.016 157.1	52 41.4	1.016 156.8	54 39.3	1.016 156.2	56 36.9	1.016 155.5	57 06.2	1.016 155.3	58 04.9	1.016 154.9	6
7	50 33.8	1.017 156.0	51 03.2	1.017 155.9	51 32.7	1.017 155.7	52 31.5	1.017 155.4	54 29.1	1.017 154.7	56 26.4	1.017 154.0	56 55.7	1.017 153.8	57 54.2	1.017 153.4	7
8	50 23.6	1.018 154.7	50 53.0	1.018 154.5	51 22.4	1.018 154.3	52 21.1	1.018 154.0	54 18.4	1.018 153.3	56 15.5	1.018 152.5	56 44.7	1.018 152.3	57 43.0	1.018 151.9	8
9	50 12.9	1.019 153.3	50 42.2	1.019 153.1	51 11.5	1.019 152.9	52 10.2	1.019 152.6	54 07.2	1.019 151.9	56 03.9	1.019 151.1	56 33.1	1.019 150.9	57 31.3	1.019 150.4	9
20	50 01.6	1.020 152.0	50 30.9	1.020 151.8	51 00.2	1.020 151.6	51 58.7	1.020 151.3	53 55.4	1.020 150.5	55 51.9	1.020 149.6	56 20.9	1.020 149.4	57 18.9	1.020 149.0	20
1	49 49.9	1.021 150.6	50 19.9	1.021 150.4	50 48.3	1.021 150.3	51 46.7	1.021 149.9	53 43.2	1.021 149.1	55 39.3	1.021 148.2	56 08.2	1.021 148.0	57 05.9	1.021 147.5	1
2	49 37.7	1.022 149.3	50 06.9	1.022 149.1	50 36.0	1.022 148.9	51 34.2	1.022 148.5	53 30.4	1.022 147.7	55 26.2	1.022 146.8	55 55.1	1.022 146.6	56 52.7	1.022 146.1	2
3	49 25.0	1.023 148.0	49 54.1	1.023 147.8	50 23.2	1.023 147.6	51 21.2	1.023 147.2	53 17.1	1.023 146.3	55 12.6	1.023 145.4	55 41.4	1.023 145.2	56 38.9	1.023 144.6	3
4	49 11.8	1.024 146.7	49 40.8	1.024 146.5	50 09.8	1.024 146.3	51 07.8	1.024 145.9	53 03.3	1.024 145.0	55 05.8	1.024 144.0	55 27.2	1.024 143.8	56 24.5	1.024 143.2	4
25	48 58.2	1.025 145.4	49 27.1	1.025 145.2	49 56.0	1.025 145.0	50 53.8	1.025 144.5	52 49.1	1.025 143.6	54 43.9	1.025 142.6	55 12.5	1.025 142.4	56 09.7	1.025 141.8	25
6	48 44.1	1.026 144.1	49 13.0	1.026 143.9	49 41.8	1.026 143.6	50 39.4	1.026 143.2	52 34.4	1.026 142.3	54 28.9	1.026 141.3	54 57.4	1.026 141.0	55 54.3	1.026 140.5	6
7	48 29.5	1.027 142.8	48 58.3	1.027 142.6	49 27.1	1.027 142.4	50 24.6	1.027 141.9	52 19.2	1.027 141.0	54 13.4	1.027 139.9	54 41.8	1.027 139.7	55 38.6	1.027 139.1	7
8	48 14.6	1.028 141.5	48 43.3	1.028 141.3	49 12.0	1.028 141.1	50 09.3	1.028 140.6	52 03.6	1.028 139.6	53 57.4	1.028 138.6	54 25.8	1.028 138.3	55 22.4	1.028 137.7	8
9	47 59.2	1.029 140.2	48 27.8	1.029 140.0	48 56.5	1.029 139.8	49 53.6	1.029 139.3	51 47.6	1.029 138.3	53 41.1	1.029 137.3	54 09.3	1.029 137.0	55 05.8	1.029 136.4	9
30	47 43.4	1.030 139.0	48 11.9	1.030 138.8	48 40.5	1.030 138.5	49 37.5	1.030 138.1	51 31.2	1.030 137.0	53 24.3	1.030 135.9	53 52.5	1.030 135.7	54 48.7	1.030 135.1	30
1	47 27.1	1.031 137.7	47 55.7	1.031 137.5	48 24.1	1.031 137.3	49 21.0	1.031 136.8	51 14.4	1.031 135.8	53 07.1	1.031 134.6	53 35.2	1.031 134.4	54 31.3	1.031 133.7	1
2	47 10.5	1.032 136.5	47 39.0	1.032 136.3	48 07.4	1.032 136.0	49 04.1	1.032 135.5	50 57.2	1.032 134.5	52 49.6	1.032 133.4	53 17.6	1.032 133.1	54 13.5	1.032 132.4	2
3	46 53.6	1.033 135.3	47 21.9	1.033 135.0	47 50.3	1.033 134.8	48 46.8	1.033 134.3	50 39.6	1.033 133.2	52 31.7	1.033 132.1	52 59.6	1.033 131.8	53 55.3	1.033 131.2	3
4	46 36.2	1.034 134.1	47 04.5	1.034 133.8	47 32.7	1.034 133.6	48 29.2	1.034 133.1	50 21.6	1.034 132.0	52 13.4	1.034 130.8	52 41.2	1.034 130.5	53 36.7	1.034 129.9	4
35	46 18.5	1.035 132.9	46 46.7	1.035 132.6	47 14.9	1.035 132.4	48 11.2	1.035 131.8	50 03.3	1.035 130.7	51 54.7	1.035 129.6	52 22.5	1.035 129.3	53 17.8	1.035 128.6	35
6	46 00.4	1.036 131.7	46 28.6	1.036 131.4	46 56.7	1.036 131.1	47 52.8	1.036 130.6	49 44.6	1.036 129.5	51 35.8	1.036 128.3	52 03.4	1.036 128.0	52 58.6	1.036 127.4	6
7	45 42.0	1.037 130.5	46 10.4	1.037 130.2	46 38.1	1.037 130.0	47 34.1	1.037 129.4	49 25.6	1.037 128.3	51 16.4	1.037 127.1	51 44.0	1.037 126.8	52 39.0	1.037 126.1	7
8	45 23.3	1.038 129.3	45 51.3	1.038 129.0	46 19.3	1.038 128.8	47 15.1	1.038 128.2	49 06.3	1.038 127.1	50 56.8	1.038 125.9	51 24.3	1.038 125.6	52 19.2	1.038 124.9	8
9	45 04.2	1.039 128.1	45 32.2	1.039 127.9	46 00.1	1.039 127.6	46 55.8	1.039 127.1	48 46.7	1.039 125.9	50 36.9	1.039 124.7	51 04.3	1.039 124.4	51 59.0	1.039 123.7	9
40	44 44.9	1.040 127.0	45 12.8	1.040 126.7	45 40.6	1.040 126.4	46 36.2	1.040 125.9	48 26.8	1.040 124.7	50 16.7	1.040 123.5	50 44.1	1.040 123.2	51 38.6	1.040 122.5	40
1	44 25.2	1.041 125.8	44 53.0	1.041 125.5	45 20.8	1.041 125.3	46 16.2	1.041 124.7	48 06.6	1.041 123.6	49 56.2	1.041 122.3	50 23.5	1.041 122.0	51 17.9	1.041 121.3	1
2	44 05.3	1.042 124.7	44 33.0	1.042 124.4	45 00.8	1.042 124.1	45 56.1	1.042 123.6	47 46.1	1.042 122.4	49 35.5	1.042 121.2	50 02.7	1.042 120.8	50 56.9	1.042 120.2	2
3	43 45.1	1.043 123.5	44 12.8	1.043 123.3	44 40.4	1.043 123.0	45 35.6	1.043 122.4	47 25.4	1.043 121.3	49 14.5	1.043 120.0	49 41.6	1.043 119.7	50 35.7	1.043 119.0	3
4	43 24.6	1.044 122.4	43 52.2	1.044 122.1	44 19.8	1.044 121.9	45 14.9	1.044 121.3	47 04.4	1.044 120.1	48 53.2	1.044 118.9	49 20.3	1.044 118.5	50 14.2	1.044 117.9	4
45	43 03.9	1.045 121.3	43 31.4	1.045 121.0	43 59.0	1.045 120.7	44 53.9	1.045 120.2	46 43.2	1.045 119.0	48 31.7	1.045 117.7	48 58.7				

DECLINATION SAME NAME AS LATITUDE

Lat. 66°

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.
	Alt.	Ad At															
91	25 00.0	89 40	25 26.8	89 40	25 53.6	89 39	26 47.0	89 39	28 33.6	89 39	30 19.7	88 39	30 46.2	88 39	31 39.0	88 39	91
2	24 36.3	89 39	25 03.1	89 39	25 29.9	89 39	26 23.4	89 39	28 10.1	89 39	29 56.4	88 39	30 22.8	88 39	31 15.7	88 39	2
3	24 12.6	89 39	24 39.5	89 39	25 06.3	89 39	25 59.9	89 39	27 46.7	89 39	29 33.1	88 39	29 59.6	88 39	30 52.5	88 39	3
4	23 49.1	89 39	24 16.0	89 39	24 42.8	89 39	25 36.4	89 39	27 23.4	89 39	29 09.9	88 39	29 36.4	88 39	30 29.4	88 39	4
95	23 25.6	89 39	23 52.5	89 39	24 19.4	89 39	25 13.1	89 39	27 00.2	89 39	28 46.8	88 39	29 13.4	88 39	30 06.5	88 39	95
6	23 02.3	89 39	23 29.2	89 39	23 56.1	89 39	24 49.9	89 39	26 37.1	89 39	28 23.9	88 39	28 50.5	88 39	29 43.7	88 39	6
7	22 39.1	89 39	23 06.0	89 39	23 33.0	89 39	24 26.8	89 39	26 14.2	89 39	28 01.1	88 39	28 27.8	88 39	29 21.0	88 39	7
8	22 15.9	89 39	22 42.9	89 39	23 09.9	89 39	24 03.8	89 39	25 51.3	89 39	27 38.4	88 39	28 05.1	88 39	28 58.4	88 39	8
9	21 52.9	89 39	22 20.0	89 39	22 47.0	89 39	23 41.0	89 39	25 28.6	89 39	27 15.9	88 39	27 42.6	88 39	28 36.0	88 39	9
100	21 30.1	89 39	21 57.1	89 39	22 24.2	89 39	23 18.2	89 39	25 06.0	89 39	26 53.5	88 39	27 20.2	88 39	28 13.7	88 39	100
1	21 07.3	89 39	21 34.4	89 39	22 01.5	89 39	22 55.6	89 39	24 43.6	89 39	26 31.2	88 39	26 58.0	88 39	27 51.6	88 39	1
2	20 44.7	89 39	21 11.9	89 39	21 39.0	89 39	22 33.2	89 39	24 21.3	89 39	26 09.1	88 39	26 35.9	88 39	27 29.6	88 39	2
3	20 22.3	89 39	20 49.4	89 39	21 16.6	89 39	22 10.9	89 39	23 59.2	89 39	25 47.1	88 39	26 14.0	88 39	27 07.8	88 39	3
4	19 59.9	89 39	20 27.2	89 39	20 54.4	89 39	21 48.7	89 39	23 37.2	89 39	25 25.3	88 39	25 52.3	88 39	26 46.1	88 39	4
105	19 37.8	89 39	20 05.0	89 39	20 32.3	89 39	21 26.7	89 39	23 15.3	89 39	25 03.6	88 39	25 30.2	88 39	26 24.6	88 39	105
6	19 15.7	89 39	19 43.0	89 39	20 10.3	89 39	21 04.8	89 39	22 53.6	89 39	24 42.1	88 39	25 09.2	88 39	26 03.3	88 39	6
7	18 53.9	89 39	19 21.2	89 39	19 48.5	89 39	20 43.1	89 39	22 32.1	89 39	24 20.8	88 39	24 47.9	88 39	25 42.1	88 39	7
8	18 32.2	89 39	18 59.6	89 39	19 26.9	89 39	20 21.6	89 39	22 10.8	89 39	23 59.7	88 39	24 26.8	88 39	25 21.1	88 39	8
9	18 10.7	89 39	18 38.1	89 39	19 05.5	89 39	19 59.1	89 39	21 49.6	89 39	23 38.7	88 39	24 05.9	88 39	25 00.3	88 39	9
110	17 49.3	89 39	18 16.8	89 39	18 44.2	89 39	19 39.1	89 39	21 27.8	89 39	23 17.9	88 39	23 45.2	88 39	24 39.6	88 39	110
1	17 28.1	89 39	17 55.6	89 39	18 23.1	89 39	19 18.1	89 39	21 07.8	89 39	22 57.3	88 39	23 24.6	88 39	24 19.2	88 39	1
2	17 07.1	89 39	17 34.7	89 39	18 02.2	89 39	18 57.3	89 39	20 47.2	89 39	22 36.9	88 39	23 04.3	88 39	23 58.9	88 39	2
3	16 46.3	89 39	17 13.9	89 39	17 41.5	89 39	18 36.7	89 39	20 26.8	89 39	22 16.7	88 39	22 44.1	88 39	23 38.0	88 39	3
4	16 25.7	89 39	16 53.3	89 39	17 21.0	89 39	18 16.2	89 39	20 06.5	89 39	21 56.6	88 39	22 24.1	88 39	23 19.0	88 39	4
115	16 05.3	89 39	16 33.0	89 39	17 00.7	89 39	17 56.0	89 39	19 46.5	89 39	21 36.8	88 39	22 04.3	88 39	22 59.3	88 39	115
6	15 45.0	89 39	16 12.8	89 39	16 40.5	89 39	17 36.0	89 39	19 26.7	89 39	21 17.2	88 39	21 44.8	88 39	22 39.9	88 39	6
7	15 25.0	89 39	15 52.8	89 39	16 20.6	89 39	17 16.1	89 39	19 07.1	89 39	20 57.8	88 39	21 25.4	88 39	22 20.6	88 39	7
8	15 05.2	89 39	15 33.1	89 39	16 00.9	89 39	16 56.5	89 39	18 47.7	89 39	20 38.6	88 39	21 06.3	88 39	22 01.6	88 39	8
9	14 45.6	89 39	15 13.5	89 39	15 41.4	89 39	16 37.1	89 39	18 28.5	89 39	20 19.6	88 39	20 47.3	88 39	21 42.8	88 39	9
120	14 26.2	89 39	14 54.2	89 39	15 22.1	89 39	16 17.9	89 39	18 09.5	89 39	20 00.8	88 39	20 28.6	88 39	21 24.2	88 39	120
1	14 07.1	89 39	14 35.1	89 39	15 03.1	89 39	15 59.0	89 39	17 50.7	89 39	19 42.3	88 39	20 10.2	88 39	21 05.8	88 39	1
2	13 48.1	89 39	14 16.2	89 39	14 44.2	89 39	15 40.3	89 39	17 32.2	89 39	19 24.0	88 39	19 51.9	88 39	20 47.7	88 39	2
3	13 29.4	89 39	13 57.5	89 39	14 25.6	89 39	15 21.8	89 39	17 13.9	89 39	19 05.9	88 39	19 33.9	88 39	20 29.8	88 39	3
4	13 11.0	89 39	13 39.1	89 39	14 07.3	89 39	15 03.5	89 39	16 55.9	89 39	18 48.1	88 39	19 16.1	88 39	20 12.1	88 39	4
125	12 52.8	89 39	13 20.9	89 39	13 49.1	89 39	14 45.4	89 39	16 38.1	89 39	18 30.5	88 39	18 58.6	88 39	19 54.7	88 39	125
6	12 34.8	89 39	13 03.0	89 39	13 31.2	89 39	14 27.7	89 39	16 20.5	89 39	18 13.1	88 39	18 41.3	88 39	19 37.5	88 39	6
7	12 17.0	89 39	12 45.3	89 39	13 13.6	89 39	14 10.2	89 39	16 03.2	89 39	17 56.0	88 39	18 24.2	88 39	19 20.6	88 39	7
8	11 59.5	89 39	12 27.9	89 39	13 02.2	89 39	13 58.9	89 39	15 46.1	89 39	17 39.2	88 39	18 07.4	88 39	19 03.9	88 39	8
9	11 42.3	89 39	12 10.7	89 39	12 39.1	89 39	13 35.8	89 39	15 29.3	89 39	17 22.6	88 39	17 50.9	88 39	18 47.4	88 39	9
130	11 25.3	89 39	11 53.8	89 39	12 22.2	89 39	13 19.1	89 39	15 12.7	89 39	17 06.2	88 39	17 34.6	88 39	18 31.3	88 39	130
1	11 08.6	89 39	11 37.1	89 39	12 05.6	89 39	13 02.6	89 39	14 56.4	89 39	16 50.1	88 39	17 18.5	88 39	18 15.3	88 39	1
2	10 52.2	89 39	11 20.7	89 39	11 49.3	89 39	12 46.3	89 39	14 40.4	89 39	16 34.3	88 39	17 02.8	88 39	17 59.7	88 39	2
3	10 36.0	89 39	11 04.6	89 39	11 33.2	89 39	12 30.4	89 39	14 24.6	89 39	16 18.8	88 39	16 47.3	88 39	17 44.3	88 39	3
4	10 20.1	89 39	10 48.8	89 39	11 17.4	89 39	12 14.7	89 39	14 09.1	89 39	16 03.5	88 39	16 32.0	88 39	17 29.2	88 39	4
135	10 04.5	89 39	10 33.2	89 39	11 01.9	89 39	11 59.2	89 39	13 53.9	89 39	15 48.5	88 39	16 17.1	88 39	17 14.3	88 39	135
6	9 49.2	89 39	10 17.9	89 39	10 46.7	89 39	11 44.1	89 39	13 39.0	89 39	15 33.7	88 39	16 02.4	88 39	16 59.8	88 39	6
7	9 34.1	89 39	10 02.9	89 39	10 31.7	89 39	11 29.3	89 39	13 24.3	89 39	15 19.3	88 39	15 48.0	88 39	16 45.5	88 39	7
8	9 19.4	89 39	9 48.2	89 39	10 17.0	89 39	11 14.7	89 39	13 10.0	89 39	15 05.1	88 39	15 33.9	88 39	16 31.5	88 39	8
9	9 04.9	89 39	9 33.8	89 39	10 02.7	89 39	11 00.4	89 39	12 55.9	89 39	14 51.3	88 39	15 20.1	88 39	16 17.7	88 39	9
140	8 50.7	89 39	9 19.7	89 39	9 48.6	89 39	10 46.4	89 39	12 42.1	89 39	14 37.7	88 39	15 06.5	88 39	16 04.3	88 39	140
1	8 36.9	89 39	9 05.9	89 39	9 34.8	89 39	10 32.8	89 39	12 28.6	89 39	14 24.4	88 39	14 53.3	88 39	15 51.2	88 39	1
2	8 23.3	89 39	8 52.3	89 39	9 21.4	89 39	10 19.4	89 39	12 15.4	89 39	14 11.4	88 39	14 40.4	88 39	15 38.3	88 39	2
3	8 10.1	89 39	8 39.1	89 39	9 08.2	89 39	10 06.3	89 39	12 02.5	89 39	13 58.7	88 39	14 27.7	88 39	15 25.7	88 39	3
4	7 57.1	89 39	8 26.2	89 39	8 55.3	89 39	9 53.6	89 39	11 49.9	89 39	13 46.3	88 39	14 15.4	88 39	15 13.5	88 39	4
145	7 44.5	89 39	8 13.6	89 39	8 42.8	89 39	9 41.0	89 39	11 37.7	89 39	13 34.2	88 39	14 03.6	88 39	14 49.9	88 39	145
6	7 32.2	89 39	8 01.4	89 39	8 30.6	89 39	9 29.0	89 39	11 25.7	89 39	13 22.4	88 39	13 51.7	88 39	14 38.6	88 39	6

Lat. 66°

H.A.	86° 00'		87° 00'		88° 30'		40° 00'		42° 00'		42° 30'		43° 00'		45° 00'		H.A.
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.											
00	60 00.0	1.001 180.0	61 00.0	1.001 180.0	62 30.0	1.001 180.0	64 00.0	1.001 180.0	66 00.0	1.001 180.0	66 30.0	1.001 180.0	67 00.0	1.001 180.0	69 00.0	1.001 180.0	00
1	59 59.7	1.002 178.4	60 59.6	1.002 178.4	62 29.6	1.002 178.3	63 59.6	1.002 178.3	65 59.6	1.002 178.2	66 29.6	1.002 178.2	66 59.6	1.002 178.1	68 59.6	1.002 178.0	1
2	59 58.6	1.003 176.8	60 58.6	1.003 176.7	62 28.6	1.003 176.6	63 58.6	1.003 176.6	65 58.4	1.003 176.5	66 28.4	1.003 176.5	66 58.4	1.003 176.4	68 58.3	1.004 176.1	2
3	59 56.9	1.004 175.2	60 56.8	1.004 175.1	62 26.8	1.004 174.9	63 56.7	1.004 174.8	65 56.5	1.005 174.5	66 26.5	1.005 174.5	66 56.4	1.005 174.4	68 56.2	1.005 174.1	3
4	59 54.5	1.005 173.5	60 54.4	1.005 173.4	62 24.2	1.005 173.2	63 54.1	1.006 173.0	65 53.8	1.006 172.7	66 23.7	1.006 172.6	66 53.6	1.006 172.5	68 53.3	1.006 172.1	4
05	59 51.4	1.006 171.9	60 51.3	1.006 171.8	62 21.0	1.007 171.5	63 50.7	1.007 171.3	65 50.3	1.007 170.9	66 20.2	1.007 170.8	66 50.1	1.007 170.7	68 49.5	1.008 170.2	05
6	59 47.6	1.007 170.3	60 47.6	1.007 170.2	62 17.1	1.008 169.9	63 46.7	1.008 169.6	65 46.1	1.008 169.1	66 15.9	1.008 169.0	66 45.7	1.008 168.8	68 45.0	1.008 168.2	6
7	59 43.2	1.008 168.7	60 43.2	1.008 168.5	62 12.4	1.009 168.2	63 41.9	1.009 167.8	65 41.1	1.009 167.3	66 10.9	1.009 167.1	66 40.6	1.009 166.9	68 39.6	1.009 166.3	7
8	59 38.1	1.009 167.1	60 37.7	1.009 166.9	62 07.1	1.009 166.5	63 36.4	1.009 166.1	65 35.3	1.009 165.5	66 05.0	1.009 165.3	66 34.7	1.009 165.2	68 33.4	1.009 164.4	8
9	59 32.3	1.010 165.5	60 31.8	1.010 165.3	62 01.1	1.010 164.9	63 30.2	1.010 164.4	65 28.9	1.010 163.7	65 58.5	1.010 163.5	66 28.1	1.010 163.3	68 26.5	1.010 162.5	9
10	59 25.9	1.012 164.0	60 25.3	1.012 163.7	61 54.4	1.012 163.2	63 23.3	1.012 162.7	65 21.7	1.012 162.0	65 51.2	1.012 161.8	66 20.8	1.012 161.5	68 18.7	1.012 160.6	10
1	59 18.9	1.013 162.4	60 18.3	1.013 162.1	61 47.0	1.013 161.6	63 15.7	1.013 161.0	65 13.8	1.013 160.2	65 43.2	1.013 160.0	66 12.7	1.013 159.8	68 10.2	1.013 158.7	1
2	59 11.2	1.014 160.8	60 10.9	1.014 160.5	61 38.9	1.014 160.0	63 07.4	1.014 159.4	65 05.2	1.014 158.5	65 34.5	1.014 158.2	66 03.9	1.014 158.0	68 01.0	1.014 156.9	2
3	59 02.8	1.015 159.3	60 01.8	1.015 158.9	61 30.3	1.015 158.3	62 58.5	1.015 157.7	64 55.9	1.015 156.8	65 25.1	1.015 156.5	65 54.4	1.015 156.2	67 51.1	1.015 155.0	3
4	58 53.9	1.016 157.7	59 52.8	1.016 157.4	61 20.9	1.016 156.7	62 48.9	1.016 156.1	64 45.9	1.016 155.1	65 15.1	1.016 154.8	65 44.2	1.016 154.5	67 40.7	1.016 153.2	4
15	58 44.3	1.017 156.2	59 43.1	1.017 155.8	61 11.0	1.017 155.2	62 38.7	1.017 154.4	64 35.3	1.017 153.4	65 04.4	1.017 153.1	65 33.4	1.017 152.8	67 29.1	1.017 151.4	15
6	58 34.2	1.018 154.7	59 32.8	1.018 154.3	61 00.4	1.018 153.6	62 27.9	1.018 152.8	64 24.0	1.018 151.7	64 53.0	1.018 151.4	65 21.9	1.018 151.1	67 17.1	1.018 149.7	6
7	58 23.5	1.019 153.2	59 21.9	1.019 152.7	60 49.3	1.019 152.0	62 16.4	1.019 151.0	64 12.2	1.019 150.0	64 41.9	1.019 149.7	65 09.8	1.019 149.4	67 04.5	1.019 147.9	7
8	58 12.2	1.020 151.7	59 10.4	1.020 151.2	60 37.5	1.020 150.5	62 04.4	1.020 149.6	63 59.7	1.020 148.4	64 28.4	1.020 148.1	64 57.1	1.020 147.7	66 51.2	1.020 146.2	8
9	58 00.3	1.021 150.2	58 58.4	1.021 149.7	60 25.2	1.021 148.9	61 51.8	1.021 148.1	63 46.6	1.021 146.8	64 15.2	1.021 146.5	64 43.7	1.021 146.1	66 37.4	1.021 144.5	9
20	57 47.9	1.022 148.7	58 45.8	1.022 148.2	60 12.3	1.022 147.4	61 38.6	1.022 146.5	63 32.9	1.022 145.2	64 01.4	1.022 144.8	64 29.8	1.022 144.5	66 22.9	1.022 142.9	20
1	57 35.0	1.023 147.3	58 32.7	1.023 146.7	59 58.9	1.023 145.9	61 24.8	1.023 145.0	63 18.7	1.023 143.6	63 47.1	1.023 143.3	64 15.4	1.023 142.9	66 07.9	1.023 141.2	1
2	57 21.5	1.024 145.8	58 19.0	1.024 145.3	59 45.0	1.024 144.4	61 10.6	1.024 143.5	63 04.0	1.024 142.1	63 32.2	1.024 141.7	64 00.4	1.024 141.3	65 52.4	1.024 139.6	2
3	57 07.6	1.025 144.4	58 04.9	1.025 143.8	59 30.5	1.025 142.9	60 55.8	1.025 142.0	62 48.8	1.025 140.5	63 16.9	1.025 140.2	63 44.9	1.025 139.8	65 36.3	1.025 138.0	3
4	56 53.1	1.026 143.0	57 50.2	1.026 142.4	59 15.6	1.026 141.5	60 40.5	1.026 140.5	62 33.0	1.026 139.0	63 01.0	1.026 138.6	63 28.9	1.026 138.2	65 19.7	1.026 136.4	4
25	56 38.2	1.027 141.6	57 35.1	1.027 141.0	59 00.1	1.027 140.0	60 24.7	1.027 139.0	62 16.8	1.027 137.5	62 44.6	1.027 137.1	63 12.4	1.027 136.7	65 02.7	1.027 134.9	25
6	56 22.8	1.028 140.2	57 19.5	1.028 139.6	58 44.2	1.028 138.6	60 08.5	1.028 137.6	62 00.1	1.028 136.1	62 27.8	1.028 135.6	62 55.4	1.028 135.2	64 45.1	1.028 133.4	6
7	56 06.9	1.029 138.8	57 03.4	1.029 138.2	58 27.9	1.029 137.2	59 51.8	1.029 136.2	61 42.9	1.029 134.6	62 10.5	1.029 134.2	62 38.0	1.029 133.8	64 27.2	1.029 131.9	7
8	55 50.6	1.030 137.4	56 47.0	1.030 136.8	58 11.1	1.030 135.8	59 34.7	1.030 134.7	61 25.3	1.030 133.2	61 52.8	1.030 132.7	62 20.2	1.030 132.3	64 08.8	1.030 130.4	8
9	55 33.9	1.031 136.1	56 30.0	1.031 135.5	57 53.9	1.031 134.4	59 17.2	1.031 133.4	61 07.3	1.031 131.8	61 34.6	1.031 131.3	62 01.9	1.031 130.9	63 50.0	1.031 129.0	9
30	55 16.8	1.032 134.8	56 12.7	1.032 134.1	57 36.2	1.032 133.1	58 59.2	1.032 132.0	60 48.9	1.032 130.4	61 16.1	1.032 129.9	61 43.3	1.032 129.5	63 30.9	1.032 127.6	30
1	54 59.2	1.033 133.4	55 55.0	1.033 132.8	57 18.2	1.033 131.7	58 40.9	1.033 130.6	60 30.1	1.033 129.0	60 57.2	1.033 128.5	61 24.2	1.033 128.1	63 11.4	1.033 126.2	1
2	54 41.3	1.034 132.1	55 36.9	1.034 131.5	56 59.8	1.034 130.4	58 22.2	1.034 129.3	60 11.0	1.034 127.6	60 38.0	1.034 127.2	61 04.9	1.034 126.7	62 51.5	1.034 124.8	2
3	54 23.0	1.035 130.8	55 18.4	1.035 130.2	56 41.1	1.035 129.1	58 03.1	1.035 128.0	59 51.5	1.035 126.3	60 18.3	1.035 125.8	60 45.1	1.035 125.4	62 31.3	1.035 123.4	3
4	54 04.4	1.036 129.6	55 04.6	1.036 128.9	56 21.9	1.036 127.8	57 43.7	1.036 126.7	59 31.6	1.036 125.0	59 58.4	1.036 124.5	60 25.1	1.036 124.1	62 10.7	1.036 122.1	4
35	53 45.4	1.037 128.3	54 40.4	1.037 127.6	56 02.5	1.037 126.5	57 24.0	1.037 125.4	59 11.5	1.037 123.7	59 38.1	1.037 123.2	60 04.7	1.037 122.8	61 49.9	1.037 120.8	35
6	53 26.1	1.038 127.0	54 20.9	1.038 126.4	55 42.7	1.038 125.3	57 03.9	1.038 124.1	58 51.0	1.038 122.4	59 17.6	1.038 121.9	59 44.0	1.038 121.5	61 28.8	1.038 119.5	6
7	53 06.5	1.039 125.8	54 01.1	1.039 125.1	55 22.7	1.039 124.0	56 43.5	1.039 122.8	58 30.3	1.039 121.1	58 56.7	1.039 120.7	59 23.1	1.039 120.2	61 07.4	1.039 118.2	7
8	52 46.5	1.040 124.6	53 41.0	1.040 123.9	55 02.3	1.040 122.8	56 22.9	1.040 121.6	58 09.2	1.040 119.9	58 35.6	1.040 119.4	59 01.9	1.040 118.9	60 45.8	1.040 117.0	8
9	52 26.3	1.041 123.4	53 20.6	1.041 122.7	54 41.6	1.041 121.6	56 02.0	1.041 120.4	57 47.9	1.041 118.6	58 14.2	1.041 118.2	58 40.4	1.041 117.7	60 23.9	1.041 115.7	9
40	52 05.8	1.042 122.2	52 59.9	1.042 121.5	54 20.7	1.042 120.3	55 40.8	1.042 119.2	57 26.4	1.042 117.4	57 52.6	1.042 117.0	58 17.0	1.042 116.5	60 01.8	1.042 114.5	40
1	51 45.0	1.043 121.0	52 39.0	1.043 120.3	53 59.5	1.043 119.2	55 19.3	1.043 118.0	57 04.6	1.043 116.2	57 30.7	1.043 115.8	57 56.7	1.043 115.3	59 39.5	1.043 113.3	1
2	51 23.9	1.044 119.8	52 17.8	1.044 119.1	53 38.1	1.044 118.0	54 57.7	1.044 116.8	56 42.6	1.044 115.0	57 08.6	1.044 114.6	57 34.5	1.044 114.1	59 17.0	1.044 112.1	2
3	51 02.6	1.045 118.7	51 56.3	1.045 117.9	53 16.4	1.045 116.8	54 35.8	1.045 115.6	56 20.4	1.045 113.9	56 46.3	1.045 113.4	57 12.2	1.045 112.9	58 54.3	1.045 111.0	3
4	50 41.1	1.046 117.5	51 34.7	1.046 116.8	52 54.5	1.046 115.7	54 13.7	1.046 114.5	55 58.0	1.046 112.7	56 23.8	1.046 112.3	56 49.8	1.046 111.8	58 31.5	1.046 109.8	4
45	50 19.3	1.047 116.4	51 12.8	1.047 115.6	52 32.4	1.047 114.5	53 51.3	1.047 113.3	55 35.4	1.047 111.6	56 01.2	1.047 111.1</					

Partial table on the left edge showing declination values for latitudes 45° 00' to 89° 00'.

Main table with columns for H.A., Alt., Az., and declination values for latitudes 66° to 89°.

Partial table on the right edge showing declination values for latitudes 66° to 89°.

Lat. 66°

H.A.	46° 00'		47° 00'		48° 30'		49° 30'		50° 30'		51° 30'		52° 30'		54° 00'		H.A.
	Alt.	Az.															
00	70 00.0	1.001 180.0	71 00.0	1.001 180.0	72 30.0	1.001 180.0	73 30.0	1.001 180.0	74 30.0	1.001 180.0	75 30.0	1.001 180.0	76 30.0	1.001 180.0	78 00.0	1.001 180.0	00
1	69 59.6	1.002 178.0	70 59.6	1.002 177.9	72 29.5	1.002 177.8	73 29.5	1.002 177.7	74 29.5	1.002 177.6	75 29.5	1.002 177.5	76 29.4	1.003 177.4	77 59.4	1.003 177.2	1
2	69 58.3	1.004 175.9	70 58.2	1.004 175.8	72 28.1	1.004 175.6	73 28.1	1.004 175.4	74 28.0	1.004 175.2	75 27.9	1.004 175.0	76 27.8	1.005 174.8	77 57.6	1.005 174.4	2
3	69 56.1	1.006 173.9	70 56.0	1.006 173.7	72 25.8	1.006 173.4	73 25.6	1.006 173.2	74 25.4	1.006 172.9	75 25.2	1.006 172.6	76 25.0	1.006 172.2	77 54.6	99 07 171.6	3
4	69 53.1	1.008 171.9	70 52.9	1.007 171.6	72 22.5	1.007 171.2	73 22.2	1.007 170.9	74 21.9	99 08 170.5	75 21.6	99 08 170.1	76 21.2	99 08 169.6	77 50.4	99 09 168.8	4
05	69 49.2	99 09 169.9	70 48.9	99 08 169.6	72 18.3	99 08 169.0	73 17.9	99 09 168.6	74 17.4	99 09 168.2	75 16.9	99 10 167.7	76 16.2	99 10 167.1	77 45.1	99 11 166.0	05
6	69 44.5	99 09 167.9	70 44.1	99 10 167.5	72 13.3	99 10 166.9	73 12.6	99 10 166.4	74 11.9	99 11 165.9	75 11.2	99 11 165.3	76 10.3	98 12 164.6	77 38.7	98 13 163.3	6
7	69 39.0	99 11 165.9	70 38.4	99 11 165.5	72 07.3	99 11 164.7	73 06.4	98 12 164.2	74 05.5	98 12 163.6	75 04.5	98 13 162.9	76 03.3	98 13 162.1	77 31.1	97 14 160.6	7
8	69 32.7	98 12 163.9	70 31.8	98 12 163.5	72 00.4	98 13 162.6	72 59.3	98 13 162.0	73 58.1	98 14 161.3	74 56.8	98 14 160.5	75 55.2	97 15 159.6	77 22.5	97 16 158.0	8
9	69 25.5	98 13 162.0	70 24.5	98 14 161.4	71 52.7	98 14 160.5	72 51.4	98 15 159.8	73 49.7	97 15 159.1	74 48.2	97 16 158.2	75 46.3	97 17 157.2	77 12.8	96 18 155.4	9
10	69 17.6	98 14 160.1	70 16.3	98 15 159.5	71 44.2	97 16 158.5	72 42.5	97 16 157.7	73 40.7	97 17 156.9	74 38.7	96 17 155.9	75 36.3	98 18 154.8	77 02.2	95 19 152.9	10
1	69 08.9	98 16 158.1	70 07.4	97 16 157.5	71 34.8	97 17 156.4	72 32.9	97 17 155.6	73 30.9	96 18 154.7	74 28.9	96 19 153.7	75 25.5	95 19 152.5	76 50.7	94 21 150.5	1
2	68 59.4	97 17 156.2	69 57.6	97 17 155.6	71 24.6	96 18 154.4	72 22.4	96 19 153.5	73 19.8	96 19 152.5	74 17.0	95 20 151.5	75 13.8	94 21 150.2	76 38.2	93 23 148.1	2
3	68 49.2	97 18 154.4	69 47.2	96 19 153.6	71 13.7	96 19 152.4	72 11.1	96 20 151.5	73 08.2	95 21 150.4	74 05.0	94 21 149.3	75 01.3	94 22 148.0	76 10.9	92 24 145.7	3
4	68 38.3	96 19 152.5	69 36.0	96 20 151.8	71 02.0	96 21 150.4	71 59.1	95 21 149.5	72 55.8	94 22 148.4	73 52.1	94 23 147.2	74 48.0	93 23 145.8	76 12.7	91 25 143.5	4
15	68 26.7	96 20 150.7	69 24.1	95 21 149.9	70 49.6	95 22 148.5	71 46.3	94 22 147.5	72 42.6	94 23 146.4	73 38.5	93 24 145.1	74 33.9	92 25 143.7	75 55.8	90 26 141.3	15
6	68 14.4	95 22 148.9	69 11.5	95 22 148.1	70 36.6	94 23 146.6	71 32.9	94 24 145.6	72 28.8	93 24 144.4	73 24.2	92 25 143.1	74 19.1	91 26 141.6	75 40.2	89 27 139.1	6
7	68 01.5	95 23 147.1	68 58.2	94 23 146.2	70 22.8	94 24 144.8	71 18.7	93 25 143.7	72 14.2	92 25 142.4	73 09.2	91 26 141.1	74 03.6	90 27 139.6	75 23.9	88 28 137.0	7
8	67 47.9	94 24 145.4	68 44.4	94 24 144.5	70 08.4	93 25 142.9	71 03.9	92 26 141.8	71 59.0	91 26 140.5	72 53.6	90 27 139.2	73 47.5	89 28 137.6	75 06.9	87 29 135.0	8
9	67 33.8	94 25 143.7	68 29.9	93 25 142.7	69 53.4	92 26 141.1	70 48.5	92 27 140.0	71 43.2	91 27 138.7	72 37.3	90 28 137.3	73 30.7	88 29 135.7	74 49.4	86 30 133.0	9
20	67 19.0	93 26 142.0	68 14.8	93 26 141.0	69 37.8	92 27 139.4	70 32.6	91 28 138.2	71 26.8	90 28 136.9	72 20.4	89 29 135.4	73 13.4	88 30 133.8	74 31.3	85 31 131.1	20
1	67 03.7	93 28 140.3	67 59.2	92 27 139.3	69 21.6	91 28 137.6	70 16.0	90 28 136.4	71 09.8	89 29 135.1	72 03.0	88 30 133.6	72 55.7	87 31 132.0	74 12.6	84 32 129.3	1
2	66 47.9	92 27 138.7	67 43.0	92 28 137.6	69 04.9	90 28 136.0	69 58.9	90 29 134.7	70 52.4	89 30 133.3	71 45.1	87 31 131.9	72 37.2	86 31 130.2	73 53.5	84 33 127.5	2
3	66 31.5	92 28 137.0	67 26.3	91 29 136.0	68 47.7	90 30 134.3	69 41.3	89 30 133.0	70 34.4	88 31 131.6	71 26.7	87 31 130.1	72 18.3	85 32 128.5	73 33.9	83 33 125.7	3
4	66 14.6	91 29 135.5	67 09.1	90 29 134.4	68 30.0	89 30 132.7	69 23.2	88 31 131.4	70 15.9	87 32 130.0	71 07.8	86 32 128.5	71 59.0	84 33 126.8	73 13.9	82 34 124.0	4
25	65 57.3	91 30 133.9	66 51.4	90 30 132.8	68 11.8	89 31 131.1	69 04.7	88 32 129.8	69 57.0	87 32 128.4	70 48.5	86 33 126.8	71 39.2	84 34 125.2	72 53.3	81 35 122.4	25
6	65 39.4	90 30 132.4	66 33.3	89 31 131.3	67 53.2	88 32 129.5	68 45.7	87 32 128.2	69 37.6	86 33 126.8	70 28.8	85 34 125.2	71 19.1	83 34 123.6	72 32.7	80 35 120.8	6
7	65 21.2	90 31 130.9	66 14.8	89 32 129.8	67 34.2	88 32 128.0	68 26.5	86 33 126.6	69 17.9	85 34 125.2	70 08.7	84 34 123.7	70 58.6	82 35 122.0	72 11.6	80 36 119.2	7
8	65 05.5	89 32 129.4	65 55.8	88 32 128.3	67 14.7	87 33 126.5	68 06.6	86 34 125.1	68 57.8	85 34 123.7	69 48.2	83 35 122.2	70 37.7	82 35 120.5	71 50.1	79 36 117.7	8
9	64 43.5	89 32 127.9	65 36.5	88 33 126.8	66 54.9	86 34 125.0	67 46.4	85 34 123.7	68 37.3	84 35 122.2	69 27.3	83 35 120.7	70 16.5	81 36 119.0	71 28.4	78 37 116.3	9
30	64 24.1	88 33 126.5	65 16.7	87 33 125.4	66 34.7	86 34 123.5	67 26.0	85 35 122.2	68 16.5	84 35 120.8	69 06.2	83 36 119.2	69 55.0	81 36 117.6	71 06.3	78 37 114.8	30
1	64 04.3	88 34 125.1	64 56.7	87 34 124.0	66 14.2	85 35 122.1	67 05.2	84 35 120.8	67 55.4	83 36 119.4	68 44.8	82 36 117.8	69 33.3	80 37 116.2	70 44.1	77 38 113.4	1
2	63 44.1	87 34 123.7	64 36.3	86 35 122.6	65 53.4	85 36 120.7	66 44.0	84 36 119.4	67 33.9	83 36 118.0	68 23.0	81 37 116.4	69 11.2	80 37 114.8	70 21.6	77 38 112.1	2
3	63 23.7	87 35 122.4	64 15.5	86 35 121.2	65 32.3	84 36 119.4	66 22.6	83 36 118.0	67 12.3	82 37 116.6	68 01.1	81 37 115.1	68 49.0	79 38 113.4	69 58.8	76 38 110.7	3
4	63 02.9	86 35 121.0	63 54.5	86 36 119.9	65 10.9	84 36 118.0	66 01.0	83 37 116.7	66 50.3	82 37 115.3	67 38.8	80 37 113.7	68 26.4	79 38 112.1	69 35.9	75 38 109.5	4
35	62 41.8	86 36 119.7	63 33.2	85 36 118.6	64 49.2	84 37 116.7	65 39.0	83 37 115.4	66 28.1	81 37 114.0	67 16.4	80 38 112.4	68 03.7	78 38 110.8	69 12.8	75 39 108.2	35
6	62 20.5	86 36 118.4	63 11.7	85 36 117.3	64 27.3	83 37 115.4	65 16.9	82 37 114.1	66 05.7	81 38 112.7	66 53.7	79 38 111.2	67 40.8	78 38 109.6	68 49.6	75 39 107.0	6
7	61 58.9	85 36 117.1	62 49.8	84 37 116.0	64 05.1	83 37 114.2	64 54.5	82 38 112.8	65 43.1	80 38 111.4	66 30.9	79 38 109.9	67 17.8	77 39 108.3	68 26.2	75 39 105.8	7
8	61 37.1	85 37 115.9	62 27.8	84 37 114.7	63 42.8	82 38 112.9	64 31.9	81 38 111.6	65 20.3	80 38 110.2	66 07.9	79 39 108.7	66 54.5	77 39 107.1	68 02.6	74 39 104.6	8
9	61 15.0	85 37 114.6	62 05.5	84 37 113.5	63 20.2	82 38 111.7	64 09.1	81 38 110.4	64 57.3	80 39 109.0	65 44.7	78 39 107.5	66 31.1	77 39 106.0	67 38.9	74 40 103.4	9
40	60 52.7	84 38 113.4	61 43.0	83 38 112.3	62 57.4	82 38 110.5	63 46.1	81 39 109.2	64 34.1	79 39 107.8	65 21.3	78 39 106.3	66 07.6	76 39 104.8	67 15.1	74 40 102.3	40
1	60 30.2	84 38 112.2	61 20.4	83 38 111.1	62 34.5	82 39 109.3	63 23.0	80 39 108.0	64 10.8	79 39 106.6	64 57.8	78 39 105.2	65 43.9	76 40 103.7	66 51.2	73 40 101.2	1
2	60 07.5	84 38 111.1	60 57.5	83 38 109.9	62 11.3	81 39 108.1	62 59.7	80 39 106.9	63 47.4	79 39 105.5	64 34.2	77 40 104.1	65 20.2	76 40 102.5	66 27.2	73 40 100.1	2
3	59 44.7	83 38 109.9	60 34.5	83 39 108.8	61 48.1	81 39 107.0	62 36.3	80 39 105.7	63 23.8	79 40 104.4	64 10.5	77 40 102.9	64 56.3	76 40 101.4	66 03.2	73 40 99.0	3
4	59 21.7	83 39 108.8	60 11.3	82 39 107.6	61 24.7	81 39 105.9	62 12.7	80 39 104.6	63 00.1	78 40 103.3	63 46.6	77 40 101.9	64 32.3	75 40 100.4	65 39.9	73 40 98.0	4
45	58 58.5	83 39 107.6	59 48.0	82 39 106.5	61 01.1	80 39 104.8	61 49.1	79 40 103.5	62 36.3	78 40 102.2	63 22.7	77 40 100.8	64 0				

Table on the left side of the page, partially cut off, showing astronomical data for various latitudes and declinations.

Main table with columns for H.A., Alt., Az., and declination values (46° 00' to 54° 00'). It contains a grid of numerical data for each combination of latitude and declination.

Lat. 66°

Lat. 67°

Lat. 68°

Lat. 69°

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and values for various declinations (54° 30' to 59° 30'). Each declination has a sub-column for Az. and a column for values. The table is organized in 5-degree intervals.

Main table with columns for H.A., Alt., Az., and declination values for various latitude ranges from 54° 30' to 59° 30'.

Lat. 66°

Lat. 67°

Lat. 68°

Lat. 69°

Vertical text on the left margin containing various numbers and partial table entries.

Lat. 66°

H.A.	60° 00'		60° 30'		62° 00'		62° 30'		63° 00'		69° 00'		69° 30'		74° 30'		H.A.					
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.						
00	84 00.0	1.02	180.0	84 30.0	1.02	180.0	86 00.0	1.02	180.0	86 30.0	1.03	180.0	87 00.0	1.02	00.0	86 30.0	1.02	00.0	81 30.0	1.01	00.0	00
1	83 59.0	1.05	175.2	84 28.9	1.05	174.9	85 58.6	99 07	173.3	86 28.4	99 09	171.4	86 58.6	99 07	06.8	86 28.8	99 06	05.7	81 29.6	1.02	01.8	1
2	83 55.9	99 08	170.5	84 25.6	99 09	169.8	85 54.3	98 12	166.7	86 23.6	97 13	165.2	86 52.8	97 14	163.1	86 54.3	96 12	13.4	81 28.5	1.03	03.6	2
3	83 51.0	97 14	165.9	84 20.3	96 12	164.9	85 47.4	96 16	160.4	86 16.0	95 17	158.2	86 44.1	93 19	155.3	86 47.3	92 16	19.6	81 26.5	99 04	05.4	3
4	83 44.1	97 14	161.4	84 12.9	96 15	160.1	85 38.1	93 19	154.5	86 05.6	91 21	151.8	86 32.5	88 23	148.3	86 38.0	88 19	25.2	81 23.9	98 06	07.2	4
05	83 35.4	96 17	157.0	84 03.7	94 18	155.5	85 26.5	89 22	149.0	85 53.0	87 24	145.9	86 18.6	83 27	142.1	86 26.6	82 22	30.2	81 20.5	97 07	08.9	05
6	83 25.0	93 20	152.9	83 52.7	92 21	151.1	85 13.0	86 25	143.9	85 38.4	83 27	140.6	86 02.7	79 29	136.5	86 13.5	76 24	34.7	81 16.3	96 08	10.6	6
7	83 13.2	91 22	148.9	83 40.2	89 23	147.0	84 57.9	83 28	139.3	85 22.1	79 29	135.6	85 45.1	74 31	131.7	85 36.9	71 26	38.6	81 11.5	95 09	12.3	7
8	82 59.9	89 24	145.2	83 26.2	87 25	143.2	84 41.3	79 30	135.1	85 04.5	75 31	131.5	85 26.3	70 33	127.4	85 43.2	65 28	41.9	81 06.0	93 10	13.9	8
9	82 45.4	86 26	141.7	83 11.0	84 27	139.5	84 23.5	76 31	131.3	84 45.7	72 33	127.7	85 06.4	67 34	123.6	85 26.4	60 29	44.8	81 07.4	91 11	15.9	9
10	82 29.7	84 28	138.3	82 54.6	82 29	136.1	84 04.7	73 33	127.8	84 25.9	69 34	124.3	84 45.7	63 37	120.3	85 08.8	55 30	47.4	81 01.3	89 12	17.0	10
1	82 13.0	80 29	135.2	82 37.2	80 30	133.0	83 45.0	70 34	124.6	84 05.4	66 35	121.2	84 24.3	61 37	117.3	84 50.6	50 31	49.5	81 04.4	87 29	45.0	1
2	81 55.3	80 31	132.3	82 18.9	77 32	130.0	83 24.6	68 35	121.7	83 44.2	63 36	118.4	84 02.4	58 37	114.6	84 31.7	46 32	51.4	81 16.8	83 30	46.9	2
3	81 36.9	78 32	129.5	81 59.9	75 33	127.3	83 03.5	65 36	119.1	83 22.5	61 37	115.8	83 40.0	56 38	112.2	84 12.4	42 33	53.0	81 58.8	80 31	48.7	3
4	81 17.7	76 33	126.9	81 40.1	73 34	124.7	82 41.9	63 37	116.7	83 00.3	58 38	113.5	83 17.2	54 38	110.0	83 42.0	39 33	54.4	81 40.2	78 32	50.2	4
15	80 57.9	74 34	124.5	81 19.8	72 35	122.3	82 19.9	61 37	114.4	82 37.7	57 38	111.3	82 54.2	52 39	108.0	83 32.8	35 34	55.6	81 21.3	76 32	51.6	15
6	80 37.5	73 35	122.2	80 58.9	70 36	120.0	81 57.5	60 38	112.3	82 14.8	56 39	109.4	82 30.8	51 39	106.2	83 12.5	32 34	56.6	81 02.0	74 33	52.7	6
7	80 16.6	71 36	120.0	80 37.5	68 36	117.9	81 34.8	58 38	110.4	81 51.7	54 39	107.5	82 07.3	50 40	104.5	82 52.0	29 34	57.5	81 42.4	72 34	53.8	7
8	79 55.3	70 36	118.0	80 15.8	67 37	115.9	81 11.8	57 39	108.6	81 28.3	53 39	105.8	81 43.6	49 40	102.9	82 31.3	26 35	58.3	82 22.6	70 34	54.7	8
9	79 33.5	68 37	116.1	79 53.6	66 37	114.0	80 48.5	56 39	106.9	81 04.7	52 40	104.2	81 19.7	48 40	101.4	82 10.5	23 35	59.0	82 02.6	68 34	55.5	9
20	79 11.4	67 37	114.2	79 31.2	64 38	112.2	80 25.1	55 39	105.3	80 41.0	51 40	102.7	80 55.7	47 40	100.0	81 49.5	21 35	59.5	81 42.4	66 34	56.1	20
1	78 49.0	66 38	112.5	79 08.4	63 38	110.5	80 01.5	54 40	103.8	80 17.1	50 40	101.3	80 31.7	46 40	98.7	81 28.4	18 35	60.0	81 22.1	64 34	56.7	1
2	78 26.4	65 38	110.8	78 45.5	62 39	108.9	79 37.7	53 40	102.4	79 53.1	50 40	99.9	80 07.5	46 40	97.4	81 07.2	16 35	60.4	81 01.6	62 34	57.3	2
3	78 03.4	64 39	109.2	78 22.3	62 39	107.3	79 13.8	53 40	101.0	79 29.1	49 40	98.7	79 43.3	45 40	96.2	80 46.0	14 36	60.8	80 41.1	60 34	57.7	3
4	77 40.3	63 39	107.7	77 58.9	61 39	105.9	78 49.8	52 40	99.7	79 04.9	49 40	97.5	79 19.0	45 41	95.1	80 24.6	12 36	61.0	80 20.4	58 34	58.1	4
25	77 17.0	62 39	106.3	77 35.3	60 40	104.5	78 25.7	52 40	98.5	78 40.7	48 40	96.3	78 54.6	45 41	94.0	80 03.3	10 36	61.3	79 59.6	56 35	58.4	25
6	76 53.4	62 39	104.9	77 11.6	59 40	103.1	78 01.5	51 40	97.3	78 16.4	48 41	95.2	78 30.3	45 41	93.0	79 41.9	08 36	61.5	79 38.8	54 35	58.7	6
7	76 29.8	61 40	103.6	76 47.3	58 40	101.8	77 37.3	51 40	96.2	77 52.1	48 41	94.1	78 05.9	45 41	92.0	79 20.4	06 36	61.6	79 17.9	52 35	58.9	7
8	76 06.0	61 40	102.3	76 23.9	58 40	100.6	77 13.0	51 41	95.1	77 27.7	48 41	93.1	77 41.5	44 41	91.0	78 58.9	04 36	61.7	78 57.0	50 35	59.1	8
9	75 42.1	60 40	101.0	75 59.8	58 40	99.4	76 48.7	50 41	94.0	77 03.3	47 41	92.1	77 17.1	44 41	90.1	78 37.4	02 36	61.7	78 36.1	07 35	59.2	9
30	75 18.1	60 40	99.8	75 35.7	58 40	98.2	76 24.3	50 41	93.0	76 38.9	47 41	91.1	76 52.7	44 41	89.2	78 15.9	01 36	61.8	78 15.1	05 35	59.3	30
1	74 54.0	59 40	98.7	75 11.5	57 40	97.1	75 59.9	50 41	92.0	76 14.5	47 41	90.2	76 28.3	45 41	88.3	77 54.4	01 36	61.8	77 54.1	03 35	59.4	1
2	74 29.9	59 40	97.6	74 47.3	57 40	96.0	75 35.5	50 41	91.1	75 50.1	47 41	89.3	76 03.9	45 41	87.5	77 32.9	02 36	61.7	77 33.1	01 36	59.4	2
3	74 05.6	59 40	96.5	74 23.0	57 41	95.0	75 11.1	50 41	90.1	75 25.7	47 41	88.4	75 39.6	45 41	86.6	77 11.5	04 36	61.7	77 12.1	00 35	59.4	3
4	73 41.4	59 41	95.4	73 58.7	57 41	93.9	74 46.7	50 41	89.2	75 01.3	47 41	87.5	75 15.2	45 41	85.8	76 50.0	06 36	61.6	76 51.1	02 35	59.4	4
35	73 17.1	58 41	94.4	73 34.3	57 41	92.9	74 22.3	50 41	88.3	74 37.0	48 41	86.7	74 50.9	45 40	85.0	76 28.5	07 36	61.5	76 30.1	03 35	59.4	35
6	72 52.7	58 41	93.4	73 09.9	56 41	92.0	73 57.9	50 41	87.5	74 12.6	48 41	85.9	74 26.3	45 40	84.2	76 07.1	08 36	61.4	76 09.1	05 35	59.3	6
7	72 28.3	58 41	92.4	72 45.5	56 41	91.0	73 33.6	50 41	86.6	73 48.3	48 40	85.1	74 02.3	45 40	83.5	75 45.7	10 36	61.3	75 48.7	06 36	59.2	7
8	72 03.9	58 41	91.4	72 21.1	56 41	90.1	73 09.2	50 41	85.8	73 24.0	48 40	84.3	73 38.1	46 40	82.7	75 24.3	11 36	61.1	75 27.1	08 35	59.1	8
9	71 39.5	58 41	90.5	71 56.7	56 41	89.2	72 44.9	51 40	85.0	72 59.7	48 40	83.5	73 13.9	46 40	82.0	75 02.9	13 36	60.9	75 06.2	09 35	59.0	9
40	71 15.1	58 41	89.6	71 32.3	56 41	88.3	72 20.6	51 40	84.2	72 35.5	49 40	82.8	72 49.8	46 40	81.3	74 41.6	14 35	60.8	74 43.3	11 35	58.9	40
1	70 50.7	58 41	88.7	71 07.9	56 41	87.4	71 56.3	51 40	83.4	72 11.3	49 40	82.0	72 25.7	47 40	80.6	74 20.3	15 35	60.6	74 24.4	12 35	58.7	1
2	70 26.3	58 41	87.8	70 43.6	57 41	86.6	71 32.1	51 40	82.7	71 47.2	49 40	81.3	72 01.6	47 40	79.9	73 59.1	16 35	60.4	74 03.3	13 35	58.6	2
3	70 02.0	58 41	86.9	70 19.2	57 41	85.7	71 07.9	51 40	81.9	71 23.1	49 40	80.6	71 37.6	47 40	79.2	73 37.9	18 35	60.1	73 42.8	15 35	58.4	3
4	69 37.6	58 41	86.1	69 54.9	57 40	84.9	70 43.8	52 40	81.2	70 59.0	50 40	79.9	71 13.7	48 40	78.5	73 16.8	19 35	59.9	73 22.0	16 35	58.2	4
45	69 13.3	59 40	85.3	69 30.6	57 40	84.1	70 19.7	52 40	80.4	70 35.0	50 40	79.2	70 49.8	48 40								



# STAR IDENTIFICATION TABLE

182

ALTITUDE

Lat.  
66°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.															
00	28	180	32	180	36	180	40	180	44	180	48	180	52	180	56	180	60	180	64	180	68	180	00
4	28	176	32	175	36	175	40	175	44	175	48	175	52	174	56	174	60	174	64	173	68	172	4
8	28	171	32	171	36	170	40	170	44	170	48	169	52	169	56	168	60	167	64	166	68	165	8
12	27	166	31	166	35	166	39	165	43	164	47	164	51	163	55	162	59	161	63	159	67	157	12
16	27	162	31	161	35	161	39	160	43	159	47	158	51	157	55	156	59	155	62	153	66	150	16
20	26	158	30	157	34	156	38	155	42	154	46	153	50	152	54	150	58	149	62	147	65	144	20
24	26	153	30	152	34	151	38	150	41	149	45	148	49	147	53	145	57	143	61	140	64	137	24
28	25	149	29	148	33	147	37	146	41	145	44	143	48	142	52	140	56	137	60	135	63	131	28
32	24	145	28	144	32	142	36	141	40	140	43	138	47	137	51	134	55	132	58	129	62	126	32
36	23	140	27	139	31	138	35	137	38	135	42	134	46	132	50	130	53	127	57	124	61	121	36
40	22	136	26	135	30	134	33	132	37	131	41	129	45	127	48	125	52	122	56	119	59	116	40
44	21	132	25	131	28	129	32	128	36	126	40	124	43	122	47	120	51	118	54	114	58	111	44
48	20	128	23	127	27	125	31	124	35	122	38	120	42	118	46	116	49	113	53	110	56	106	48
52	18	124	22	123	26	121	30	119	33	118	37	116	41	114	44	111	48	109	51	106	55	102	52
56	17	120	21	119	24	117	28	115	32	114	35	112	39	110	43	107.7	46	105	50	102	53	98	56
60	15	116	19	115	23	113	27	111	30	110	34	108	37	106	41	103	45	101	48	98	51	94	60
64	14	112	18	111	21	109	25	108	29	106	32	104	36	102	39	99	43	97	46	94	50	90	64
68	12	109	16	107	20	105	23	104	27	102	31	100	34	98	38	95	41	93	45	90	48	87	68
72	11	105	15	103	18	102	22	100	26	98	29	96	33	94	36	92	40	89	43	86	46	83	72
76	09	101	13	100	17	98	20	96	24	94	27	92	31	90	35	88	38	86	41	83	45	80	76
80	08	98	11	96	15	94	19	92	22	91	26	89	29	87	33	84	36	82	40	79	43	77	80
84	06	94	10	92	13	91	17	89	21	87	24	85	28	83	31	81	35	79	38	76	42	73	84
88	04	90	08	89	12	87	15	85	19	83	23	82	26	80	30	77	33	75	37	73	40	70	88
92	03	87	06	85	10	83	14	82	17	80	21	78	25	76	28	74	32	72	35	70	39	67	92
96	01	83	05	81	09	80	12	78	16	76	19	74	23	73	27	71	30	69	34	66	37	64	96
100	00	79	03	78	07	76	11	74	14	73	18	71	22	69	25	67	29	65	32	63	36	61	100
104	02	75	02	74	05	72	09	71	13	69	16	67	20	66	24	64	27	62	31	60	34	58	104
108	04	72	00	70	04	69	08	67	11	66	15	64	19	62	22	61	26	59	29	57	33	55	108
112	05	68	01	67	02	65	06	64	10	62	13	61	17	59	21	57	24	55	28	54	32	52	112
116	07	64	03	63	01	62	05	60	08	59	12	57	16	56	19	54	23	52	27	50	30	49	116
120	08	61	04	59	01	58	03	57	07	55	11	54	14	52	18	51	22	49	26	47	29	46	120
124	09	57	06	56	02	54	02	53	06	52	09	50	13	49	17	47	21	46	24	44	28	43	124
128	11	53	07	52	03	51	01	49	04	48	08	47	12	45	16	44	20	43	23	41	27	40	128
132	12	49	08	48	04	47	01	46	03	44	07	43	11	42	15	41	18	39	22	38	26	37	132
136	13	45	09	44	06	43	02	42	02	41	06	40	10	38	14	37	17	36	21	35	25	33	136
140	14	41	10	40	07	39	03	38	01	37	05	36	09	35	13	34	17	33	20	32	24	30	140
144	15	37	11	36	08	35	04	34	00	34	04	33	08	32	12	31	16	30	20	29	23	27	144
148	16	33	12	32	08	32	05	31	01	30	03	29	07	28	11	27	15	26	19	25	23	24	148
152	17	29	13	29	09	28	05	27	01	26	02	25	06	25	10	24	14	23	18	22	22	21	152
156	18	25	14	25	10	24	06	23	02	22	02	22	06	21	10	20	14	20	18	19	22	18	156
160	19	21	15	20	11	20	07	19	03	19	01	18	05	18	09	17	13	17	17	16	21	15	160
164	19	17	15	16	11	16	07	15	03	15	01	15	05	14	09	14	13	13	17	13	21	12	164
168	19	13	15	12	11	12	08	12	04	11	00	11	04	11	08	10	12	10	16	10	20	09	168
172	20	08	16	08	12	08	08	08	04	08	00	07	04	07	08	07	12	07	16	06	20	06	172
176	20	04	16	04	12	04	08	04	04	04	00	04	04	04	08	03	12	03	16	03	20	03	176
180	20	00	16	00	12	00	08	00	04	00	00	00	04	00	08	00	12	00	16	00	20	00	180

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

# STAR IDENTIFICATION TABLE

## ALTITUDE

0°			44°			ALTITUDE																								Lat. 66°		
						48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°						
AZ.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	AZ.		
180	68	180	68	180	80	180	84	180	88	180	88	00	84	00	80	00	76	00	72	00	68	00	68	00	68	00	68	00	68	00	00	
173	68	172	68	171	80	167	84	161	87	138	87	36	84	12	80	06	76	03	72	01	68	00	68	00	68	00	68	00	68	00	4	
166	68	165	67	163	79	155	83	145	86	117	86	54	83	22	80	11	76	06	72	03	68	01	68	01	68	01	68	01	68	01	8	
159	67	157	66	155	78	144	82	132	85	106	85	61	83	30	79	16	76	08	72	04	68	01	68	01	68	01	68	01	68	01	12	
153	66	150	66	147	77	135	81	122	83	99	83	65	82	36	79	20	75	11	72	05	68	01	68	01	68	01	68	01	68	01	16	
147	65	144	65	140	76	127	79	114	81	94	82	67	81	41	78	24	75	13	72	06	68	02	68	02	68	02	68	02	68	02	20	
140	64	137	64	133	75	120	78	108	80	90	80	67	80	44	78	27	75	15	71	08	68	02	68	02	68	02	68	02	68	02	24	
135	63	131	63	127	73	113	76	102	78	87	79	67	78	47	77	30	74	17	71	09	68	02	68	02	68	02	68	02	68	02	28	
129	62	126	62	122	72	108	74	98	76	84	77	66	77	48	76	32	74	19	71	10	68	03	68	03	68	03	68	03	68	03	32	
124	61	121	61	116	70	103	73	93	75	81	76	66	76	49	75	33	73	21	71	11	68	03	68	03	68	03	68	03	68	03	36	
119	59	116	59	111	69	99	71	90	73	78	75	64	75	49	74	35	73	22	70	11	67	03	67	03	67	03	67	03	67	03	40	
114	58	111	58	106	67	94	70	86	72	76	73	63	74	49	73	35	72	23	70	12	67	04	67	04	67	04	67	04	67	04	44	
110	56	106	56	102	65	91	68	83	70	73	72	62	72	49	72	36	71	24	70	13	67	04	67	04	67	04	67	04	67	04	48	
106	55	102	55	98	64	87	66	80	69	71	70	61	71	49	71	36	71	24	69	13	67	04	67	04	67	04	67	04	67	04	52	
102	53	98	53	94	62	84	65	77	67	69	69	59	70	48	70	36	70	25	69	14	67	04	67	04	67	04	67	04	67	04	56	
98	51	94	51	90	61	80	63	74	66	66	67	58	69	47	69	36	69	25	68	14	67	04	67	04	67	04	67	04	67	04	60	
94	50	90	50	87	59	77	62	71	64	64	66	56	68	47	68	36	69	25	68	15	67	05	67	05	67	05	67	05	67	05	64	
90	48	87	48	83	57	74	60	69	63	62	65	54	66	46	67	36	68	25	68	15	67	05	67	05	67	05	67	05	67	05	68	
86	46	83	46	80	56	71	59	66	61	60	63	53	65	44	66	35	67	25	67	15	67	05	67	05	67	05	67	05	67	05	72	
83	45	80	45	77	54	69	57	64	60	58	62	51	64	43	66	35	66	25	67	15	66	05	66	05	66	05	66	05	66	05	76	
79	43	77	43	73	53	66	56	61	58	56	61	49	63	42	65	34	66	25	66	15	66	05	66	05	66	05	66	05	66	05	80	
76	42	73	42	70	51	63	54	59	57	53	60	48	62	41	64	33	65	24	66	15	66	05	66	05	66	05	66	05	66	05	84	
73	40	70	40	67	50	60	53	56	56	51	58	46	61	39	63	32	64	24	66	15	66	05	66	05	66	05	66	05	66	05	88	
70	39	67	39	64	49	58	52	54	55	49	57	44	60	38	62	31	64	23	65	14	66	05	66	05	66	05	66	05	66	05	92	
66	37	64	37	61	47	55	50	51	53	47	56	42	59	36	61	30	63	22	65	14	66	05	66	05	66	05	66	05	66	05	96	
63	36	61	36	58	46	52	49	49	52	45	55	40	58	35	60	29	63	22	64	14	66	05	66	05	66	05	66	05	66	05	100	
60	34	58	34	55	45	50	48	46	51	43	54	38	57	33	60	28	62	21	64	13	65	05	65	05	65	05	65	05	65	05	104	
57	33	55	33	52	44	47	47	44	50	40	53	36	56	32	59	26	61	20	64	13	65	05	65	05	65	05	65	05	65	05	108	
54	32	52	32	49	43	46	44	46	49	38	52	35	55	30	58	25	61	19	63	12	65	04	65	04	65	04	65	04	65	04	112	
50	30	49	30	47	41	42	45	39	48	36	51	33	54	29	57	24	60	18	63	12	65	04	65	04	65	04	65	04	65	04	116	
47	29	46	29	44	40	39	44	37	47	34	50	31	54	27	57	23	60	17	63	11	65	04	65	04	65	04	65	04	65	04	120	
44	28	43	28	41	39	39	43	34	46	32	50	29	53	25	56	21	59	16	62	11	65	04	65	04	65	04	65	04	65	04	124	
41	27	40	27	38	38	34	42	32	45	29	49	27	52	23	56	20	59	15	62	10	65	04	65	04	65	04	65	04	65	04	128	
38	26	37	26	35	37	31	41	29	45	27	48	25	52	22	55	18	58	14	62	09	65	03	65	03	65	03	65	03	65	03	132	
35	25	33	25	32	36	29	40	27	44	25	48	23	51	20	55	17	58	13	61	09	65	03	65	03	65	03	65	03	65	03	136	
32	24	30	24	29	36	26	39	25	43	23	47	21	51	18	54	15	58	12	61	08	64	03	64	03	64	03	64	03	64	03	140	
29	23	27	23	26	35	24	39	22	43	20	46	19	50	16	54	14	57	11	61	07	64	03	64	03	64	03	64	03	64	03	144	
25	23	24	23	23	34	21	38	20	42	18	46	17	50	15	53	12	57	10	61	07	64	02	64	02	64	02	64	02	64	02	148	
22	22	21	22	20	34	18	38	17	42	16	45	15	49	13	53	11	57	09	61	06	64	02	64	02	64	02	64	02	64	02	152	
19	22	18	22	18	33	16	37	15	41	14	45	12	49	11	53	09	57	07	60	05	64	02	64	02	64	02	64	02	64	02	156	
16	21	15	21	15	33	13	37	12	41	11	45	10	49	09	53	08	56	06	60	04	64	02	64	02	64	02	64	02	64	02	160	
13	21	12	21	12	33	11	37	10	41	09	44	08	48	07	52	06	56	05	60	03	64	01	64	01	64	01	64	01	64	01	164	
10	20	09	20	09	32	08	36	07	40	07	44	06	48	06	52	05	56	04	60	02	64	01	64	01	64	01	64	01	64	01	168	
06	20	06	20	06	32	05	36	05	40	05	44	04	48	04	52	03	56	02	60	02	64	01	64	01	64	01	64	01	64	01	172	
03	20	03	20	03	32	03	36	02	40	02	44	02	48	02	52	02	56	01	60	01	64	00	64	00	64	00	64	00	64	00	176	
00	20	00	20	00	32	00	36	00	40	00	44	00	48	00	52	00	56	00	60	00	64	00	64	00	64	00	64	00	64	00	180	

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

Lat. 67°

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Az.															
00	23 00.0	1.00 180.0	23 30.0	1.00 180.0	24 00.0	1.00 180.0	24 30.0	1.00 180.0	25 00.0	1.00 180.0	25 30.0	1.00 180.0	26 00.0	1.00 180.0	26 30.0	1.00 180.0	00
1	22 59.8	1.001 178.9	23 29.8	1.001 178.9	23 59.8	1.001 178.9	24 29.8	1.001 178.9	24 59.8	1.001 178.9	25 29.8	1.001 178.9	25 59.8	1.001 178.9	26 29.8	1.001 178.9	1
2	22 59.1	1.002 177.8	23 29.1	1.002 177.8	23 59.1	1.002 177.8	24 29.1	1.002 177.8	24 59.1	1.002 177.8	25 29.1	1.002 177.8	25 59.1	1.002 177.8	26 29.1	1.002 177.8	2
3	22 58.0	1.003 176.7	23 28.0	1.003 176.7	23 58.0	1.003 176.7	24 28.0	1.003 176.7	24 58.0	1.003 176.7	25 28.0	1.003 176.7	25 58.0	1.003 176.7	26 27.9	1.003 176.7	3
4	22 56.4	1.003 175.6	23 26.4	1.003 175.6	23 56.4	1.003 175.6	24 26.4	1.003 175.6	24 56.4	1.003 175.6	25 26.4	1.003 175.6	25 56.4	1.003 175.6	26 26.4	1.003 175.6	4
05	22 54.4	1.004 174.6	23 24.4	1.004 174.6	23 54.4	1.004 174.6	24 24.4	1.004 174.6	24 54.4	1.004 174.6	25 24.3	1.004 174.5	25 54.3	1.004 174.5	26 24.3	1.004 174.5	05
6	22 52.0	1.005 173.5	23 22.0	1.005 173.5	23 52.0	1.005 173.5	24 22.0	1.005 173.5	24 51.9	1.005 173.4	25 21.9	1.005 173.4	25 51.8	1.005 173.3	26 21.8	1.005 173.3	6
7	22 49.1	1.006 172.4	23 19.1	1.006 172.4	23 49.0	1.006 172.3	24 19.0	1.006 172.3	24 49.0	1.006 172.3	25 18.9	1.006 172.3	25 48.9	1.006 172.2	26 18.8	1.006 172.2	7
8	22 45.8	1.006 171.3	23 15.8	1.006 171.3	23 45.7	1.006 171.2	24 15.7	1.006 171.2	24 45.6	1.006 171.2	25 15.5	1.006 171.2	25 45.5	1.006 171.1	26 15.4	1.006 171.1	8
9	22 42.1	1.007 170.2	23 12.0	1.007 170.2	23 41.9	1.007 170.1	24 11.9	1.007 170.1	24 41.8	1.007 170.1	25 11.7	1.007 170.1	25 41.6	1.007 170.0	26 11.6	1.007 170.0	9
10	22 37.9	1.008 169.2	23 07.8	1.008 169.1	23 37.7	1.008 169.1	24 07.6	1.008 169.0	24 37.5	1.008 169.0	25 07.4	1.008 169.0	25 37.4	1.008 168.9	26 07.3	1.008 168.9	10
1	22 33.2	1.008 168.1	23 03.1	1.008 168.0	23 33.0	1.008 168.0	24 02.9	1.008 167.9	24 32.8	1.008 167.9	25 02.7	1.008 167.9	25 32.6	1.008 167.8	26 02.5	1.008 167.8	1
2	22 28.2	1.009 167.0	22 58.1	1.009 166.9	23 27.9	1.009 166.9	23 57.8	1.009 166.9	24 27.7	1.009 166.8	24 57.6	1.009 166.8	25 27.5	1.009 166.7	25 57.3	1.009 166.7	2
3	22 22.7	1.010 165.9	22 52.5	1.010 165.9	23 22.4	1.010 165.8	23 52.3	1.010 165.8	24 22.1	1.010 165.7	24 52.0	1.010 165.7	25 21.9	1.010 165.6	25 51.7	1.010 165.6	3
4	22 16.8	09 11 164.8	22 46.6	09 11 164.8	23 16.5	09 11 164.7	23 46.3	09 11 164.7	24 16.1	09 11 164.6	24 46.0	09 11 164.6	25 15.8	09 11 164.5	25 45.6	09 11 164.4	4
15	22 10.4	09 11 163.8	22 40.2	09 11 163.7	23 10.1	09 11 163.7	23 39.9	09 11 163.6	24 09.7	09 11 163.5	24 39.5	09 11 163.5	25 09.3	09 12 163.4	25 39.1	09 12 163.3	15
6	22 03.7	09 12 162.7	22 33.5	09 12 162.6	23 03.3	09 12 162.6	23 33.0	09 12 162.5	24 02.8	09 12 162.4	24 32.6	09 12 162.4	25 02.4	09 12 162.3	25 32.2	09 12 162.2	6
7	21 56.5	09 13 161.6	22 26.3	09 13 161.6	22 56.0	09 13 161.5	23 25.8	09 13 161.4	23 55.6	09 13 161.4	24 25.3	09 13 161.3	24 55.1	09 13 161.2	25 24.8	09 13 161.2	7
8	21 48.9	09 13 160.6	22 18.6	09 13 160.5	22 48.4	09 13 160.4	23 18.1	09 14 160.3	23 47.9	09 14 160.3	24 17.6	09 14 160.2	24 47.3	09 14 160.1	25 17.1	09 14 160.1	8
9	21 40.9	09 14 159.5	22 10.6	09 14 159.4	22 40.3	09 14 159.3	23 10.0	09 14 159.3	23 39.7	09 14 159.2	24 09.4	09 14 159.1	24 39.1	09 14 159.0	25 08.8	09 14 159.0	9
20	21 32.5	09 15 158.4	22 02.1	09 15 158.3	22 31.8	09 15 158.3	23 01.5	09 15 158.2	23 31.2	09 15 158.1	24 00.9	09 15 158.0	24 30.6	09 15 158.0	25 00.2	09 15 157.9	20
1	21 23.6	09 16 157.4	21 53.3	09 16 157.3	22 23.0	09 16 157.2	22 52.6	09 16 157.1	23 22.3	09 16 157.0	23 51.9	09 16 157.0	24 21.5	09 16 156.9	24 51.2	09 16 156.8	1
2	21 14.4	09 16 156.3	21 44.0	09 16 156.2	22 13.7	09 16 156.1	22 43.3	09 16 156.0	23 12.9	09 16 155.9	23 42.5	09 16 155.9	24 12.1	09 16 155.8	24 41.7	09 16 155.7	2
3	21 04.8	09 17 155.2	21 34.4	09 17 155.2	22 04.0	09 17 155.1	22 33.6	09 17 155.0	23 03.2	09 17 154.9	23 32.7	09 17 154.8	24 02.3	09 17 154.7	24 31.9	09 17 154.6	3
4	20 54.8	09 17 154.2	21 24.3	09 17 154.1	21 53.9	09 17 154.0	22 23.5	09 18 153.9	22 53.0	09 18 153.8	23 22.6	09 18 153.7	23 52.1	09 18 153.6	24 21.6	09 18 153.5	4
25	20 44.4	09 18 153.1	21 13.9	09 18 153.0	21 43.4	09 18 152.9	22 13.9	09 18 152.8	22 42.5	09 18 152.8	23 12.0	09 18 152.7	23 41.5	09 18 152.6	24 11.0	09 18 152.5	25
6	20 33.6	09 19 152.1	21 03.1	09 19 152.0	21 32.6	09 19 151.9	22 02.1	09 19 151.8	22 31.5	09 19 151.7	23 01.0	09 19 151.6	23 30.5	09 19 151.5	24 00.0	09 19 151.4	6
7	20 22.4	09 19 151.0	20 51.9	09 19 150.9	21 21.3	09 19 150.8	21 50.8	09 19 150.7	22 20.2	09 19 150.6	22 49.7	09 20 150.5	23 19.1	09 20 150.4	23 48.5	09 20 150.3	7
8	20 10.9	09 20 150.0	20 40.3	09 20 149.9	21 09.7	09 20 149.8	21 39.1	09 20 149.7	22 08.5	09 20 149.6	22 37.9	09 20 149.5	23 07.3	09 20 149.4	23 36.7	09 20 149.2	8
9	19 59.0	09 20 148.9	20 28.4	09 21 148.8	20 57.7	09 21 148.7	21 27.1	09 21 148.6	21 56.5	09 21 148.5	22 25.8	09 21 148.4	22 55.2	09 21 148.3	23 24.6	09 21 148.2	9
30	19 46.7	09 21 147.9	20 16.0	09 21 147.8	20 45.4	09 21 147.7	21 14.7	09 21 147.6	21 44.1	09 21 147.5	22 13.4	09 21 147.3	22 42.7	09 21 147.2	23 12.0	09 21 147.1	30
1	19 34.1	09 22 146.9	20 03.4	09 22 146.8	20 32.7	09 22 146.8	21 02.0	09 22 146.5	21 31.3	09 22 146.4	22 00.6	09 22 146.3	22 29.8	09 22 146.2	22 59.1	09 22 146.1	1
2	19 21.1	09 22 145.8	19 50.3	09 22 145.7	20 19.6	09 22 145.6	20 48.9	09 22 145.5	21 18.1	09 22 145.4	21 47.4	09 22 145.2	22 16.6	09 22 145.1	22 45.8	09 22 145.0	2
3	19 07.7	09 23 144.8	19 37.0	09 23 144.7	20 06.2	09 23 144.6	20 35.4	09 23 144.4	21 04.6	09 23 144.3	21 33.8	09 23 144.2	22 03.0	09 23 144.1	22 32.2	09 23 143.9	3
4	18 54.0	09 23 143.8	19 23.2	09 23 143.6	19 52.4	09 23 143.5	20 21.6	09 23 143.4	20 50.8	09 23 143.3	21 19.9	09 23 143.1	21 49.1	09 23 143.0	22 18.2	09 23 142.9	4
35	18 40.0	09 24 142.7	19 09.2	09 24 142.6	19 38.3	09 24 142.5	20 07.4	09 24 142.4	20 36.6	09 24 142.2	21 05.7	09 24 142.1	21 34.8	09 24 142.0	22 03.9	09 24 141.8	35
6	18 25.7	09 24 141.7	18 54.8	09 24 141.6	19 23.9	09 24 141.5	19 53.0	09 24 141.3	20 22.1	09 24 141.2	20 51.1	09 24 141.1	21 20.2	09 24 140.9	21 49.3	09 24 140.8	6
7	18 11.0	09 25 140.6	18 40.0	09 25 140.6	19 09.1	09 25 140.4	19 38.2	09 25 140.3	20 07.2	09 25 140.2	20 36.2	09 25 140.0	21 05.3	09 25 139.9	21 34.3	09 25 139.8	7
8	17 56.0	09 26 139.7	18 25.0	09 26 139.5	18 54.0	09 26 139.4	19 23.0	09 26 139.3	19 52.0	09 26 139.1	20 21.0	09 26 139.0	20 50.0	09 26 138.9	21 19.0	09 26 138.7	8
9	17 40.6	09 26 138.7	18 09.6	09 26 138.5	18 38.6	09 26 138.4	19 07.6	09 26 138.3	19 36.5	09 26 138.1	20 05.5	09 26 138.0	20 34.4	09 26 137.8	21 03.4	09 26 137.7	9
40	17 25.0	09 27 137.6	17 53.9	09 27 137.5	18 22.9	09 27 137.4	18 51.8	09 27 137.2	19 20.7	09 27 137.1	19 49.6	09 27 136.9	20 18.5	09 27 136.8	20 47.4	09 27 136.7	40
1	17 09.1	09 27 136.6	17 37.9	09 27 136.5	18 06.8	09 27 136.4	18 35.7	09 27 136.2	19 04.6	09 27 136.1	19 33.5	09 27 135.9	20 02.3	09 27 135.8	20 31.2	09 27 135.6	1
2	16 52.8	09 28 135.6	17 21.7	09 28 135.5	17 50.5	09 28 135.3	18 19.4	09 28 135.2	18 48.2	09 28 135.1	19 17.0	09 28 134.9	19 45.8	09 28 134.8	20 14.7	09 28 134.6	2
3	16 36.3	09 28 134.6	17 05.1	09 28 134.5	17 33.9	09 28 134.3	18 02.7	09 28 134.2	18 31.5	09 28 134.0	19 00.3	09 28 133.9	19 29.1	09 28 133.7	19 57.8	09 28 133.6	3
4	16 19.4	09 28 133.6	16 48.2	09 29 133.5	17 17.0	09 29 133.3	17 45.7	09 29 133.2	18 14.5	09 29 133.0	18 43.2	09 29 132.9	19 12.0	09 29 132.7	19 40.7	09 29 132.6	4
45	16 02.3	09 29 132.6	16 31.1	09 29 132.5	16 59.8	09 29 132.3	17 28.5	09 29 132.2	17 57.2	09 29 132.0	18 25.9	09 29 131.9	18 54.6	09 29			

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Az.															
00	23 00.0	1.00 180.0	22 30.0	1.00 180.0	22 00.0	1.00 180.0	21 30.0	1.00 180.0	21 00.0	1.00 180.0	20 30.0	1.00 180.0	20 00.0	1.00 180.0	19 30.0	1.00 180.0	00
1	22 59.8	1.01 178.9	22 29.8	1.01 178.9	21 59.8	1.01 178.9	21 29.8	1.01 178.9	20 59.8	1.01 178.9	20 29.8	1.01 178.9	19 59.8	1.01 178.9	19 29.8	1.01 178.9	1
2	22 59.1	1.02 177.8	22 29.1	1.02 177.8	21 59.1	1.02 177.8	21 29.1	1.02 177.8	20 59.1	1.02 177.8	20 29.1	1.02 177.8	19 59.1	1.02 177.8	19 29.1	1.02 177.8	2
3	22 58.0	1.03 176.7	22 28.0	1.03 176.7	21 58.0	1.03 176.7	21 28.0	1.03 176.7	20 58.0	1.03 176.7	20 28.0	1.03 176.7	19 58.0	1.03 176.7	19 28.0	1.03 176.7	3
4	22 56.4	1.03 175.7	22 26.5	1.03 175.7	21 56.5	1.03 175.7	21 26.5	1.03 175.7	20 56.5	1.03 175.7	20 26.5	1.03 175.7	19 56.5	1.03 175.7	19 26.5	1.03 175.7	4
05	22 54.4	1.04 174.6	22 24.5	1.04 174.6	21 54.5	1.04 174.6	21 24.5	1.04 174.6	20 54.5	1.04 174.6	20 24.5	1.04 174.6	19 54.6	1.04 174.7	19 24.6	1.04 174.7	05
6	22 52.0	1.05 173.5	22 22.0	1.05 173.5	21 52.1	1.05 173.5	21 22.1	1.05 173.6	20 52.1	1.05 173.6	20 22.2	1.05 173.6	19 52.2	1.05 173.6	19 22.2	1.05 173.7	6
7	22 49.1	1.06 172.4	22 19.2	1.06 172.4	21 49.2	1.06 172.5	21 19.2	1.06 172.5	20 49.3	1.06 172.5	20 19.3	1.06 172.5	19 49.4	1.06 172.6	19 19.4	1.06 172.6	7
8	22 45.8	1.06 171.3	22 15.9	1.06 171.4	21 45.9	1.06 171.4	21 16.0	1.06 171.4	20 46.0	1.06 171.4	20 16.1	1.06 171.5	19 46.1	1.06 171.5	19 16.2	1.06 171.5	8
9	22 42.1	1.07 170.2	22 12.1	1.07 170.3	21 42.2	1.07 170.3	21 12.2	1.07 170.3	20 42.3	1.07 170.4	20 12.4	1.07 170.4	19 42.4	1.07 170.4	19 12.5	1.07 170.5	9
10	22 37.9	1.08 169.2	22 07.9	1.08 169.2	21 38.0	1.08 169.2	21 08.1	1.08 169.3	20 38.2	1.08 169.3	20 08.3	1.08 169.4	19 38.3	1.08 169.4	19 08.4	1.08 169.4	10
1	22 33.2	1.08 168.1	22 03.3	1.08 168.1	21 33.4	1.08 168.2	21 03.5	1.08 168.2	20 33.6	1.08 168.2	20 03.7	1.08 168.3	19 33.8	1.08 168.3	19 03.9	1.08 168.4	1
2	22 28.2	1.09 167.0	21 58.3	1.09 167.0	21 28.4	1.09 167.1	20 58.5	1.09 167.1	20 28.6	1.09 167.2	20 58.7	1.09 167.2	19 28.9	1.09 167.3	18 59.0	1.09 167.3	2
3	22 22.7	1.10 165.9	21 52.8	1.10 166.0	21 23.0	1.10 166.0	20 53.1	1.10 166.1	20 23.2	1.10 166.1	19 53.4	1.10 166.2	19 23.5	1.10 166.2	18 53.6	1.10 166.3	3
4	22 16.8	1.11 164.8	21 46.9	1.11 164.9	21 17.1	1.11 165.0	20 47.2	1.11 165.0	20 17.4	1.11 165.1	19 47.5	1.11 165.1	19 17.7	1.11 165.2	18 47.8	1.11 165.2	4
15	22 10.4	1.11 163.8	21 40.9	1.11 163.8	21 10.8	1.11 163.9	20 41.0	1.11 163.9	20 11.1	1.11 164.0	19 41.3	1.11 164.1	19 11.5	1.11 164.1	18 41.7	1.11 164.2	15
6	22 03.7	1.12 162.7	21 33.9	1.12 162.8	21 04.1	1.12 162.8	20 34.3	1.12 162.9	20 04.5	1.12 163.0	19 34.7	1.12 163.0	19 04.9	1.12 163.1	18 35.1	1.12 163.1	6
7	21 56.5	1.13 161.6	21 26.7	1.13 161.7	20 56.9	1.13 161.8	20 27.2	1.13 161.8	19 57.4	1.13 161.9	19 27.6	1.13 162.0	18 57.8	1.13 162.0	18 28.0	1.13 162.1	7
8	21 48.9	1.13 160.6	21 19.1	1.13 160.6	20 49.4	1.13 160.7	20 19.6	1.13 160.8	19 49.9	1.13 160.8	19 20.1	1.13 160.9	18 50.4	1.13 161.0	18 20.6	1.13 161.0	8
9	21 40.9	1.14 159.5	21 11.2	1.14 159.6	20 41.4	1.14 159.6	20 11.7	1.14 159.7	19 42.0	1.14 159.8	19 12.3	1.14 159.9	18 42.5	1.14 159.9	18 12.8	1.14 160.0	9
20	21 32.5	1.15 158.4	21 02.8	1.15 158.5	20 33.1	1.15 158.6	20 03.4	1.15 158.7	19 33.7	1.15 158.7	19 04.0	1.15 158.8	18 34.3	1.15 158.9	18 04.6	1.15 159.0	20
1	21 23.6	1.15 157.4	20 54.0	1.15 157.4	20 24.3	1.15 157.5	19 54.7	1.15 157.6	19 25.0	1.15 157.7	18 55.3	1.15 157.8	18 25.6	1.15 157.8	17 56.0	1.15 157.9	1
2	21 14.4	1.16 156.3	20 44.8	1.16 156.4	20 15.2	1.16 156.5	19 45.5	1.16 156.6	19 15.9	1.16 156.6	18 46.2	1.16 156.7	18 16.6	1.16 156.8	17 47.0	1.16 156.9	2
3	21 04.8	1.17 155.2	20 35.2	1.17 155.3	20 05.6	1.17 155.4	19 36.0	1.17 155.5	19 06.4	1.17 155.6	18 36.8	1.17 155.7	18 07.2	1.17 155.8	17 37.6	1.17 155.8	3
4	20 54.8	1.17 154.2	20 25.2	1.17 154.3	19 55.7	1.17 154.4	19 26.1	1.17 154.5	18 56.5	1.17 154.5	18 26.9	1.17 154.6	17 57.4	1.17 154.7	17 27.8	1.17 154.8	4
25	20 44.4	1.18 153.1	20 14.9	1.18 153.2	19 45.3	1.18 153.3	19 15.8	1.18 153.4	18 46.2	1.18 153.5	18 16.7	1.18 153.6	17 47.2	1.18 153.7	17 17.6	1.18 153.8	25
6	20 33.6	1.19 152.1	20 04.1	1.19 152.2	19 34.6	1.19 152.3	19 05.1	1.19 152.4	18 35.6	1.19 152.5	18 06.1	1.19 152.6	17 36.6	1.19 152.7	17 07.1	1.19 152.8	6
7	20 22.4	1.19 151.0	19 53.0	1.19 151.1	19 23.5	1.19 151.2	18 54.0	1.19 151.3	18 24.6	1.19 151.4	17 55.1	1.19 151.5	17 25.6	1.19 151.6	16 56.1	1.19 151.7	7
8	20 10.9	1.20 150.0	19 41.5	1.20 150.1	19 12.0	1.20 150.2	18 42.6	1.20 150.3	18 13.2	1.20 150.4	17 43.7	1.20 150.5	17 14.3	1.20 150.6	16 44.9	1.20 150.7	8
9	19 59.0	1.20 148.9	19 29.6	1.20 149.1	19 00.2	1.20 149.2	18 30.8	1.20 149.3	18 01.4	1.20 149.4	17 32.0	1.20 149.5	17 02.6	1.20 149.6	16 33.2	1.20 149.7	9
30	19 46.7	1.21 147.9	19 17.4	1.21 148.0	18 48.0	1.21 148.1	18 18.6	1.21 148.2	17 49.3	1.21 148.3	17 19.9	1.21 148.4	16 50.6	1.21 148.5	16 21.2	1.21 148.7	30
1	19 34.1	1.22 146.9	19 04.8	1.22 147.0	18 35.4	1.22 147.1	18 06.1	1.22 147.2	17 36.8	1.22 147.3	17 07.5	1.22 147.4	16 38.2	1.22 147.5	16 08.8	1.22 147.6	1
2	19 21.1	1.22 145.8	18 51.8	1.22 145.9	18 22.5	1.22 146.0	17 53.3	1.22 146.1	17 24.0	1.22 146.2	16 54.7	1.22 146.3	16 25.4	1.22 146.4	15 56.1	1.22 146.6	2
3	19 07.7	1.23 144.8	18 38.9	1.23 144.9	18 09.3	1.23 145.0	17 40.0	1.23 145.2	17 10.8	1.23 145.3	16 41.5	1.23 145.4	16 12.3	1.23 145.5	15 43.0	1.23 145.6	3
4	18 54.0	1.23 143.8	18 25.9	1.23 143.9	17 55.7	1.23 144.0	17 26.5	1.23 144.1	16 57.3	1.23 144.2	16 28.0	1.23 144.3	15 58.8	1.23 144.4	15 29.6	1.23 144.6	4
35	18 40.0	1.24 142.7	18 10.9	1.24 142.9	17 41.7	1.24 143.0	17 12.6	1.24 143.1	16 43.4	1.24 143.2	16 14.2	1.24 143.3	15 45.0	1.24 143.5	15 15.9	1.24 143.6	35
6	18 25.7	1.24 141.7	17 56.6	1.24 141.8	17 27.4	1.24 142.0	16 58.3	1.24 142.1	16 29.2	1.24 142.2	16 00.1	1.24 142.3	15 30.9	1.24 142.5	15 01.8	1.24 142.6	6
7	18 11.0	1.25 140.7	17 41.9	1.25 140.8	17 12.8	1.25 141.0	16 43.8	1.25 141.1	16 14.7	1.25 141.2	15 45.6	1.25 141.3	15 16.5	1.25 141.5	14 47.4	1.25 141.7	7
8	17 56.0	1.25 139.7	17 26.9	1.25 139.8	16 57.9	1.25 139.9	16 28.9	1.25 140.1	15 59.8	1.25 140.2	15 30.8	1.25 140.3	15 01.7	1.25 140.5	14 32.7	1.25 140.6	8
9	17 40.6	1.26 138.7	17 11.6	1.26 138.8	16 42.7	1.26 138.9	16 13.7	1.26 139.1	15 44.7	1.26 139.2	15 15.7	1.26 139.3	14 46.6	1.26 139.5	14 17.6	1.26 139.6	9
40	17 25.0	1.27 137.6	16 56.1	1.27 137.8	16 27.1	1.27 137.9	15 58.1	1.27 138.1	15 29.2	1.27 138.2	15 00.2	1.27 138.3	14 31.2	1.27 138.5	14 02.3	1.27 138.6	40
1	17 09.1	1.27 136.6	16 40.2	1.27 136.8	16 11.2	1.27 136.9	15 42.3	1.27 137.1	15 13.4	1.27 137.2	14 44.5	1.27 137.3	14 15.6	1.27 137.5	13 46.6	1.27 137.6	1
2	16 52.8	1.28 135.6	16 23.9	1.28 135.8	15 55.1	1.28 135.9	15 26.2	1.28 136.1	14 57.3	1.28 136.2	14 28.4	1.28 136.3	13 59.6	1.28 136.5	13 30.7	1.28 136.6	2
3	16 36.3	1.28 134.6	16 07.4	1.28 134.8	15 38.6	1.28 134.9	15 09.8	1.28 135.1	14 41.0	1.28 135.2	14 12.1	1.28 135.3	13 43.3	1.28 135.5	13 14.4	1.28 135.6	3
4	16 19.4	1.28 133.6	15 50.7	1.28 133.8	15 21.9	1.28 133.9	14 53.1	1.28 134.1	14 24.3	1.28 134.2	13 55.5	1.28 134.3	13 26.7	1.28 134.5	12 57.9	1.28 134.6	4
45	16 02.3	1.29 132.6	15 33.6	1.29 132.8	15 04.9	1.29 132.9	14 36.1	1.29 133.1	14 07.3	1.29 133.2	13 38.6	1.29 133.3	13 09.8	1.29 133.5	12 41.1	1.29 133.7	45
6	15 44.9	1.29 131.6	15 16.2	1.29 131.8	14 47.5	1.29 131.9	14 18.8	1.29 132.1	13 50.1	1.29 132.2	13 21.4	1.29 132.3	12 52.7	1.29 132.5	12 24.0	1.29 132.7	6
7	15 27.3	1.30 130.6	14 58.6	1.30 130.8	14 30.0												

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., 4° 00', 4° 30', 5° 00', 5° 30', 6° 00', 6° 30', 7° 00', 7° 30', and H.A. Each column contains sub-columns for Alt., Az., and Az. with numerical values representing astronomical data.

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.		
	Ait.	Az.	Ait.	Az.	Ait.	Az.	Ait.	Az.	Ait.	Az.	Ait.	Az.	Ait.	Az.	Ait.	Az.			
00	19 00.0	1.000	180.0	18 30.0	1.000	180.0	18 00.0	1.000	180.0	17 30.0	1.000	180.0	17 00.0	1.000	180.0	16 30.0	1.000	180.0	00
1	18 59.8	1.001	178.9	18 29.8	1.001	178.9	17 59.8	1.001	179.0	17 29.8	1.001	179.0	16 59.8	1.001	179.0	16 29.8	1.001	179.0	1
2	18 59.1	1.002	177.9	18 29.1	1.002	177.9	17 59.1	1.002	177.9	17 29.1	1.002	177.9	16 59.1	1.002	177.9	16 29.1	1.002	177.9	2
3	18 58.5	1.002	176.8	18 28.5	1.002	176.8	17 58.5	1.002	176.9	17 28.5	1.002	176.9	16 58.5	1.002	176.9	16 28.5	1.002	176.9	3
4	18 56.5	1.003	175.8	18 26.5	1.003	175.8	17 56.5	1.003	175.8	17 26.5	1.003	175.8	16 56.5	1.003	175.8	16 26.5	1.003	175.9	4
05	18 54.6	1.004	174.7	18 24.6	1.004	174.7	17 54.6	1.004	174.8	17 24.6	1.004	174.8	16 54.7	1.004	174.8	16 24.7	1.004	174.9	5
6	18 52.2	1.005	173.7	18 22.3	1.005	173.7	17 52.3	1.005	173.7	17 22.3	1.005	173.7	16 52.4	1.005	173.8	16 22.4	1.005	173.8	6
7	18 49.4	1.005	172.6	18 19.5	1.005	172.6	17 49.5	1.005	172.7	17 19.6	1.005	172.7	16 49.6	1.005	172.7	16 19.7	1.005	172.8	7
8	18 46.2	1.006	171.6	18 16.3	1.006	171.6	17 46.3	1.006	171.7	17 16.4	1.006	171.7	16 46.4	1.006	171.7	16 16.5	1.006	171.8	8
9	18 42.6	1.007	170.5	18 12.6	1.007	170.6	17 42.7	1.007	170.6	17 12.8	1.007	170.6	16 42.8	1.007	170.7	16 12.9	1.007	170.8	9
10	18 38.5	1.008	169.5	18 08.6	1.008	169.5	17 38.6	1.008	169.5	17 08.7	1.008	169.6	16 38.8	1.008	169.6	16 08.9	1.008	169.7	10
1	18 34.0	1.008	168.4	18 04.1	1.008	168.5	17 34.2	1.008	168.5	17 04.3	1.008	168.5	16 34.4	1.008	168.6	16 04.5	1.008	168.7	1
2	18 29.1	1.009	167.4	17 59.2	1.009	167.4	17 29.3	1.009	167.5	17 04.3	1.009	167.5	16 29.5	1.009	167.5	16 04.5	1.009	167.6	2
3	18 23.7	1.010	166.4	17 53.9	1.010	166.4	17 24.0	1.010	166.4	16 59.4	1.010	166.5	16 24.3	1.010	166.5	16 04.5	1.010	166.6	3
4	18 18.0	1.010	165.3	17 48.1	1.010	165.3	17 18.3	1.010	165.4	16 48.4	1.010	165.4	16 24.3	1.010	165.5	16 04.5	1.010	165.6	4
15	18 11.8	09 11	164.2	17 42.0	09 11	164.3	17 12.2	09 11	164.3	16 42.3	09 11	164.4	16 12.5	09 11	164.5	15 42.7	09 11	164.5	15
6	18 05.2	09 12	163.2	17 35.4	09 12	163.2	17 05.6	09 12	163.3	16 35.8	09 12	163.4	16 06.0	09 12	163.4	15 36.2	09 12	163.5	6
7	17 58.3	09 12	162.1	17 28.5	09 12	162.2	16 58.7	09 12	162.3	16 28.9	09 12	162.3	15 59.1	09 12	162.4	15 29.3	09 12	162.5	7
8	17 50.9	09 13	161.1	17 21.1	09 13	161.2	16 51.4	09 13	161.3	16 28.9	09 13	161.3	15 51.8	09 13	161.4	15 22.1	09 13	161.5	8
9	17 43.1	09 14	160.1	17 13.3	09 14	160.1	16 43.6	09 14	160.2	16 21.9	09 14	160.3	15 44.1	09 14	160.3	15 14.4	09 14	160.4	9
20	17 34.9	09 14	159.0	17 05.2	09 14	159.1	16 35.5	09 14	159.2	16 05.8	09 14	159.2	15 36.1	09 14	159.3	15 06.4	09 14	159.4	20
1	17 26.3	09 15	158.0	16 56.6	09 15	158.1	16 26.9	09 15	158.1	15 57.3	09 15	158.2	15 27.6	09 15	158.3	14 57.9	09 15	158.4	1
2	17 17.3	09 16	157.0	16 47.7	09 16	157.0	16 18.0	09 16	157.1	15 48.4	09 16	157.2	15 18.7	09 16	157.3	14 49.1	09 16	157.4	2
3	17 08.0	09 16	155.9	16 38.3	09 16	156.0	16 08.7	09 16	156.1	15 39.1	09 16	156.2	15 09.5	09 16	156.3	14 40.1	09 16	156.4	3
4	16 58.2	09 17	154.9	16 28.9	09 17	155.0	15 59.0	09 17	155.1	15 29.4	09 17	155.2	14 59.8	09 17	155.3	14 30.3	09 17	155.4	4
25	16 48.1	09 18	153.9	16 18.5	09 18	153.0	15 49.0	09 18	153.1	15 19.4	09 18	153.1	14 49.8	09 18	153.2	14 20.3	09 18	153.3	25
6	16 37.5	09 18	152.8	16 08.0	09 18	152.9	15 38.5	09 18	153.0	15 09.0	09 18	153.1	14 39.5	09 18	153.2	14 09.9	09 18	153.3	6
7	16 26.7	09 19	151.8	15 57.2	09 19	151.9	15 27.7	09 19	152.0	14 58.2	09 19	152.1	14 28.7	09 19	152.2	13 59.2	09 19	152.3	7
8	16 15.4	09 19	150.8	15 46.0	09 19	150.9	15 16.5	09 19	151.0	14 47.1	09 19	151.1	14 17.6	09 19	151.2	13 48.1	09 19	151.3	8
9	16 03.8	09 20	149.8	15 34.4	09 20	149.9	15 05.0	09 20	150.0	14 35.5	09 20	150.1	14 06.1	09 20	150.2	13 36.7	09 20	150.3	9
30	15 51.8	09 21	148.8	15 22.4	09 21	148.9	14 53.1	09 21	149.0	14 23.7	09 21	149.1	13 54.3	09 21	149.2	13 24.9	09 21	149.3	30
1	15 39.5	09 21	147.8	15 10.1	09 21	147.9	14 40.8	09 21	148.0	14 11.5	09 21	148.1	13 42.1	09 21	148.2	13 12.8	09 21	148.3	1
2	15 26.8	09 22	146.7	14 57.5	09 22	146.8	14 28.2	09 22	147.0	13 58.9	09 22	147.1	13 29.6	09 22	147.2	13 00.3	09 22	147.3	2
3	15 13.8	09 22	145.7	14 44.5	09 22	145.8	14 15.2	09 22	146.0	13 46.0	09 22	146.1	13 16.7	09 22	146.2	12 47.4	09 22	146.3	3
4	15 00.4	09 23	144.7	14 31.2	09 23	144.8	14 01.9	09 23	145.0	13 32.7	09 23	145.1	13 03.5	09 23	145.2	12 28.2	09 23	145.3	4
35	14 46.7	09 23	143.7	14 17.5	09 23	143.8	13 48.3	09 23	144.0	13 19.1	09 23	144.1	12 49.9	09 23	144.2	12 20.7	09 23	144.3	35
6	14 32.7	09 24	142.7	14 03.5	09 24	142.8	13 34.4	09 24	143.0	13 05.2	09 24	143.1	12 36.1	09 24	143.2	12 06.9	09 24	143.3	6
7	14 18.3	09 24	141.7	13 49.2	09 24	141.8	13 20.1	09 24	142.0	12 51.0	09 24	142.1	12 21.8	09 24	142.2	11 52.7	09 24	142.3	7
8	14 03.6	09 25	140.7	13 34.5	09 25	140.8	13 05.5	09 25	141.0	12 36.0	09 25	141.1	12 07.3	09 25	141.2	11 38.2	09 25	141.3	8
9	13 48.6	09 26	139.7	13 19.6	09 26	139.9	12 50.6	09 26	140.0	12 21.5	09 26	140.1	11 52.5	09 26	140.2	11 23.4	09 26	140.3	9
40	13 33.3	09 26	138.7	13 04.3	09 26	138.9	12 35.3	09 26	139.0	12 06.3	09 26	139.1	11 37.3	09 26	139.3	11 08.3	09 26	139.4	40
1	13 17.7	09 27	137.7	12 48.7	09 27	137.9	12 19.8	09 27	138.0	11 50.8	09 27	138.1	11 21.9	09 27	138.3	10 52.9	09 27	138.4	1
2	13 01.8	09 27	136.8	12 32.9	09 27	136.9	12 04.0	09 27	137.0	11 35.0	09 27	137.2	11 06.1	09 27	137.3	10 37.2	09 27	137.4	2
3	12 45.6	09 27	135.8	12 16.7	09 27	135.9	11 47.8	09 27	136.0	11 19.0	09 27	136.2	10 50.1	09 27	136.3	10 21.2	09 27	136.4	3
4	12 29.1	09 28	134.8	12 00.2	09 28	134.9	11 31.4	09 28	135.1	11 02.6	09 28	135.2	10 33.8	09 28	135.4	10 04.9	09 28	135.5	4
45	12 12.3	09 28	133.8	11 43.5	09 28	134.0	11 14.7	09 28	134.1	10 45.9	09 28	134.2	10 17.1	09 28	134.4	9 48.3	09 28	134.5	45
6	11 55.2	09 29	132.8	11 26.5	09 29	133.0	10 57.7	09 29	133.1	10 29.0	09 29	133.3	10 00.2	09 29	133.4	9 31.5	09 29	133.6	6
7	11 37.9	09 29	131.9	11 09.2	09 29	132.0	10 40.5	09 29	132.1	10 11.8	09 29	132.3	9 43.1	09 29	132.4	9 14.4	09 29	132.6	7
8	11 20.3	09 30	130.9	10 51.6	09 30	131.0	10 23.0	09 30	131.2	9 54.3	09 30	131.3	9 25.6	09 30	131.5	8 57.0	09 30	131.6	8
9	11 02.4	09 30	129.9	10 33.8	09 30	130.1	10 05.2	09 30	130.2	9 36.6	09 30	130.4	9 08.0	09 30	130.5	8 30.3	09 30	130.7	9
50	10 44.3	09 31	128.9	10 15.8	09 31	129.1	9 47.2	09 31	129.2	9 18.6	09 31	129.4	8 50.0	09 31	129.6	8 21.4	09 31	129.7	50
1	10 26.0	09 31	128.0	9 57.4	09 31	128.1	9 28.9	09 31	128.3	9 00.4	09 31	128.4	8 31.8	09 31	128.6	8 03.3	09 31		

Lat. 67°

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Az.															
00	31 00.0	1.00 180.0	31 30.0	1.00 180.0	32 00.0	1.00 180.0	32 30.0	1.00 180.0	33 00.0	1.00 180.0	33 30.0	1.00 180.0	34 00.0	1.00 180.0	34 30.0	1.00 180.0	00
1	30 59.8	1.001 178.8	31 29.8	1.001 178.8	31 59.8	1.001 178.8	32 29.8	1.001 178.8	32 59.8	1.001 178.8	33 29.8	1.001 178.8	33 59.8	1.001 178.8	34 29.8	1.001 178.8	1
2	30 59.1	1.002 177.7	31 29.1	1.002 177.7	31 59.1	1.002 177.7	32 29.1	1.002 177.7	32 59.1	1.002 177.7	33 29.1	1.002 177.7	33 59.1	1.002 177.7	34 29.1	1.002 177.7	2
3	30 57.9	1.003 176.5	31 27.9	1.003 176.5	31 57.9	1.003 176.5	32 27.9	1.003 176.5	32 57.9	1.003 176.5	33 27.9	1.003 176.5	33 57.9	1.003 176.5	34 27.9	1.003 176.5	3
4	30 56.2	1.004 175.4	31 26.2	1.004 175.4	31 56.2	1.004 175.3	32 26.2	1.004 175.3	32 56.2	1.004 175.3	33 26.2	1.004 175.3	33 56.2	1.004 175.3	34 26.2	1.004 175.2	4
05	30 54.1	1.004 174.2	31 24.1	1.004 174.2	31 54.0	1.004 174.2	32 24.0	1.004 174.2	32 54.0	1.004 174.1	33 24.0	1.004 174.1	33 54.0	1.004 174.1	34 23.9	1.004 174.1	05
6	30 51.5	1.005 173.1	31 21.5	1.005 173.0	31 51.4	1.005 173.0	32 21.4	1.005 173.0	32 51.4	1.005 173.0	33 21.3	1.005 172.9	33 51.3	1.005 172.9	34 21.3	1.005 172.9	6
7	30 48.4	1.006 171.9	31 18.4	1.006 171.9	31 48.4	1.006 171.9	32 18.3	1.006 171.8	32 48.3	1.006 171.8	33 18.2	1.006 171.8	33 48.2	1.006 171.7	34 18.1	1.006 171.7	7
8	30 44.9	1.007 170.8	31 14.9	1.007 170.7	31 44.8	1.007 170.7	32 14.7	1.007 170.7	32 44.7	1.007 170.6	33 14.6	1.007 170.6	33 44.5	1.007 170.5	34 14.5	1.007 170.5	8
9	30 40.9	1.007 169.6	31 10.8	1.007 169.6	31 40.8	1.007 169.5	32 10.7	1.007 169.5	32 40.6	1.008 169.5	33 10.5	1.008 169.4	33 40.5	1.008 169.4	34 10.4	1.008 169.3	9
10	30 36.5	1.008 168.5	31 06.4	1.008 168.4	31 36.3	1.008 168.4	32 06.2	1.008 168.3	32 36.1	1.008 168.3	33 06.0	1.008 168.2	33 35.9	1.008 168.2	34 05.8	1.008 168.1	10
1	30 31.6	1.009 167.3	31 01.4	1.009 167.3	31 31.3	1.009 167.2	32 01.2	1.009 167.2	32 31.1	1.009 167.1	33 01.0	1.009 167.1	33 30.9	1.009 167.0	34 00.7	1.009 167.0	1
2	30 26.2	1.010 166.2	30 56.1	1.010 166.1	31 25.9	1.010 166.1	31 55.8	1.010 166.0	32 25.6	1.010 166.0	32 55.5	1.010 165.9	33 25.4	1.010 165.8	33 55.2	1.010 165.8	2
3	30 20.4	1.011 165.0	30 50.2	1.011 165.0	31 20.0	1.011 164.9	31 49.9	1.011 164.8	32 19.7	1.011 164.8	32 49.6	1.011 164.7	33 19.4	1.011 164.7	33 49.2	1.011 164.6	3
4	30 14.1	1.011 163.9	30 43.9	1.011 163.8	31 13.7	1.011 163.8	31 43.5	1.011 163.7	32 13.4	1.011 163.6	32 43.2	1.011 163.6	33 13.0	1.011 163.5	33 42.8	1.011 163.4	4
15	30 07.4	1.012 162.8	30 37.2	1.012 162.7	31 06.9	1.012 162.6	31 36.7	1.012 162.6	32 06.5	1.012 162.5	32 36.3	1.012 162.4	33 06.1	1.012 162.3	33 35.9	1.012 162.3	15
6	30 00.2	1.013 161.6	30 30.0	1.013 161.6	30 59.7	1.013 161.5	31 29.5	1.013 161.4	31 59.2	1.013 161.3	32 29.0	1.013 161.3	32 58.8	1.013 161.2	33 28.5	1.013 161.1	6
7	29 52.6	1.013 160.5	30 22.3	1.013 160.4	30 52.1	1.013 160.3	31 21.8	1.013 160.3	31 51.5	1.013 160.2	32 21.2	1.013 160.1	32 51.0	1.013 160.0	33 20.7	1.013 159.9	7
8	29 44.5	1.014 159.4	30 14.2	1.014 159.3	30 44.0	1.014 159.2	31 13.7	1.014 159.1	31 43.4	1.014 159.0	32 13.0	1.014 159.0	32 42.7	1.014 158.9	33 12.4	1.014 158.8	8
9	29 36.1	1.015 158.2	30 05.7	1.015 158.2	30 35.4	1.015 158.1	31 05.1	1.015 158.0	31 34.7	1.015 157.9	32 04.4	1.015 157.8	32 34.1	1.015 157.7	33 03.7	1.015 157.6	9
20	29 27.2	1.016 157.1	29 56.8	1.016 157.0	30 26.4	1.016 156.9	30 56.1	1.016 156.8	31 25.7	1.016 156.8	31 55.3	1.016 156.7	32 25.0	1.016 156.6	32 54.6	1.016 156.5	20
1	29 17.8	1.016 156.0	29 47.4	1.016 155.9	30 17.0	1.016 155.8	30 46.6	1.016 155.7	31 15.8	1.016 155.6	31 45.8	1.016 155.5	32 15.4	1.016 155.4	32 45.0	1.016 155.3	1
2	29 08.1	1.017 154.9	29 37.7	1.017 154.8	30 07.2	1.017 154.7	30 36.8	1.017 154.6	31 06.3	1.017 154.5	31 35.9	1.017 154.4	32 05.5	1.017 154.3	32 35.0	1.017 154.2	2
3	28 57.9	1.018 153.8	29 27.5	1.018 153.7	29 57.0	1.018 153.6	30 26.5	1.018 153.5	30 56.0	1.018 153.3	31 25.6	1.018 153.2	31 55.1	1.018 153.1	32 24.6	1.018 153.0	3
4	28 47.3	1.018 152.6	29 16.8	1.018 152.5	29 46.3	1.018 152.4	30 15.8	1.018 152.3	30 45.3	1.018 152.2	31 14.8	1.018 152.1	31 44.3	1.018 152.0	32 13.7	1.018 151.9	4
25	28 36.4	1.019 151.5	29 05.8	1.019 151.4	29 35.3	1.019 151.3	30 04.7	1.019 151.2	30 34.2	1.019 151.1	31 03.6	1.019 151.0	31 33.1	1.019 150.9	32 02.5	1.019 150.8	25
6	28 25.0	1.020 150.4	28 54.4	1.020 150.3	29 23.8	1.020 150.2	29 53.2	1.020 150.1	30 22.7	1.020 150.0	30 52.1	1.020 149.9	31 21.4	1.020 149.7	31 50.8	1.020 149.6	6
7	28 13.2	1.020 149.3	28 42.6	1.020 149.2	29 12.0	1.020 149.1	29 41.4	1.020 149.0	30 10.7	1.020 148.9	30 40.1	1.020 148.7	31 09.4	1.020 148.6	31 38.8	1.020 148.5	7
8	28 01.1	1.021 148.2	28 30.4	1.021 148.1	28 59.8	1.021 148.0	29 29.1	1.021 147.9	29 58.4	1.021 147.7	30 27.7	1.021 147.6	30 57.0	1.021 147.5	31 26.3	1.021 147.4	8
9	27 48.5	1.022 147.1	28 18.8	1.022 147.0	28 47.1	1.022 146.9	29 16.4	1.022 146.8	29 45.7	1.022 146.6	30 15.0	1.022 146.5	30 44.2	1.022 146.4	31 13.5	1.022 146.3	9
30	27 35.6	1.023 146.0	28 04.9	1.023 145.9	28 34.1	1.023 145.8	29 03.4	1.023 145.7	29 32.6	1.023 145.5	30 01.8	1.023 145.4	30 31.1	1.023 145.3	31 00.3	1.023 145.1	30
1	27 22.3	1.023 144.9	27 51.6	1.023 144.8	28 20.8	1.023 144.7	28 50.0	1.023 144.6	29 19.2	1.023 144.4	29 48.4	1.023 144.3	30 17.5	1.023 144.2	30 46.7	1.023 144.0	1
2	27 08.7	1.024 143.9	27 37.9	1.024 143.7	28 07.0	1.024 143.6	28 36.2	1.024 143.5	29 05.3	1.024 143.3	29 34.5	1.024 143.2	30 03.6	1.024 143.1	30 32.7	1.024 142.9	2
3	26 54.7	1.024 142.8	27 23.8	1.024 142.6	27 52.9	1.024 142.5	28 22.1	1.024 142.4	28 51.2	1.024 142.2	29 20.3	1.024 142.1	29 49.3	1.024 142.0	30 18.4	1.024 141.8	3
4	26 40.3	1.025 141.7	27 09.4	1.025 141.6	27 38.5	1.025 141.4	28 07.6	1.025 141.3	28 36.6	1.025 141.1	29 05.7	1.025 141.0	29 34.7	1.025 140.9	30 03.8	1.025 140.7	4
35	26 25.6	1.026 140.6	26 54.7	1.026 140.5	27 23.7	1.026 140.4	27 52.7	1.026 140.2	28 21.8	1.026 140.1	28 50.8	1.026 139.9	29 19.8	1.026 139.8	29 48.7	1.026 139.6	35
6	26 10.6	1.026 139.6	26 39.6	1.026 139.4	27 08.6	1.026 139.3	27 37.6	1.026 139.1	28 06.5	1.026 139.0	28 35.5	1.026 138.8	29 04.4	1.026 138.7	29 33.4	1.026 138.5	6
7	25 55.2	1.027 138.5	26 24.2	1.027 138.4	26 53.1	1.027 138.2	27 22.1	1.027 138.1	27 51.0	1.027 137.9	28 19.9	1.027 137.8	28 48.8	1.027 137.6	29 17.7	1.027 137.5	7
8	25 39.5	1.027 137.4	26 08.4	1.027 137.3	26 37.3	1.027 137.1	27 06.2	1.027 137.0	27 35.1	1.027 136.8	28 04.0	1.027 136.7	28 32.8	1.027 136.5	29 01.7	1.027 136.4	8
9	25 23.5	1.028 136.4	25 52.4	1.028 136.2	26 21.2	1.028 136.1	26 50.1	1.028 135.9	27 18.9	1.028 135.8	27 47.7	1.028 135.6	28 16.6	1.028 135.5	28 45.4	1.028 135.3	9
40	25 07.2	1.028 135.3	25 36.0	1.028 135.2	26 04.8	1.028 135.0	26 33.6	1.028 134.9	27 02.4	1.028 134.7	27 31.2	1.028 134.5	28 00.0	1.028 134.4	28 28.7	1.028 134.2	40
1	24 50.6	1.029 134.3	25 19.3	1.029 134.1	25 48.1	1.029 134.0	26 16.9	1.029 133.8	26 45.6	1.029 133.6	27 14.3	1.029 133.5	27 43.0	1.029 133.3	28 11.8	1.029 133.2	1
2	24 33.6	1.029 133.2	25 02.4	1.029 133.1	25 31.1	1.029 132.9	25 59.8	1.029 132.8	26 28.5	1.029 132.6	26 57.2	1.029 132.4	27 25.8	1.029 132.3	27 54.5	1.029 132.1	2
3	24 16.4	1.029 132.2	24 45.1	1.029 132.0	25 13.8	1.029 131.9	25 42.4	1.029 131.7	26 11.1	1.029 131.5	26 39.7	1.029 131.3	27 08.3	1.029 131.2	27 37.0	1.029 131.0	3
4	23 58.9	1.030 131.2	24 27.5	1.030 131.0	24 56.2	1.030 130.8	25 24.8	1.030 130.7	25 53.4	1.030 130.5	26 22.0	1.030 130.3	26 50.6	1.030 130.2	27 19.1	1.030 130.0	4
45	23 41.1	1.030 130.1	24 09.7	1.030 130.0	24 38.3	1.030 129.8	25 06.9	1.030 129.6	25 35.4	1.030 129.5	26 04.0	1.030 129.3	26 32.5	1.			

Main table with columns for H.A., Alt., Az., and declination angles (8° 00' to 11° 30') for various H.A. values (00 to 55).

Lat. 67°

DECLINATION SAME NAME AS LATITUDE

Main table with columns for H.A., Alt., Az., and declination angles (8° 00' to 11° 30') for various H.A. values (91 to 100).

Lat. 68°

Lat. 69°

Vertical text on the left margin containing numbers and partial table headers.

Lat. 67°

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	35 00.0	1.000	180.0	35 30.0	1.000	180.0	36 00.0	1.000	180.0	36 30.0	1.000	180.0	37 00.0	1.000	180.0	37 30.0	1.000	180.0	00
1	34 59.8	1.001	178.8	35 29.8	1.001	178.8	35 59.8	1.001	178.8	36 29.8	1.001	178.8	36 59.8	1.001	178.8	37 29.8	1.001	178.8	1
2	34 59.0	1.002	177.6	35 29.0	1.002	177.6	35 59.0	1.002	177.6	36 29.0	1.002	177.6	36 59.0	1.002	177.6	37 29.0	1.002	177.6	2
3	34 57.8	1.003	176.4	35 27.8	1.003	176.4	35 57.8	1.003	176.4	36 27.8	1.003	176.4	36 57.8	1.003	176.4	37 27.8	1.003	176.4	3
4	34 56.1	1.004	175.2	35 26.1	1.004	175.2	35 56.1	1.004	175.2	36 26.1	1.004	175.2	36 56.1	1.004	175.2	37 26.1	1.004	175.2	4
05	34 53.9	1.004	174.0	35 23.9	1.004	174.0	35 53.8	1.004	174.0	36 23.8	1.004	174.0	36 53.8	1.005	173.9	37 23.8	1.005	173.9	05
6	34 51.2	1.005	172.8	35 21.2	1.005	172.8	35 51.1	1.005	172.8	36 21.1	1.005	172.8	36 51.1	1.006	172.7	37 21.1	1.006	172.7	6
7	34 48.1	1.006	171.7	35 18.0	1.006	171.6	35 48.0	1.006	171.6	36 17.9	1.006	171.5	36 47.9	1.006	171.5	37 17.8	1.006	171.5	7
8	34 44.4	1.007	170.5	35 14.3	1.007	170.4	35 44.3	1.007	170.4	36 14.2	1.007	170.3	36 44.1	1.007	170.3	37 14.1	1.007	170.3	8
9	34 40.3	1.008	169.3	35 10.2	1.008	169.2	35 40.1	1.008	169.2	36 10.0	1.008	169.1	36 40.0	1.008	169.1	37 09.9	1.008	169.0	9
10	34 35.7	1.008	168.1	35 05.6	1.008	168.0	35 35.5	1.009	167.9	36 05.4	1.009	167.9	36 35.3	1.009	167.9	37 05.2	1.009	167.8	10
1	34 30.0	1.009	166.9	35 00.0	1.009	166.9	35 30.4	1.009	166.7	36 00.2	1.009	166.7	36 30.1	1.009	166.7	37 00.0	1.009	166.6	1
2	34 25.1	1.010	165.7	34 54.9	1.010	165.7	35 24.8	1.010	165.6	35 54.6	1.010	165.5	36 24.5	1.010	165.5	36 54.3	1.010	165.4	2
3	34 19.1	1.011	164.5	34 48.9	1.011	164.5	35 18.7	1.011	164.4	35 48.5	1.011	164.4	36 18.4	1.011	164.3	36 48.2	1.011	164.2	3
4	34 12.6	1.012	163.4	34 42.4	1.012	163.3	35 12.2	1.012	163.2	35 42.0	1.012	163.2	36 11.8	1.012	163.1	36 41.6	1.012	163.0	4
15	34 05.6	1.012	162.2	34 35.4	1.012	162.1	35 05.2	1.012	162.0	35 35.0	1.012	162.0	36 04.7	1.012	161.9	36 34.5	1.012	161.8	15
6	33 58.3	1.013	161.0	34 28.0	1.013	160.9	34 57.7	1.013	160.8	35 27.5	1.013	160.8	35 57.2	1.013	160.7	36 26.9	1.013	160.6	6
7	33 50.4	1.014	159.9	34 20.1	1.014	159.8	34 49.8	1.014	159.7	35 19.5	1.014	159.6	35 49.2	1.014	159.5	36 18.9	1.014	159.4	7
8	33 42.1	1.015	158.7	34 11.8	1.015	158.6	34 41.5	1.015	158.5	35 11.0	1.015	158.4	35 40.8	1.015	158.3	36 10.5	1.015	158.2	8
9	33 33.4	1.016	157.5	34 03.0	1.016	157.4	34 32.7	1.016	157.3	35 02.3	1.016	157.3	35 31.9	1.016	157.2	36 01.6	1.016	157.1	9
20	33 24.2	1.016	156.4	33 53.8	1.016	156.3	34 23.4	1.016	156.2	34 53.0	1.016	156.1	35 22.6	1.016	156.0	35 52.2	1.016	155.9	20
1	33 14.6	1.017	155.2	33 44.2	1.017	155.1	34 13.7	1.017	155.0	34 43.3	1.017	154.9	35 12.8	1.017	154.8	35 42.4	1.017	154.7	1
2	33 04.5	1.018	154.1	33 34.1	1.018	154.0	34 03.6	1.018	153.9	34 33.1	1.018	153.8	35 02.7	1.018	153.7	35 32.2	1.018	153.6	2
3	32 54.1	1.018	152.9	33 23.6	1.018	152.8	33 53.1	1.018	152.7	34 22.6	1.018	152.6	34 52.0	1.018	152.5	35 21.5	1.018	152.4	3
4	32 43.2	1.019	151.8	33 12.7	1.019	151.7	33 42.1	1.019	151.6	34 11.6	1.019	151.4	34 41.0	1.019	151.3	35 10.4	1.019	151.2	4
25	32 31.9	1.020	150.6	33 01.3	1.020	150.5	33 30.7	1.020	150.4	34 00.1	1.020	150.3	34 29.5	1.020	150.2	34 58.9	1.020	149.9	25
6	32 20.2	1.020	149.5	32 49.6	1.020	149.4	33 19.0	1.020	149.3	33 48.3	1.020	149.1	34 17.7	1.020	149.0	34 47.0	1.020	148.9	6
7	32 08.1	1.021	148.4	32 37.4	1.021	148.2	33 06.8	1.021	148.1	33 36.1	1.021	148.0	34 05.4	1.021	147.9	34 34.7	1.021	147.7	7
8	31 55.6	1.021	147.2	32 24.9	1.021	147.1	32 54.2	1.021	146.9	33 23.5	1.021	146.8	33 52.7	1.021	146.7	34 22.0	1.021	146.5	8
9	31 42.7	1.022	146.1	32 12.0	1.022	146.0	32 41.2	1.022	145.9	33 10.5	1.022	145.7	33 39.7	1.022	145.6	34 08.9	1.022	145.4	9
30	31 29.5	1.022	145.0	31 58.7	1.022	144.9	32 27.9	1.022	144.7	32 57.1	1.022	144.6	33 26.2	1.022	144.5	33 55.4	1.022	144.3	30
1	31 15.9	1.023	143.8	31 45.0	1.023	143.7	32 14.2	1.023	143.6	32 43.3	1.023	143.5	33 12.4	1.023	143.3	33 41.5	1.023	143.2	1
2	31 01.9	1.024	142.6	31 31.0	1.024	142.5	32 00.1	1.024	142.4	32 29.1	1.024	142.3	32 58.2	1.024	142.2	33 27.3	1.024	142.1	2
3	30 47.8	1.025	141.4	31 16.6	1.025	141.3	31 45.6	1.025	141.2	32 14.6	1.025	141.1	32 43.7	1.025	141.0	33 12.7	1.025	140.8	3
4	30 32.8	1.026	140.2	31 01.8	1.026	140.1	31 30.8	1.026	140.0	31 59.8	1.026	139.9	32 28.8	1.026	139.8	32 57.7	1.026	139.6	4
35	30 17.7	1.026	139.0	30 46.7	1.026	138.9	31 15.6	1.026	138.8	31 44.6	1.026	138.7	32 13.5	1.026	138.6	32 42.4	1.026	138.5	35
6	30 02.3	1.027	137.8	30 31.2	1.027	137.7	31 00.1	1.027	137.6	31 29.0	1.027	137.5	31 57.9	1.027	137.4	32 26.8	1.027	137.3	6
7	29 46.6	1.027	136.6	30 15.5	1.027	136.5	30 44.3	1.027	136.4	31 13.2	1.027	136.3	31 42.0	1.027	136.2	32 10.8	1.027	136.1	7
8	29 30.5	1.028	135.4	29 59.3	1.028	135.3	30 28.2	1.028	135.2	30 57.0	1.028	135.1	31 25.8	1.028	135.0	31 54.5	1.028	134.9	8
9	29 14.1	1.028	134.1	29 42.9	1.028	134.0	30 11.7	1.028	133.8	30 40.4	1.028	133.6	31 09.2	1.028	133.5	31 37.9	1.028	133.4	9
40	28 57.4	1.028	132.9	29 26.2	1.028	132.8	29 54.9	1.028	132.7	30 23.6	1.028	132.6	30 52.3	1.028	132.5	31 21.0	1.028	132.4	40
1	28 40.5	1.029	131.7	29 09.1	1.029	131.6	29 37.8	1.029	131.5	30 06.5	1.029	131.4	30 35.1	1.029	131.3	31 03.7	1.029	131.2	1
2	28 23.2	1.029	130.5	28 51.8	1.029	130.4	29 20.4	1.029	130.3	29 49.9	1.029	130.2	30 17.6	1.029	130.1	30 46.2	1.029	130.0	2
3	28 05.6	1.030	129.3	28 34.2	1.030	129.2	29 02.7	1.030	129.1	29 31.3	1.030	129.0	29 59.9	1.030	128.9	30 28.4	1.030	128.8	3
4	27 47.7	1.030	128.1	28 16.2	1.030	128.0	28 44.8	1.030	127.9	29 13.3	1.030	127.8	29 41.8	1.030	127.7	30 10.3	1.030	127.6	4
45	27 29.6	1.031	126.9	27 58.1	1.031	126.8	28 26.5	1.031	126.7	28 55.0	1.031	126.6	29 23.5	1.031	126.5	29 51.9	1.031	126.4	45
6	27 11.1	1.031	125.7	27 39.6	1.031	125.6	28 08.0	1.031	125.5	28 36.5	1.031	125.4	29 04.9	1.031	125.3	29 33.3	1.031	125.2	6
7	26 52.5	1.032	124.5	27 20.9	1.032	124.4	27 49.3	1.032	124.3	28 17.7	1.032	124.2	28 46.0	1.032	124.1	29 14.4	1.032	124.0	7
8	26 33.5	1.032	123.3	27 01.9	1.032	123.2	27 30.3	1.032	123.1	27 58.6	1.032	123.0	28 26.9	1.032	122.9	28 55.2	1.032	122.8	8
9	26 14.4	1.032	122.1	26 42.7	1.032	122.0	27 11.0	1.032	121.9	27 39.3	1.032	121.8	28 07.6	1.032	121.7	28 35.8	1.032	121.6	9
50	25 55.0	1.033	120.9	26 23.2	1.033	120.8	26 51.5	1.033	120.7	27 19.8	1.033	120.6	27 48.0	1.033	120.5	28 16.2	1.033	120.4	50
1	25 35.3	1.033	119.7	26 03.6	1.033	119.6	26 31.8	1.033	119.5	27 00.0	1.033	119.4	27 28.2	1.033	119.3	27 56.4	1.033	119.2	1
2	25 15.4	1.034	118.5	25 43.6	1.034	118.4	26 11.8	1.034	118.3	26 40.0	1.034	118.2	27 08.2	1.034	118.1	27 36.3	1.034	118.0	2
3	24 55.4	1.034	117.3	25 23.5	1.034	117.2	25 51.7	1.034	117.1	26 19.8	1.034	117.0	26 47.9	1.034	116.9	27 16.0	1.034	116.8	3
4	24 35.1	1.034	116.1	25 03.2	1.034	116.0	25 31.3	1.034	115.9	25 59.4	1.034	115.8	26 27.5	1.034	115.7	26 55.5	1.034	115.6	4
55	24 14.6	1.034	114.9	24 42.6	1.034	114.8	25 10.7	1.034	114.7	25 38.8	1.034	114.6	26 06.8	1.034	114.5	26 34.8	1.034	114.4	55
6	23 53.9	1.035	113.7	24 21.9	1.035	113.6	24 49.9	1.035	113.5	25 18.0	1.035	113.4	25 46.0	1.035	113.3	26 1			

Table with columns for H.A., Alt., Az., and declination values for latitudes 12° 00' to 15° 30'.

Lat. 67°

DECLINATION SAME NAME AS LATITUDE

Table with columns for H.A., Alt., Az., and declination values for latitudes 12° 00' to 15° 30'.

Lat. 68°

Lat. 67°

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
00	39 00.0	180.0	39 30.0	180.0	40 00.0	180.0	40 30.0	180.0	41 00.0	180.0	41 30.0	180.0	42 00.0	180.0	42 30.0	180.0	00
1	38 59.7	178.8	39 29.7	178.8	39 59.7	178.8	40 29.7	178.7	40 59.7	178.7	41 29.7	178.7	41 59.7	178.7	42 29.7	178.7	1
2	38 59.0	177.5	39 29.0	177.5	39 59.0	177.5	40 29.0	177.5	40 59.0	177.5	41 29.0	177.5	41 59.0	177.5	42 29.0	177.4	2
3	38 57.7	176.3	39 27.7	176.3	39 57.7	176.3	40 27.7	176.2	40 57.7	176.2	41 27.7	176.2	41 57.7	176.2	42 27.6	176.2	3
4	38 56.0	175.1	39 25.9	175.0	39 55.9	175.0	40 25.9	175.0	40 55.9	175.0	41 25.9	174.9	41 55.8	174.9	42 25.8	174.9	4
5	38 53.7	173.8	39 23.7	173.8	39 53.6	173.8	40 23.6	173.7	40 53.6	173.7	41 23.5	173.7	41 53.5	173.6	42 23.5	173.6	5
6	38 50.9	172.6	39 20.9	172.6	39 50.8	172.6	40 20.8	172.5	40 50.7	172.5	41 20.7	172.4	41 50.7	172.4	42 20.6	172.3	6
7	38 47.6	171.4	39 17.6	171.3	39 47.5	171.3	40 17.5	171.2	40 47.4	171.2	41 17.3	171.2	41 47.3	171.1	42 17.2	171.1	7
8	38 43.9	170.1	39 13.8	170.1	39 43.7	170.0	40 13.6	170.0	40 43.6	169.9	41 13.5	169.9	41 43.4	169.8	42 13.3	169.8	8
9	38 39.6	168.9	39 09.5	168.8	39 39.4	168.8	40 09.3	168.7	40 39.2	168.6	41 09.1	168.6	41 39.0	168.6	42 08.9	168.5	9
10	38 34.8	167.7	39 04.7	167.6	39 34.6	167.6	40 04.5	167.5	40 34.4	167.4	41 04.2	167.4	41 34.1	167.3	42 04.0	167.3	10
1	38 29.6	166.4	38 59.4	166.4	39 29.3	166.3	39 59.2	166.3	40 29.0	166.2	40 58.9	166.1	41 28.7	166.1	41 58.6	166.0	1
2	38 23.8	165.2	38 53.7	165.2	39 23.5	165.1	39 53.4	165.0	40 23.2	164.9	40 53.0	164.9	41 22.8	164.8	41 52.7	164.7	2
3	38 17.6	164.0	38 47.4	163.9	39 17.2	163.9	39 47.0	163.8	40 16.9	163.7	40 46.6	163.6	41 16.4	163.6	41 46.2	163.5	3
4	38 10.9	162.8	38 40.7	162.7	39 10.5	162.6	39 40.3	162.6	40 10.0	162.5	40 39.8	162.4	41 09.6	162.3	41 39.3	162.2	4
5	38 03.8	161.6	38 33.5	161.5	39 03.3	161.4	39 33.0	161.3	40 02.7	161.2	40 32.5	161.2	41 02.2	161.1	41 31.9	161.0	5
6	37 56.1	160.4	38 25.8	160.3	38 55.5	160.2	39 25.3	160.1	39 55.0	160.0	40 24.7	159.9	41 04.4	159.8	41 24.0	159.7	6
7	37 48.0	159.2	38 17.7	159.1	38 47.4	159.0	39 17.0	158.9	39 46.7	158.8	40 16.4	158.7	40 46.0	158.6	41 15.7	158.5	7
8	37 39.4	158.0	38 09.1	157.9	38 38.7	157.8	39 08.4	157.7	39 38.0	157.6	40 07.6	157.5	40 37.2	157.4	41 06.9	157.3	8
9	37 30.4	156.8	38 00.0	156.7	38 29.6	156.6	38 59.2	156.5	39 28.8	156.3	39 58.4	156.2	40 28.0	156.1	41 07.6	156.0	9
20	37 20.9	155.6	37 50.5	155.5	38 20.1	155.4	38 49.6	155.2	39 19.2	155.1	39 48.7	155.0	40 18.3	154.9	40 47.8	154.8	20
1	37 11.0	154.4	37 40.6	154.3	38 10.1	154.2	38 39.6	154.0	39 09.1	153.9	39 38.6	153.8	40 08.1	153.7	40 37.6	153.6	1
2	37 00.7	153.2	37 30.2	153.1	37 59.6	153.0	38 29.1	152.8	38 58.6	152.7	39 28.0	152.6	39 57.5	152.5	40 26.9	152.4	2
3	36 49.9	152.0	37 19.3	151.9	37 48.8	151.8	38 18.2	151.6	38 47.6	151.5	39 17.0	151.4	39 46.4	151.3	40 15.8	151.1	3
4	36 38.7	150.8	37 08.1	150.7	37 37.5	150.6	38 06.9	150.5	38 36.2	150.3	39 05.6	150.2	39 35.0	150.1	40 04.3	149.9	4
5	36 27.0	149.7	36 56.4	149.5	37 25.7	149.3	37 55.1	149.1	38 24.4	148.9	38 53.7	148.8	39 23.0	148.7	39 52.4	148.6	5
6	36 15.0	148.5	36 44.3	148.4	37 13.6	148.2	37 42.9	148.1	38 12.2	147.9	38 41.5	147.8	39 10.7	147.7	39 40.0	147.5	6
7	36 02.5	147.3	36 31.8	147.2	37 01.1	147.1	37 30.3	146.9	37 59.5	146.8	38 28.8	146.6	38 58.0	146.5	39 27.2	146.3	7
8	35 49.7	146.2	36 18.9	146.0	36 48.1	145.9	37 17.3	145.8	37 46.5	145.6	38 15.7	145.5	38 44.8	145.3	39 14.0	145.2	8
9	35 36.4	145.0	36 05.6	144.9	36 34.8	144.7	37 03.9	144.6	37 33.1	144.4	38 02.2	144.3	38 31.3	144.1	39 00.4	144.0	9
30	35 22.8	143.7	35 51.9	143.7	36 21.0	143.6	36 50.1	143.4	37 19.2	143.3	37 48.3	143.1	38 17.4	143.0	38 46.4	142.8	30
1	35 08.8	142.5	35 37.9	142.4	36 06.9	142.4	36 36.0	142.3	37 05.0	142.1	37 34.0	142.0	38 03.1	141.8	38 32.1	141.6	1
2	34 54.4	141.3	35 23.5	141.4	35 52.5	141.3	36 21.5	141.1	36 50.4	141.0	37 19.4	140.8	37 48.4	140.6	38 17.3	140.5	2
3	34 39.7	140.1	35 08.7	140.0	35 37.6	139.9	36 06.6	139.8	36 35.5	139.6	37 04.4	139.5	37 33.3	139.3	38 02.2	139.2	3
4	34 24.6	138.9	34 53.5	138.9	35 22.4	138.8	35 51.3	138.7	36 20.2	138.5	36 49.1	138.5	37 17.9	138.3	37 46.8	138.2	4
35	34 09.1	137.8	34 38.0	137.8	35 06.9	137.7	35 35.7	137.7	36 04.5	137.6	36 33.4	137.4	37 02.2	137.2	37 30.9	137.0	35
6	33 53.4	136.6	34 22.2	136.6	34 51.0	136.6	35 19.8	136.6	35 48.6	136.4	36 17.3	136.2	36 46.1	136.1	37 14.8	135.9	6
7	33 37.2	135.4	34 06.0	135.3	34 34.8	135.3	35 03.5	135.3	35 32.2	135.2	36 00.9	135.1	36 29.6	134.9	36 58.3	134.8	7
8	33 20.8	134.2	33 49.5	134.2	34 18.2	134.1	34 46.9	134.1	35 15.6	134.0	35 44.2	133.8	36 12.9	133.8	36 41.5	133.6	8
9	33 04.0	133.0	33 32.7	133.0	34 01.3	133.0	34 30.0	133.0	34 58.6	132.9	35 27.2	132.9	35 55.8	132.7	36 24.4	132.5	9
40	32 46.9	131.7	33 15.6	131.7	33 44.2	131.6	34 12.8	131.5	34 41.3	131.4	35 09.9	131.3	35 38.4	131.2	36 07.0	131.1	40
1	32 29.6	130.5	32 58.1	130.4	33 26.7	130.3	33 55.2	130.2	34 23.8	130.1	34 52.3	130.0	35 20.7	129.9	35 49.2	129.8	1
2	32 11.9	129.3	32 40.4	129.3	33 08.9	129.2	33 37.4	129.1	34 05.9	129.0	34 34.3	128.9	35 02.8	128.8	35 31.2	128.7	2
3	31 53.9	128.1	32 22.4	128.0	32 50.9	127.9	33 19.3	127.8	33 47.7	127.7	34 16.1	127.6	34 44.5	127.5	35 12.9	127.3	3
4	31 35.7	126.9	32 04.1	126.8	32 32.5	126.8	33 00.9	126.7	33 29.3	126.6	33 57.6	126.5	34 26.0	126.4	34 54.3	126.3	4
45	31 17.2	125.7	31 45.5	125.7	32 13.9	125.6	32 42.3	125.6	33 10.6	125.5	33 38.9	125.4	34 07.2	125.3	34 35.4	125.2	45
6	30 58.4	124.5	31 26.7	124.5	31 55.0	124.5	32 23.3	124.4	32 51.6	124.3	33 19.9	124.2	33 48.1	124.1	34 16.3	124.0	6
7	30 39.4	123.3	31 07.6	123.2	31 35.9	123.2	32 04.2	123.1	32 32.4	123.0	33 00.6	122.9	33 28.8	122.8	33 57.0	122.7	7
8	30 20.1	122.1	30 48.3	122.0	31 16.5	122.0	31 44.7	121.9	32 12.9	121.8	32 41.1	121.7	33 09.2	121.6	33 37.4	121.5	8
9	30 00.5	120.9	30 28.7	120.8	30 56.9	120.7	31 25.1	120.6	31 53.2	120.5	32 21.4	120.4	32 49.5	120.3	33 17.5	120.2	9
50	29 40.8	119.7	30 08.9	119.6	30 37.1	119.5	31 05.2	119.4	31 33.3	119.3	32 01.4	119.2	32 29.4	119.1	32 57.5	119.0	50
1	29 20.8	118.5	29 48.9	118.4	30 17.0	118.3	30 45.1	118.2	31 11.3	118.1	31 39.4	118.0	32 07.2	117.9	32 35.2	117.8	1
2	29 00.6	117.3	29 28.7	117.2	29 56.7	117.1	30 24.8	117.0	30 52.8	116.9	31 20.8	116.8	31 48.7	116.7	32 16.7	116.6	2
3	28 40.2	116.1	29 08.2	116.0	29 36.2	115.9	30 04.2	115.8	30 32.2	115.7	31 00.2	115.6	31 28.1	115.5	31 56.0	115.4	3
4	28 19.6	114.9	28 47.6	114.8	29 15.5	114.7	29 43.5	114.6	30 11.4	114.5	30 39.3	114.4	31 07.2	114.3	31 35.1	114.2	4
55	27 58.8	113.7	28 26.7	113.6	28 54.7	113.5	29 22.6	113.4	29 50.5	113.3	30 18.3	113.2	30 46.2	113.1	31 14.0	113.0	55
6	27																

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
00	700.0	1.00 180.0	630.0	1.00 180.0	600.0	1.00 180.0	530.0	1.00 180.0	500.0	1.00 180.0							00
1	659.8	1.001 179.0	629.8	1.001 179.0	559.8	1.001 179.0	529.8	1.001 179.0									1
2	659.2	1.002 178.1	629.2	1.002 178.1	559.2	1.002 178.1	529.2	1.002 178.1									2
3	658.2	1.002 177.1	628.2	1.002 177.1	558.2	1.002 177.1	528.2	1.002 177.1									3
4	656.8	1.003 176.1	626.8	1.003 176.1	556.9	1.003 176.2	526.9	1.003 176.2									4
05	655.0	1.004 175.2	625.1	1.004 175.2	555.1	1.004 175.2	525.1	1.004 175.2									05
6	652.9	1.004 174.2	622.9	1.004 174.2	552.9	1.004 174.2	523.0	1.004 174.3									6
7	650.3	1.006 173.2	620.3	1.005 173.2	550.4	1.006 173.3	520.4	1.006 173.3									7
8	647.3	1.006 172.3	617.4	1.006 172.3	547.4	1.006 172.3	517.5	1.006 172.3									8
9	644.0	1.006 171.3	614.0	1.006 171.3	544.1	1.006 171.4	514.2	1.006 171.4									9
10	640.2	1.007 170.3	610.3	1.007 170.4	540.4	1.007 170.4	510.5	1.007 170.4									10
1	636.1	1.008 169.4	606.2	1.008 169.4	536.3	1.008 169.4	506.4	1.007 169.5									1
2	631.6	1.008 168.4	601.7	1.008 168.4	531.8	1.008 168.5	501.9	1.008 168.5									2
3	626.7	1.009 167.4	596.8	1.009 167.5	526.9	1.009 167.5											3
4	621.4	1.009 166.5	591.5	1.009 166.5	521.7	1.009 166.6											4
15	615.7	09 10 165.5	545.9	09 10 165.6	516.0	09 10 165.6											15
6	609.6	09 11 164.5	539.8	09 11 164.6	510.0	09 11 164.7											6
7	603.2	09 11 163.6	533.4	09 11 163.6	503.6	09 11 163.7											7
8	596.4	09 12 162.6	526.6	09 12 162.7													8
9	589.2	09 13 161.7	519.5	09 13 161.7													9
20	581.6	09 13 160.7	511.9	09 13 160.8													20
1	573.7	09 14 159.7	504.0	09 14 159.8													1
2	565.4	09 14 158.8															2
3	556.8	09 15 157.8															3
4	547.7	09 16 156.9															4

Lat. 67°

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
91	1418.6	92 39 82.7	1446.1	91 39 82.5	1513.5	91 39 82.3	1540.9	91 39 82.1	1606.3	91 39 81.9	1635.7	91 39 81.6	1703.1	91 39 81.4	1730.5	91 39 81.2	91
2	1355.4	92 39 81.8	1422.8	92 39 81.6	1450.3	91 39 81.4	1517.7	91 39 81.2	1545.2	91 39 81.0	1612.6	91 39 80.7	1640.0	91 38 80.5	1707.4	91 38 80.3	92
3	1332.2	92 39 80.9	1359.7	92 39 80.7	1427.1	92 38 80.5	1454.6	91 38 80.3	1522.0	91 38 80.1	1549.5	91 38 79.8	1616.9	91 38 79.6	1644.3	91 38 79.4	93
4	1309.1	92 38 80.0	1336.6	92 38 79.8	1404.0	92 38 79.6	1431.5	92 38 79.4	1459.0	91 38 79.2	1526.4	91 38 78.9	1553.8	91 38 78.7	1621.3	91 38 78.5	94
95	1246.0	92 38 79.1	1313.5	92 38 78.9	1341.0	92 38 78.7	1408.5	92 38 78.5	1436.0	92 38 78.3	1503.4	92 38 78.0	1530.9	91 38 77.8	1558.3	91 38 77.6	95
6	1223.0	92 38 78.2	1250.6	92 38 78.0	1318.1	92 38 77.8	1345.6	92 38 77.6	1413.1	92 38 77.4	1440.5	92 38 77.1	1508.0	92 38 76.9	1535.5	92 38 76.7	96
7	1200.1	92 38 77.3	1227.7	92 38 77.1	1255.2	92 38 76.9	1322.7	92 38 76.7	1350.2	92 38 76.5	1417.7	92 38 76.2	1445.2	92 38 76.0	1512.7	92 38 75.8	97
8	1137.3	92 38 76.4	1204.9	92 38 76.2	1232.4	92 38 76.0	1300.0	92 38 75.8	1327.5	92 38 75.6	1355.0	92 38 75.4	1422.5	92 38 75.1	1450.0	92 38 74.9	98
9	1114.6	92 38 75.5	1142.2	92 38 75.3	1209.7	92 38 75.1	1237.3	92 38 74.9	1304.8	92 38 74.7	1332.4	92 38 74.5	1359.9	92 38 74.3	1427.4	92 37 74.0	99
100	1051.9	92 38 74.6	1119.5	92 38 74.4	1147.1	92 38 74.2	1214.7	92 37 74.0	1242.3	92 37 73.8	1309.8	92 37 73.6	1337.4	92 37 73.4	1404.9	92 37 73.2	100
1	1029.4	92 37 73.7	1057.0	92 37 73.5	1124.6	92 37 73.3	1152.2	92 37 73.1	1219.8	92 37 72.9	1247.4	92 37 72.7	1315.0	92 37 72.5	1342.5	92 37 72.3	1
2	1006.9	92 37 72.8	1034.6	92 37 72.6	1102.2	92 37 72.4	1129.8	92 37 72.2	1157.5	92 37 72.0	1225.1	92 37 71.8	1252.7	92 37 71.6	1320.3	92 37 71.4	2
3	944.6	92 37 71.9	1012.3	92 37 71.7	1039.9	92 37 71.5	1107.6	92 37 71.3	1135.2	92 37 71.1	1202.9	92 37 70.9	1230.5	92 37 70.7	1258.1	92 37 70.5	3
4	922.4	92 37 71.0	950.1	92 37 70.8	1017.8	92 37 70.6	1045.4	92 37 70.4	1113.1	92 37 70.2	1140.8	92 37 70.0	1208.4	92 37 69.8	1236.1	92 37 69.6	4
105	900.3	92 37 70.1	928.0	92 37 69.9	955.7	92 37 69.7	1023.4	92 36 69.5	1051.1	92 36 69.3	1118.8	92 36 69.1	1146.5	92 36 68.9	1214.2	92 36 68.7	105
6	838.3	93 36 69.2	906.1	92 36 69.0	933.8	92 36 68.8	1001.5	92 36 68.6	1029.3	92 36 68.4	1057.0	92 36 68.2	1124.7	92 36 68.0	1152.4	92 36 67.8	6
7	816.5	93 36 68.3	844.2	93 36 68.1	912.0	93 36 67.9	939.8	93 36 67.7	1007.5	93 36 67.5	1035.3	93 36 67.3	1103.0	93 36 67.1	1130.8	93 36 66.9	7
8	754.7	93 36 67.4	822.6	93 36 67.2	850.4	93 36 67.0	918.1	93 36 66.8	945.9	93 36 66.6	1013.7	93 36 66.4	1041.5	93 36 66.2	1109.3	93 36 66.0	8
9	733.2	93 36 66.5	801.0	93 36 66.3	828.8	93 36 66.1	856.7	93 36 65.9	924.5	93 36 65.7	952.3	93 36 65.5	1020.1	93 36 65.3	1047.9	93 36 65.1	9
110	711.8	93 36 65.6	739.6	93 36 65.4	807.5	93 36 65.2	835.4	93 36 65.0	903.2	93 36 64.8	931.0	93 36 64.6	958.9	93 36 64.4	1026.7	93 36 64.3	110
1	650.5	93 36 64.7	718.4	93 36 64.5	746.3	93 36 64.3	814.2	93 36 64.1	842.1	93 36 63.9	909.9	93 36 63.7	937.8	93 36 63.6	1005.7	93 36 63.4	1
2	629.4	93 36 63.8	657.3	93 36 63.6	725.2	93 36 63.4	753.2	93 36 63.2	821.1	93 36 63.0	849.0	93 36 62.8	916.9	93 36 62.7	944.8	93 36 62.5	2
3	608.4	93 36 62.9	636.4	93 36 62.7	704.3	93 36 62.5	732.3	93 34 62.3	800.3	93 34 62.1	828.2	93 34 62.0	856.2	93 34 61.8	924.1	93 34 61.6	3
4	547.7	93 34 62.0	615.7	93 34 61.8	643.7	93 34 61.6	711.6	93 34 61.4	739.6	93 34 61.2	807.6	93 34 61.1	835.6	93 34 60.9	903.6	93 34 60.7	4
115	527.1	93 34 61.1	555.1	93 34 60.9	623.1	93 34 60.7	651.1	93 34 60.5	719.2	93 34 60.3	747.2	93 34 60.2	815.2	93 34 60.0	843.2	93 34 59.8	115
6	506.6	94 34 60.2	534.7	94 34 60.0	602.8	94 34 59.8	630.8	94 34 59.6	658.9	94 34 59.5	727.0	94 33 59.3	755.0	94 33 59.1	823.1	93 33 58.9	6
7			514.5	94 33 59.1	542.6	94 33 58.9	610.7	94 33 58.7	638.8	94 33 58.6	706.9	94 33 58.4	735.0	94 33 58.2	803.1	94 33 58.0	7
8					522.6	94 33 58.0	550.8	94 33 57.8	618.9	94 33 57.7	647.0	94 33 57.5	715.2	94 33 57.3	743.3	94 33 57.1	8
9					502.8	94 33 57.1	531.0	94 33 56.9	559.2	94 32 56.8	627.4	94 32 56.6	655.5	94 32 56.4	723.7	94 32 56.2	9
120							511.5	94 32 56.0	539.7	94 32 55.9	607.9	94 32 55.7	636.1	94 32 55.5	704.3	94 32 55.3	120
1									520.4	94 32 55.0	548.6	94 32 54.8	616.9	94 32 54.6	645.1	94 32 54.5	1
2									501.3	94 32 54.1	529.6	94 31 53.9	557.9	94 31 53.7	626.2	94 31 53.6	2
3											510.7	94 31 53.0	539.1	94 31 52.8	607.4	94 31 52.7	3

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Table with columns for H.A., 20° 00', 20° 30', 21° 00', 21° 30', 22° 00', 22° 30', 23° 00', 23° 30', and H.A. Each cell contains numerical values representing declination data for various latitudes.



Lat. 67°

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.
	Alt.	Az.															
00	47 09.0	1.00 180.0	47 30.0	1.00 180.0	48 00.0	1.00 180.0	48 30.0	1.00 180.0	49 00.0	1.00 180.0	49 30.0	1.00 180.0	50 00.0	1.00 180.0	50 30.0	1.00 180.0	00
1	46 59.7	1.001 178.7	47 29.7	1.001 178.7	47 59.7	1.001 178.8	48 29.7	1.001 178.8	48 59.7	1.001 178.8	49 29.7	1.001 178.8	49 59.7	1.001 178.8	50 29.7	1.001 178.8	1
2	46 58.9	1.002 177.3	47 28.9	1.002 177.3	47 58.9	1.002 177.3	48 28.9	1.002 177.3	48 58.9	1.002 177.3	49 28.9	1.002 177.3	49 58.9	1.002 177.2	50 28.9	1.002 177.2	2
3	46 57.5	1.003 176.0	47 27.5	1.003 176.0	47 57.5	1.003 175.9	48 27.5	1.003 175.9	48 57.5	1.003 175.9	49 27.5	1.003 175.9	49 57.4	1.003 175.8	50 27.4	1.003 175.8	3
4	46 55.6	1.004 174.6	47 25.6	1.004 174.6	47 55.6	1.004 174.6	48 25.6	1.004 174.6	48 55.6	1.004 174.5	49 25.6	1.004 174.5	49 55.5	1.004 174.5	50 25.4	1.004 174.4	4
05	46 53.2	1.005 173.3	47 23.1	1.005 173.3	47 53.1	1.005 173.2	48 23.0	1.005 173.2	48 53.0	1.005 173.2	49 23.0	1.005 173.2	49 52.9	1.005 173.1	50 22.9	1.005 173.0	05
6	46 50.2	1.006 172.0	47 20.1	1.006 171.9	47 50.0	1.006 171.9	48 20.0	1.006 171.8	48 49.9	1.006 171.8	49 19.9	1.006 171.7	49 49.8	1.006 171.7	50 19.8	1.006 171.6	6
7	46 46.6	1.007 170.6	47 16.5	1.007 170.6	47 46.5	1.007 170.5	48 16.4	1.007 170.5	48 46.3	1.007 170.4	49 16.2	1.007 170.4	49 46.2	1.007 170.3	50 16.1	1.007 170.3	7
8	46 42.5	1.008 169.3	47 12.4	1.008 169.3	47 42.3	1.008 169.2	48 12.2	1.008 169.1	48 42.1	1.008 169.1	49 12.0	1.008 169.0	49 41.9	1.008 168.9	50 11.8	1.008 168.9	8
9	46 37.9	1.009 168.0	47 07.8	1.009 167.9	47 37.7	1.009 167.9	48 07.6	1.009 167.8	48 37.4	1.009 167.7	49 07.3	1.009 167.6	49 37.2	1.009 167.6	50 07.0	1.009 167.5	9
10	46 32.8	1.009 166.7	47 02.6	1.010 166.6	47 32.5	1.009 166.5	48 02.3	1.009 166.4	48 32.2	1.009 166.4	49 02.0	1.009 166.3	49 31.8	1.009 166.2	50 01.7	1.009 166.1	10
1	46 27.1	1.010 165.3	46 56.9	1.010 165.3	47 26.8	1.009 165.2	47 56.6	1.009 165.1	48 26.4	1.009 165.0	48 56.2	1.009 164.9	49 26.0	1.009 164.8	49 55.8	1.009 164.8	1
2	46 20.9	1.011 164.0	46 50.7	1.011 163.9	47 20.5	1.009 163.9	47 50.3	1.009 163.8	48 20.1	1.009 163.7	48 49.8	1.009 163.6	49 19.6	1.009 163.5	49 49.4	1.009 163.4	2
3	46 14.2	1.012 162.7	46 44.0	1.012 162.6	47 13.7	1.009 162.5	47 43.5	1.009 162.4	48 13.2	1.009 162.3	48 42.9	1.009 162.2	49 12.7	1.009 162.1	49 42.4	1.009 162.0	3
4	46 07.0	1.013 161.4	46 37.7	1.013 161.3	47 06.4	1.009 161.2	47 36.1	1.009 161.1	48 05.8	1.009 161.0	48 35.5	1.009 160.9	49 05.2	1.009 160.8	49 34.9	1.009 160.7	4
15	45 59.3	1.014 160.1	46 28.9	1.014 160.0	46 58.6	1.009 159.9	47 28.3	1.009 159.8	47 57.9	1.009 159.7	48 27.6	1.009 159.6	48 57.2	1.009 159.4	49 26.9	1.009 159.3	15
6	45 51.0	1.015 158.8	46 20.7	1.015 158.7	46 50.3	1.009 158.6	47 19.9	1.009 158.5	47 49.5	1.009 158.3	48 19.1	1.009 158.2	48 48.7	1.009 158.1	49 18.3	1.009 158.0	6
7	45 42.3	1.016 157.5	46 11.9	1.016 157.4	46 41.5	1.009 157.3	47 11.1	1.009 157.2	47 40.6	1.009 157.0	48 10.2	1.009 156.9	48 39.8	1.009 156.8	49 09.3	1.009 156.6	7
8	45 33.1	1.016 156.2	46 02.7	1.016 156.1	46 32.2	1.009 156.0	47 01.7	1.009 155.8	47 31.2	1.009 155.7	48 00.8	1.009 155.6	48 30.3	1.009 155.4	48 59.8	1.009 155.3	8
9	45 23.4	1.017 154.9	45 52.9	1.017 154.8	46 22.4	1.009 154.7	46 51.9	1.009 154.5	47 21.4	1.009 154.4	47 50.8	1.009 154.3	48 20.3	1.009 154.1	48 49.7	1.009 154.0	9
20	45 13.2	1.018 153.7	45 42.7	1.018 153.5	46 12.1	1.009 153.4	46 41.6	1.009 153.3	47 11.0	1.009 153.1	47 40.4	1.009 153.0	48 09.8	1.009 152.8	48 39.2	1.009 152.7	20
1	45 02.6	1.018 152.4	45 32.0	1.018 152.3	46 01.4	1.009 152.1	46 30.8	1.009 152.0	47 00.2	1.009 151.8	47 29.5	1.009 151.7	47 58.8	1.009 151.5	48 28.2	1.009 151.4	1
2	44 51.5	1.019 151.1	45 20.9	1.019 151.0	45 50.2	1.009 150.8	46 19.5	1.009 150.7	46 48.8	1.009 150.5	47 18.1	1.009 150.4	47 47.4	1.009 150.2	48 16.7	1.009 150.0	2
3	44 40.0	1.020 149.9	45 09.3	1.020 149.7	45 38.6	1.009 149.6	46 07.8	1.009 149.4	46 37.1	1.009 149.3	47 06.3	1.009 149.1	47 35.6	1.009 148.9	48 04.8	1.009 148.8	3
4	44 28.0	1.021 148.6	44 57.2	1.021 148.5	45 26.5	1.009 148.3	45 55.7	1.009 148.1	46 24.9	1.009 148.0	46 54.1	1.009 147.8	47 23.2	1.009 147.6	47 52.4	1.009 147.5	4
25	44 15.6	1.022 147.4	44 44.8	1.022 147.2	45 13.9	1.009 147.1	45 43.1	1.009 146.9	46 12.2	1.009 146.7	46 41.4	1.009 146.5	47 10.5	1.009 146.4	47 39.6	1.009 146.2	25
6	44 02.7	1.023 146.1	44 31.9	1.023 146.0	45 01.0	1.009 145.8	45 30.3	1.009 145.6	45 59.1	1.009 145.5	46 28.2	1.009 145.3	46 57.3	1.009 145.1	47 26.3	1.009 144.9	6
7	43 49.5	1.024 144.9	44 18.5	1.024 144.7	44 47.6	1.009 144.6	45 16.6	1.009 144.4	45 45.6	1.009 144.2	46 14.6	1.009 144.0	46 43.6	1.009 143.8	47 12.6	1.009 143.6	7
8	43 35.8	1.025 143.7	44 04.8	1.025 143.5	44 33.8	1.009 143.3	45 02.8	1.009 143.1	45 31.7	1.009 142.9	46 00.7	1.009 142.8	46 29.6	1.009 142.6	46 58.5	1.009 142.4	8
9	43 21.7	1.026 142.5	43 50.6	1.026 142.3	44 19.6	1.009 142.1	44 48.5	1.009 141.9	45 17.4	1.009 141.7	45 46.3	1.009 141.5	46 15.1	1.009 141.3	46 44.0	1.009 141.1	9
30	43 07.2	1.027 141.3	43 36.1	1.027 141.1	44 05.0	1.009 140.9	44 33.8	1.009 140.7	45 02.7	1.009 140.5	45 31.5	1.009 140.3	46 00.3	1.009 140.1	46 29.1	1.009 139.9	30
1	42 52.4	1.028 140.1	43 21.2	1.028 139.9	43 50.0	1.009 139.7	44 18.8	1.009 139.5	44 47.6	1.009 139.3	45 16.3	1.009 139.1	45 45.1	1.009 138.9	46 13.8	1.009 138.7	1
2	42 37.1	1.029 138.9	43 05.9	1.029 138.7	43 34.7	1.009 138.5	44 03.4	1.009 138.3	44 32.1	1.009 138.1	45 00.8	1.009 137.9	45 29.5	1.009 137.7	45 58.1	1.009 137.4	2
3	42 21.5	1.030 137.7	42 50.2	1.030 137.5	43 18.9	1.009 137.3	43 47.6	1.009 137.1	44 16.3	1.009 136.9	44 44.9	1.009 136.7	45 13.5	1.009 136.5	45 42.1	1.009 136.2	3
4	42 05.5	1.031 136.5	42 34.2	1.031 136.3	43 02.8	1.009 136.1	43 31.1	1.009 135.9	44 00.1	1.009 135.7	44 28.6	1.009 135.5	44 57.2	1.009 135.2	45 25.7	1.009 135.0	4
35	41 49.2	1.032 135.3	42 17.8	1.032 135.1	42 46.4	1.009 134.9	43 15.0	1.009 134.7	43 43.5	1.009 134.5	44 12.0	1.009 134.3	44 40.5	1.009 134.1	45 09.0	1.009 133.8	35
6	41 32.6	1.033 134.2	42 01.1	1.033 133.9	42 29.6	1.009 133.7	42 58.1	1.009 133.5	43 26.6	1.009 133.3	43 55.1	1.009 133.1	44 23.5	1.009 132.9	44 51.9	1.009 132.6	6
7	41 15.6	1.034 133.0	41 44.1	1.034 132.8	42 12.5	1.009 132.6	42 41.0	1.009 132.4	43 09.4	1.009 132.2	43 37.8	1.009 132.0	44 06.1	1.009 131.7	44 34.9	1.009 131.5	7
8	40 58.3	1.035 131.8	41 26.7	1.035 131.6	41 55.1	1.009 131.4	42 23.5	1.009 131.2	42 51.8	1.009 131.0	43 20.2	1.009 130.8	43 48.5	1.009 130.5	44 16.7	1.009 130.3	8
9	40 40.7	1.036 130.7	41 09.0	1.036 130.5	41 37.4	1.009 130.3	42 05.7	1.009 130.0	42 34.0	1.009 129.8	43 02.3	1.009 129.6	43 30.5	1.009 129.4	43 58.7	1.009 129.1	9
40	40 22.8	1.037 129.6	40 51.1	1.037 129.4	41 19.3	1.009 129.1	41 47.6	1.009 128.9	42 15.8	1.009 128.7	42 44.0	1.009 128.4	43 12.2	1.009 128.2	43 40.4	1.009 128.0	40
1	40 04.5	1.038 128.4	40 32.8	1.038 128.2	41 01.0	1.009 128.0	41 29.2	1.009 127.8	41 57.4	1.009 127.5	42 25.5	1.009 127.3	42 53.7	1.009 127.1	43 21.7	1.009 126.8	1
2	39 46.0	1.039 127.3	40 14.2	1.039 127.1	40 42.4	1.009 126.9	41 10.5	1.009 126.6	41 38.7	1.009 126.4	42 06.8	1.009 126.2	42 34.8	1.009 125.9	43 02.8	1.009 125.7	2
3	39 27.2	1.040 126.2	39 55.4	1.040 126.0	40 23.5	1.009 126.5	40 51.6	1.009 126.1	41 19.7	1.009 125.8	41 47.7	1.009 125.5	42 15.7	1.009 125.2	42 43.7	1.009 124.9	3
4	39 08.2	1.041 125.1	39 36.3	1.041 124.9	40 04.4	1.009 124.6	40 32.4	1.009 124.4	41 00.4	1.009 124.2	41 28.4	1.009 123.9	41 56.3	1.009 123.7	42 24.2	1.009 123.4	4
45	38 48.9	1.042 124.0	39 16.9	1.042 123.8	39 44.9	1.009 123.5	40 12.9	1.009 123.3	40 40.9	1.009 123.1	41 08.8	1.009 122.8	41 36.7				

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
91	21 36.2	91 38 79.2	22 03.4	91 38 79.0	22 30.6	91 38 78.8	22 57.8	91 38 78.6	23 24.9	90 38 78.3	23 52.1	90 38 78.1	24 19.2	90 38 77.9	24 46.3	90 38 77.6	91
2	21 13.2	91 38 78.3	21 40.4	91 38 78.1	22 07.6	91 38 77.9	22 34.8	91 38 77.7	23 02.0	91 38 77.4	23 29.2	90 38 77.2	23 56.3	90 38 77.0	24 23.4	90 38 76.7	2
3	20 50.3	91 38 77.5	21 17.5	91 38 77.2	21 44.7	91 38 77.0	22 12.0	91 38 76.8	22 39.2	91 38 76.5	23 06.3	91 38 76.3	23 33.5	90 38 76.1	24 00.6	90 38 75.9	3
4	20 27.4	91 38 76.6	20 54.7	91 38 76.3	21 21.9	91 38 76.1	21 49.2	91 38 75.9	22 16.4	91 38 75.7	22 43.6	91 38 75.4	23 10.8	91 38 75.2	23 37.9	90 38 75.0	4
95	20 04.7	91 38 75.7	20 32.0	91 38 75.5	20 59.2	91 38 75.2	21 26.5	91 38 75.0	21 53.7	91 38 74.8	22 21.0	91 38 74.6	22 48.2	91 38 74.3	23 15.3	91 38 74.1	95
6	19 42.0	91 38 74.8	20 09.3	91 38 74.6	20 36.6	91 38 74.4	21 03.9	91 38 74.1	21 31.2	91 37 73.9	21 58.4	91 37 73.7	22 25.6	91 37 73.5	22 52.8	91 37 73.2	6
7	19 19.4	91 37 73.9	19 46.8	91 37 73.7	20 14.1	91 37 73.5	20 41.4	91 37 73.3	21 08.7	91 37 73.0	21 36.0	91 37 72.8	22 03.2	91 37 72.6	22 30.4	91 37 72.4	7
8	18 56.9	91 37 73.0	19 24.3	91 37 72.8	19 51.7	91 37 72.6	20 19.0	91 37 72.4	20 46.3	91 37 72.2	21 13.6	91 37 71.9	21 40.9	91 37 71.7	22 08.0	91 37 71.5	8
9	18 34.6	91 37 72.2	19 02.0	91 37 71.9	19 29.3	91 37 71.7	19 56.7	91 37 71.5	20 24.0	91 37 71.3	20 51.4	91 37 71.1	21 18.7	91 37 70.8	21 46.0	91 37 70.6	9
100	18 12.3	91 37 71.3	18 39.7	91 37 71.1	19 07.1	91 37 70.8	19 34.5	91 37 70.6	20 01.9	91 37 70.4	20 29.3	91 37 70.2	20 56.6	91 37 70.0	21 23.9	91 37 69.8	100
1	17 50.2	92 37 70.4	18 17.6	91 37 70.2	18 45.0	91 37 70.0	19 12.5	91 37 69.8	19 39.9	91 37 69.5	20 07.3	91 36 69.3	20 34.6	91 36 69.1	21 02.0	91 36 68.9	1
2	17 28.1	92 36 69.5	17 55.6	92 36 69.3	18 23.1	92 36 69.1	18 50.5	91 36 68.9	19 18.0	91 36 68.7	19 45.4	91 36 68.5	20 12.8	91 36 68.2	20 40.2	91 36 68.0	2
3	17 06.2	92 36 68.6	17 33.7	92 36 68.4	18 01.2	92 36 68.2	18 28.7	92 36 68.0	18 56.2	92 36 67.8	19 23.7	91 36 67.6	19 51.1	91 36 67.4	20 18.5	91 36 67.2	3
4	16 44.5	92 36 67.8	17 12.0	92 36 67.6	17 39.5	92 36 67.4	18 07.1	92 36 67.1	18 34.6	92 36 66.9	19 02.1	92 36 66.7	19 29.5	92 36 66.5	19 57.0	92 36 66.3	4
105	16 22.8	92 36 66.9	16 50.4	92 36 66.7	17 18.0	92 36 66.5	17 45.5	92 36 66.3	18 13.1	92 36 66.1	18 40.6	92 36 65.9	19 08.1	92 36 65.6	19 35.6	92 36 65.4	105
6	16 01.3	92 36 66.0	16 29.0	92 36 65.8	16 56.6	92 36 65.6	17 24.1	92 36 65.4	17 51.7	92 36 65.2	18 19.3	92 36 65.0	18 46.8	92 36 64.8	19 14.3	92 36 64.6	6
7	15 40.0	92 36 65.1	16 07.6	92 36 64.9	16 35.3	92 36 64.7	17 02.9	92 36 64.5	17 30.5	92 36 64.3	17 58.1	92 36 64.1	18 25.7	92 36 63.9	18 53.2	92 36 63.7	7
8	15 18.8	92 36 64.3	15 46.5	92 36 64.1	16 14.2	92 36 63.9	16 41.8	92 36 63.7	17 09.5	92 36 63.5	17 37.1	92 36 63.3	18 04.7	92 36 63.1	18 32.3	92 36 62.9	8
9	14 57.8	92 36 63.4	15 25.5	92 36 63.2	15 53.2	92 36 63.0	16 20.9	92 36 62.8	16 48.6	92 36 62.6	17 16.2	92 36 62.4	17 43.9	92 36 62.2	18 11.5	92 36 62.0	9
110	14 36.9	93 35 62.5	15 04.6	92 34 62.3	15 32.4	92 34 62.1	16 00.1	92 34 61.9	16 27.8	92 34 61.7	16 55.5	92 34 61.5	17 23.2	92 34 61.3	17 50.9	92 34 61.1	110
1	14 16.2	93 34 61.6	14 44.0	93 34 61.4	15 11.7	93 34 61.3	15 39.5	93 34 61.1	16 07.3	93 34 60.9	16 35.0	92 34 60.7	17 02.8	92 34 60.5	17 30.5	92 34 60.3	1
2	13 55.6	93 34 60.8	14 23.5	93 34 60.6	14 51.3	93 34 60.4	15 19.1	93 34 60.2	15 46.9	93 34 60.0	16 14.7	93 34 59.8	16 42.4	93 34 59.6	17 10.2	93 34 59.4	2
3	13 35.3	93 34 59.9	14 03.1	93 34 59.7	14 31.0	93 34 59.5	14 58.8	93 34 59.3	15 26.7	93 34 59.1	15 54.5	93 34 58.9	16 22.3	93 34 58.7	16 50.1	93 34 58.5	3
4	13 15.1	93 33 59.0	13 43.0	93 33 58.8	14 10.9	93 33 58.6	14 38.8	93 33 58.5	15 06.6	93 33 58.3	15 34.5	93 33 58.1	16 02.4	93 33 57.9	16 30.2	93 33 57.7	4
115	12 55.1	93 33 58.2	13 23.0	93 33 58.0	13 50.9	93 33 57.8	14 18.9	93 33 57.6	14 46.8	93 33 57.4	15 14.7	93 33 57.2	15 42.6	93 33 57.0	16 10.5	93 33 56.8	115
6	12 35.2	93 33 57.3	13 03.2	93 33 57.1	13 31.2	93 33 56.9	13 59.2	93 32 56.7	14 27.1	93 32 56.5	14 55.1	93 32 56.3	15 23.0	93 32 56.2	15 51.0	93 32 56.0	6
7	12 15.6	93 32 56.4	12 43.6	93 32 56.2	13 11.7	93 32 56.0	13 39.7	93 32 55.9	14 07.7	93 32 55.7	14 35.7	93 32 55.5	15 03.7	93 32 55.3	15 31.6	93 32 55.1	7
8	11 56.2	94 32 55.5	12 24.3	94 32 55.4	12 52.3	94 32 55.2	13 20.4	94 32 55.0	13 48.4	94 32 54.8	14 16.5	94 32 54.6	14 44.5	94 32 54.4	15 12.5	94 32 54.3	8
9	11 37.0	94 32 54.7	12 05.1	94 32 54.5	12 33.2	94 32 54.3	13 01.3	94 31 54.1	13 29.4	94 31 53.9	13 57.4	94 31 53.8	14 25.5	94 31 53.6	14 53.6	94 31 53.4	9
120	11 17.9	94 31 53.8	11 46.1	94 31 53.6	12 14.2	94 31 53.4	12 42.4	94 31 53.3	13 10.5	94 31 53.1	13 38.6	94 31 52.9	14 06.8	94 31 52.7	14 34.9	94 31 52.5	120
1	10 59.1	94 31 52.9	11 27.3	94 31 52.7	11 55.5	94 31 52.6	12 23.7	94 31 52.4	12 51.9	94 31 52.2	13 20.0	94 31 52.0	13 48.2	94 31 51.9	14 16.4	94 30 51.7	1
2	10 40.5	94 31 52.0	11 08.8	94 31 51.9	11 37.0	94 30 51.7	12 05.2	94 30 51.5	12 33.5	94 30 51.3	13 01.7	94 30 51.2	13 29.9	94 30 51.0	13 58.1	94 30 50.8	2
3	10 22.2	94 30 51.2	10 50.4	94 30 51.0	11 18.7	94 30 50.8	11 47.0	94 30 50.6	12 15.3	94 30 50.5	12 43.5	94 30 50.3	13 11.8	94 30 50.1	13 40.0	94 30 50.0	3
4	10 04.0	94 30 50.3	10 32.3	94 30 50.1	11 00.7	94 30 49.9	11 29.0	94 30 49.8	11 57.3	94 30 49.6	12 25.6	94 30 49.4	12 53.9	94 29 49.3	13 22.2	94 29 49.1	4
125	9 46.1	95 29 49.4	10 14.5	95 29 49.2	10 42.8	95 29 49.1	11 11.2	95 29 48.9	11 39.6	95 29 48.7	12 07.9	94 29 48.6	12 36.2	94 29 48.4	13 04.6	94 29 48.2	125
6	9 28.4	95 29 48.5	9 56.8	95 29 48.4	10 25.2	95 29 48.2	10 53.6	95 29 48.0	11 22.0	95 29 47.9	11 50.4	95 29 47.7	12 18.8	95 29 47.5	12 47.2	95 29 47.4	6
7	9 11.0	95 29 47.7	9 39.4	95 29 47.5	10 07.9	95 29 47.3	10 36.3	95 28 47.2	11 04.8	95 28 47.0	11 33.2	95 28 46.8	12 01.7	95 28 46.7	12 30.1	95 28 46.5	7
8	8 53.8	95 28 46.8	9 22.3	95 28 46.6	9 50.8	95 28 46.5	10 19.3	95 28 46.3	10 47.8	95 28 46.1	11 16.2	95 28 46.0	11 44.7	95 28 45.8	12 13.2	95 28 45.7	8
9	8 36.8	95 28 45.9	9 05.4	95 28 45.7	9 33.9	95 28 45.6	10 02.4	95 28 45.4	10 30.9	95 28 45.3	10 59.5	95 27 45.1	11 28.0	95 27 45.0	11 56.6	95 27 44.8	9
130	8 20.1	95 27 45.0	8 48.7	95 27 44.9	9 17.3	95 27 44.7	9 45.9	95 27 44.6	10 14.4	95 27 44.4	10 43.0	95 27 44.2	11 11.6	95 27 44.1	11 40.2	95 27 43.9	130
1	8 03.6	95 27 44.1	8 32.3	95 27 44.0	9 00.9	95 27 43.8	9 29.5	95 27 43.7	9 58.2	95 27 43.5	10 26.8	95 27 43.4	10 55.4	95 27 43.2	11 24.0	95 26 43.1	1
2	7 47.4	96 27 43.3	8 16.1	96 26 43.1	8 44.8	96 26 43.0	9 13.5	96 26 42.8	9 42.2	96 26 42.7	10 10.8	96 26 42.5	10 39.5	96 26 42.4	11 08.1	96 26 42.2	2
3	7 31.5	96 26 42.4	8 00.2	96 26 42.2	8 29.0	96 26 42.1	8 57.7	96 26 41.9	9 26.4	96 26 41.8	9 55.1	96 26 41.6	10 23.8	96 26 41.5	10 52.5	96 26 41.3	3
4	7 15.8	96 26 41.5	7 44.6	96 26 41.3	8 13.4	96 26 41.2	8 42.1	96 25 41.1	9 10.9	96 25 40.9	9 39.7	96 25 40.8	10 08.4	96 25 40.6	10 37.2	96 25 40.5	4
135	7 00.5	96 25 40.6	7 29.3	96 25 40.5	7 58.1	96 25 40.3	8 26.9	96 25 40.2	8 55.7	96 25 40.0	9 24.5	96 25 39.9	9 53.3	96 25 39.8	10 22.1	96 25 39.6	135
6	6 45.3	96 25 39.7	7 14.2	96 25 39.6	7 43.0	96 25 39.4	8 11.9	96 25 39.3	8 40.7	96 24 39.2	9 09.6	96 24 39.0	9 38.4	96 24 38.9	10 07.3	96 24 38.7	6
7	6 30.5	96 24 38.8	6 59.4	96 24 38.7	7 28.3	96 24 38.6	7 57.2	96 24 38.4	8 26.1	96 24 38.3	8 55.0	96 24 38.2	9 23.9	96 24 38.0	9 52.7	96 24 37.9	7
8	6 15.9	96 24 37.9	6 44.9	96 24 37.8	7 13.8	96 24 37.7	7 42.8	96 24 37.6</									

Lat. 67°

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.
	Alt.	As.															
00	51 00.0	1.00 180.0	51 30.0	1.00 180.0	52 00.0	1.00 180.0	53 00.0	1.00 180.0	55 00.0	1.00 180.0	57 00.0	1.00 180.0	57 30.0	1.00 180.0	58 30.0	1.00 180.0	00
1	50 59.7	1.00 178.6	51 29.7	1.00 178.6	51 59.7	1.00 178.6	52 59.7	1.00 178.6	54 59.7	1.00 178.5	56 59.7	1.00 178.5	57 29.7	1.00 178.5	58 29.7	1.00 178.4	1
2	50 58.9	1.00 177.2	51 28.8	1.00 177.2	51 58.8	1.00 177.2	52 58.8	1.00 177.1	54 58.8	1.00 177.0	56 58.8	1.00 177.0	57 28.7	1.00 177.0	58 28.7	1.00 176.9	2
3	50 57.4	1.00 175.8	51 27.4	1.00 175.8	51 57.4	1.00 175.7	52 57.4	1.00 175.7	54 57.3	1.00 175.6	56 57.2	1.00 175.4	57 27.2	1.00 175.4	58 27.1	1.00 175.3	3
4	50 55.4	1.00 174.4	51 25.4	1.00 174.4	51 55.4	1.00 174.3	52 55.3	1.00 174.2	54 55.2	1.00 174.1	56 55.0	1.00 173.9	57 25.0	1.00 173.9	58 24.9	1.00 173.8	4
05	50 52.8	1.00 173.0	51 22.8	1.00 173.0	51 52.7	1.00 172.9	52 52.7	1.00 172.8	54 52.5	1.00 172.6	56 52.2	1.00 172.4	57 22.2	1.00 172.3	58 22.0	1.00 172.2	05
6	50 49.7	1.00 171.6	51 19.6	1.00 171.5	51 49.5	1.00 171.5	52 49.4	1.00 171.4	54 49.1	1.00 171.1	56 48.8	1.00 170.9	57 18.7	1.00 170.8	58 18.5	1.00 170.7	6
7	50 46.0	1.00 170.2	51 15.9	1.00 170.1	51 45.8	1.00 170.1	52 45.6	1.00 170.0	54 45.2	1.00 169.7	56 44.8	1.00 169.4	57 14.7	1.00 169.3	58 14.5	1.00 169.1	7
8	50 41.7	1.00 168.8	51 11.6	1.00 168.7	51 41.5	1.00 168.7	52 41.3	1.00 168.5	54 40.7	1.00 168.2	56 40.2	1.00 167.9	57 10.0	1.00 167.8	58 09.7	1.00 167.6	8
9	50 36.9	1.00 167.4	51 06.8	1.00 167.3	51 36.6	1.00 167.3	52 36.3	1.00 167.1	54 35.7	1.00 166.8	56 35.0	1.00 166.4	57 04.8	1.00 166.3	58 04.4	1.00 166.1	9
10	50 31.5	1.00 166.0	51 01.3	1.00 166.0	51 31.2	1.00 165.9	52 30.8	1.00 165.7	54 30.0	1.00 165.3	56 29.1	1.00 164.9	57 58.9	1.00 164.8	58 58.4	1.00 164.5	10
1	50 25.6	1.00 164.6	50 55.4	1.00 164.6	51 25.2	1.00 164.5	52 24.7	1.00 164.3	54 23.8	1.00 163.9	56 22.7	1.00 163.3	57 51.9	1.00 163.0	58 51.2	1.00 163.0	1
2	50 19.1	1.00 163.3	50 48.9	1.00 163.2	51 18.6	1.00 163.1	52 18.1	1.00 162.9	54 17.0	1.00 162.4	56 15.8	1.00 161.9	57 44.7	1.00 161.5	58 44.0	1.00 161.5	2
3	50 12.1	1.00 161.9	50 41.8	1.00 161.8	51 11.5	1.00 161.7	52 10.9	1.00 161.5	54 09.6	1.00 161.0	56 08.2	1.00 160.4	57 37.8	1.00 160.3	58 37.0	1.00 160.3	3
4	50 04.6	1.00 160.6	50 34.2	1.00 160.4	51 03.9	1.00 160.3	52 03.2	1.00 160.1	54 01.7	1.00 159.6	56 00.1	1.00 158.8	57 26.9	1.00 158.5	58 26.7	1.00 158.5	4
15	49 56.5	1.00 159.2	50 26.1	1.00 159.1	50 55.7	1.00 159.0	51 54.9	1.00 158.7	53 53.2	1.00 158.1	55 51.4	1.00 157.5	56 20.9	1.00 157.4	57 19.8	1.00 157.0	15
6	49 47.9	1.00 157.8	50 17.5	1.00 157.7	50 47.1	1.00 157.6	51 46.2	1.00 157.3	53 44.2	1.00 156.7	55 42.4	1.00 156.1	56 11.6	1.00 155.9	57 10.4	1.00 155.5	6
7	49 38.8	1.00 156.5	50 08.4	1.00 156.4	50 37.9	1.00 156.2	51 36.9	1.00 155.9	53 34.7	1.00 155.3	55 32.4	1.00 154.5	56 01.7	1.00 154.5	57 00.4	1.00 154.1	7
8	49 29.2	1.00 155.2	49 58.7	1.00 155.0	50 28.2	1.00 154.9	51 27.1	1.00 154.6	53 24.7	1.00 153.9	55 22.1	1.00 153.2	55 51.4	1.00 153.0	56 49.9	1.00 152.6	8
9	49 19.1	1.00 153.8	49 48.6	1.00 153.7	50 18.0	1.00 153.5	51 16.7	1.00 153.2	53 14.1	1.00 152.5	55 11.2	1.00 151.8	55 40.5	1.00 151.6	56 38.9	1.00 151.2	9
20	49 08.6	1.00 152.5	49 37.9	1.00 152.4	50 07.3	1.00 152.2	51 05.9	1.00 151.9	53 03.0	1.00 151.1	54 59.9	1.00 150.4	55 29.1	1.00 150.2	56 27.3	1.00 149.7	20
1	48 57.5	1.00 151.2	49 26.8	1.00 151.0	49 56.1	1.00 150.9	50 54.6	1.00 150.5	52 51.5	1.00 149.8	54 48.1	1.00 149.0	55 17.7	1.00 148.8	56 15.3	1.00 148.3	1
2	48 46.0	1.00 149.9	49 15.2	1.00 149.7	49 44.4	1.00 149.5	50 42.8	1.00 149.2	52 39.4	1.00 148.4	54 35.7	1.00 147.6	55 04.8	1.00 147.4	56 02.7	1.00 146.9	2
3	48 34.0	1.00 148.6	49 03.2	1.00 148.4	49 32.3	1.00 148.2	50 30.6	1.00 147.9	52 26.9	1.00 147.1	54 22.9	1.00 146.2	54 51.9	1.00 146.0	55 49.7	1.00 145.5	3
4	48 21.5	1.00 147.3	48 50.6	1.00 147.1	49 19.7	1.00 146.9	50 17.9	1.00 146.5	52 14.0	1.00 145.7	54 09.7	1.00 144.8	54 38.5	1.00 144.6	55 36.2	1.00 144.1	4
25	48 08.6	1.00 146.0	48 37.7	1.00 145.8	49 06.7	1.00 145.6	50 04.7	1.00 145.2	52 00.5	1.00 144.4	53 55.9	1.00 143.5	54 24.7	1.00 143.2	55 22.2	1.00 142.7	25
6	47 55.3	1.00 144.7	48 24.3	1.00 144.5	48 53.3	1.00 144.3	49 51.2	1.00 143.9	51 46.7	1.00 143.1	53 41.8	1.00 142.1	54 10.5	1.00 141.9	55 07.8	1.00 141.4	6
7	47 41.6	1.00 143.5	48 10.5	1.00 143.3	48 39.4	1.00 143.1	49 37.1	1.00 142.6	51 32.4	1.00 141.8	53 27.2	1.00 140.8	53 55.8	1.00 140.5	54 52.9	1.00 140.0	7
8	47 27.4	1.00 142.2	47 56.3	1.00 142.0	48 25.1	1.00 141.8	49 22.7	1.00 141.4	51 17.6	1.00 140.5	53 12.1	1.00 139.5	53 40.7	1.00 139.2	54 37.6	1.00 138.7	8
9	47 12.8	1.00 140.9	47 41.6	1.00 140.7	48 10.4	1.00 140.5	49 07.9	1.00 140.1	51 02.5	1.00 139.2	52 56.7	1.00 138.2	53 25.2	1.00 137.9	54 22.7	1.00 137.4	9
30	46 57.8	1.00 139.7	47 26.6	1.00 139.5	47 55.3	1.00 139.3	48 52.6	1.00 138.8	50 47.0	1.00 137.9	52 40.9	1.00 136.9	53 09.2	1.00 136.6	54 05.9	1.00 136.0	30
1	46 42.5	1.00 138.5	47 11.2	1.00 138.2	47 39.8	1.00 138.0	48 37.0	1.00 137.6	50 31.1	1.00 136.6	52 24.6	1.00 135.6	52 52.9	1.00 135.3	53 49.4	1.00 134.7	1
2	46 26.8	1.00 137.2	46 55.4	1.00 137.0	47 23.9	1.00 136.8	48 21.0	1.00 136.3	50 14.8	1.00 135.4	52 08.0	1.00 134.3	52 36.3	1.00 134.0	53 32.4	1.00 133.4	2
3	46 10.6	1.00 136.0	46 39.2	1.00 135.8	47 07.7	1.00 135.6	48 04.6	1.00 135.1	49 58.1	1.00 134.1	51 51.1	1.00 133.0	52 19.2	1.00 132.8	53 15.4	1.00 132.2	3
4	45 54.2	1.00 134.8	46 22.7	1.00 134.6	46 51.1	1.00 134.3	47 47.9	1.00 133.9	49 41.1	1.00 132.9	51 33.8	1.00 131.8	52 01.8	1.00 131.5	52 57.8	1.00 130.9	4
35	45 37.4	1.00 133.6	46 05.8	1.00 133.4	46 34.2	1.00 133.1	47 30.8	1.00 132.7	49 23.8	1.00 131.6	51 16.1	1.00 130.5	51 44.1	1.00 130.2	52 40.0	1.00 129.6	35
6	45 20.2	1.00 132.4	45 48.6	1.00 132.2	46 16.9	1.00 131.9	47 13.4	1.00 131.5	49 06.1	1.00 130.4	50 58.1	1.00 129.3	51 26.1	1.00 129.0	52 21.7	1.00 128.4	6
7	45 02.8	1.00 131.2	45 31.0	1.00 131.0	45 59.3	1.00 130.8	46 55.7	1.00 130.3	48 48.1	1.00 129.2	50 39.8	1.00 128.1	51 07.7	1.00 127.8	52 03.2	1.00 127.2	7
8	44 45.0	1.00 130.1	45 13.2	1.00 129.8	45 41.4	1.00 129.6	46 37.6	1.00 129.1	48 29.8	1.00 128.0	50 21.2	1.00 126.9	50 49.0	1.00 126.6	51 44.4	1.00 126.0	8
9	44 26.9	1.00 128.9	44 55.0	1.00 128.6	45 23.1	1.00 128.4	46 19.3	1.00 127.9	48 11.1	1.00 126.8	50 02.3	1.00 125.7	50 30.0	1.00 125.4	51 25.3	1.00 124.8	9
40	44 08.5	1.00 127.7	44 36.6	1.00 127.5	45 04.6	1.00 127.2	46 00.6	1.00 126.7	47 52.2	1.00 125.6	49 43.2	1.00 124.5	50 10.8	1.00 124.2	51 05.9	1.00 123.6	40
1	43 49.8	1.00 126.6	44 17.8	1.00 126.3	44 45.8	1.00 126.1	45 41.7	1.00 125.6	47 33.0	1.00 124.5	49 23.7	1.00 123.3	49 51.2	1.00 123.0	50 46.2	1.00 122.4	1
2	43 30.8	1.00 125.4	43 58.8	1.00 125.2	44 26.7	1.00 124.9	45 22.5	1.00 124.4	47 13.6	1.00 123.3	49 04.0	1.00 122.1	49 31.5	1.00 121.8	50 26.3	1.00 121.2	2
3	43 11.6	1.00 124.3	43 39.5	1.00 124.1	44 07.4	1.00 123.8	45 03.3	1.00 123.3	46 53.9	1.00 122.2	48 44.0	1.00 121.0	49 11.4	1.00 120.7	50 06.1	1.00 120.0	3
4	42 52.1	1.00 123.2	43 20.0	1.00 122.9	43 47.8	1.00 122.7	44 43.3	1.00 122.1	46 33.9	1.00 121.0	48 23.8	1.00 119.8	48 51.1	1.00 119.5	49 45.7	1.00 118.9	4
45	42 32.4	1.00 122.1	43 00.2	1.00 121.8	43 27.9	1.00 121.6	44 23.3	1.00 121.0	46 13.7	1.00 119.9	48 03.3	1.00 118.7	48 30.6	1.00 118.4	49 25.1	1.00 117.8	45
6	42 12.4	1.00 121.0	42 40.1	1.00 120.7	43 07.8	1.00 120.4	44 03.1	1.00 119.9	45 53.2	1.00 118.8	47 42.7	1.00 117.6	48 09.9	1.00 117.3	49 04.2	1.00 116.6	6
7	41 52.2	1.00 119.9	42 19.														

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
91	25 13.3	90 28	77.4	25 40.4	90 28	77.1	26 07.4	90 28	76.9	27 01.4	90 28	76.4	28 49.0	90 28	75.4	30 36.2	90 28	74.4	31 02.9	90 28	74.1	31 56.2	90 28	73.6	91
2	24 50.5	90 28	76.5	25 17.6	90 28	76.3	25 44.6	90 28	76.0	26 38.6	90 28	75.5	28 26.4	90 28	74.5	30 13.6	90 28	73.5	30 40.4	90 28	73.3	31 33.8	90 28	72.7	2
3	24 27.7	90 28	75.6	24 54.8	90 28	75.4	25 21.9	90 28	75.2	26 16.0	90 28	74.7	28 03.8	90 28	73.7	29 51.2	90 28	72.7	29 28.9	90 28	71.8	29 55.7	90 28	71.6	3
4	24 05.1	90 28	74.8	24 32.2	90 28	74.5	24 59.3	90 28	74.3	25 53.4	90 28	73.8	27 41.4	90 28	72.8	29 28.9	90 28	71.8	29 06.7	90 28	71.0	29 33.5	90 28	70.7	4
95	23 42.5	91 37	73.9	24 09.6	90 37	73.6	24 36.8	90 37	73.4	25 30.9	90 37	72.9	27 19.0	90 37	72.0	29 06.7	90 37	71.0	29 33.5	90 37	70.7	30 27.1	90 37	70.2	95
6	23 20.0	91 37	73.0	23 47.2	91 37	72.8	24 14.4	90 37	72.5	25 08.6	90 37	72.1	27 07.0	90 37	71.1	28 44.6	90 37	70.1	29 11.5	90 37	69.9	30 05.1	90 37	69.3	6
7	22 57.7	91 37	72.1	23 24.9	91 37	71.9	23 52.0	91 37	71.7	24 46.3	90 37	71.2	26 34.7	90 37	70.3	28 22.6	90 37	69.3	28 49.5	90 37	69.0	29 43.2	90 37	68.5	7
8	22 35.4	91 37	71.3	23 02.6	91 37	71.0	23 29.8	91 37	70.8	24 24.2	91 37	70.3	26 12.7	90 37	69.4	28 00.7	90 37	68.4	28 27.0	90 37	68.2	28 19.5	90 37	67.7	8
9	22 13.3	91 37	70.4	22 40.5	91 37	70.2	23 07.8	91 37	69.9	24 02.2	91 37	69.5	25 50.8	90 37	68.5	27 39.0	90 37	67.6	28 06.0	90 37	67.3	28 07.0	90 37	66.8	9
100	21 51.2	91 36	69.5	22 18.5	91 36	69.3	22 45.8	91 36	69.1	23 40.3	91 36	68.8	25 29.0	90 36	67.7	27 17.4	90 36	66.7	27 44.4	90 36	66.5	28 38.4	90 36	66.0	100
1	21 29.3	91 36	68.7	21 56.7	91 36	68.4	22 24.0	91 36	68.2	23 18.5	91 36	67.8	25 07.4	91 36	66.8	26 55.9	90 36	65.9	27 23.0	90 36	65.7	28 17.0	90 36	65.2	1
2	21 07.6	91 36	67.8	21 34.9	91 36	67.6	22 02.3	91 36	67.4	22 56.9	91 36	66.9	24 45.9	91 36	66.0	26 34.6	90 36	65.1	27 01.7	90 36	64.8	27 55.8	90 36	64.3	2
3	20 45.9	91 36	66.9	21 13.3	91 36	66.7	21 40.7	91 36	66.5	22 35.4	91 36	66.1	24 24.6	91 36	65.2	26 13.4	91 36	64.2	26 40.6	90 36	64.0	27 34.8	90 36	63.5	3
4	20 24.4	91 36	66.1	20 51.9	91 36	65.9	21 19.3	91 36	65.6	22 14.0	91 36	65.2	24 03.4	91 36	64.3	25 52.4	91 36	63.4	26 19.6	91 36	63.1	27 13.9	90 36	62.7	4
105	20 03.1	92 35	65.2	20 30.5	92 35	65.0	20 58.0	92 35	64.8	21 52.8	91 35	64.4	23 42.3	91 35	63.5	25 31.5	91 35	62.5	25 58.7	91 34	61.5	26 53.1	91 34	61.8	105
6	19 41.9	92 35	64.4	20 09.4	92 35	64.1	20 36.8	92 35	63.9	21 31.8	91 35	63.5	23 21.4	91 35	62.6	25 10.8	91 34	61.7	25 38.0	91 34	61.5	26 32.5	91 34	61.0	6
7	19 20.8	92 35	63.5	19 48.3	92 35	63.3	20 15.9	92 35	63.1	21 10.9	92 35	62.6	23 00.7	91 34	61.8	24 50.2	91 34	60.9	25 17.5	91 34	60.7	26 12.1	91 34	60.2	7
8	18 59.9	92 35	62.6	19 27.5	92 34	62.4	19 55.0	92 34	62.2	20 50.1	92 34	61.8	22 40.1	92 34	60.9	24 29.8	91 34	60.0	24 57.2	91 34	59.8	25 51.9	91 33	59.4	8
9	18 39.2	92 34	61.8	19 06.8	92 34	61.6	19 34.4	92 34	61.4	20 29.6	92 34	60.9	22 19.7	92 34	60.1	24 09.6	91 33	59.2	24 37.0	91 33	59.0	25 31.8	91 33	58.5	9
110	18 18.6	92 34	60.9	18 46.3	92 34	60.7	19 13.9	92 34	60.5	20 09.1	92 34	60.1	21 59.5	92 33	59.3	23 49.5	92 33	58.4	24 17.0	92 33	58.2	25 11.9	91 33	57.7	110
1	17 58.2	92 34	60.1	18 25.9	92 34	59.9	18 53.6	92 34	59.7	19 48.9	92 33	59.2	21 59.5	92 33	59.3	23 49.5	92 33	58.4	24 17.0	92 33	58.2	25 11.9	91 33	57.7	1
2	17 38.0	92 33	59.2	18 05.7	92 33	59.0	18 33.4	92 33	58.8	19 28.9	92 33	58.4	21 59.5	92 33	58.4	23 49.5	92 33	58.4	24 17.0	92 33	58.2	25 11.9	91 33	57.7	2
3	17 17.9	92 33	58.3	17 45.7	92 33	58.2	18 13.5	92 33	58.0	19 09.0	92 33	57.6	21 59.5	92 33	57.6	23 49.5	92 33	57.6	24 17.0	92 33	57.6	25 11.9	91 33	57.0	3
4	16 58.0	92 33	57.5	17 25.9	92 33	57.3	17 53.7	92 33	57.1	18 49.3	92 32	56.7	20 40.3	92 32	55.9	22 31.1	92 32	55.1	22 58.8	92 32	54.9	23 54.1	92 32	54.4	4
115	16 38.4	92 32	56.6	17 06.2	92 32	56.4	17 34.1	92 32	56.2	18 29.8	92 32	55.9	20 21.0	92 32	55.1	22 12.0	92 32	54.2	22 39.7	92 31	54.0	23 35.1	92 31	53.6	115
6	16 18.9	92 32	55.8	16 46.8	92 32	55.6	17 14.7	92 32	55.4	18 10.5	92 32	55.0	20 01.9	92 32	54.2	21 53.1	92 31	53.4	22 28.0	92 31	53.2	23 16.3	92 31	52.8	6
7	15 59.6	92 32	54.9	16 27.6	92 32	54.7	16 55.5	92 32	54.5	17 51.4	92 32	54.2	19 43.0	92 31	53.4	21 34.4	92 31	52.6	22 02.2	92 31	52.4	22 57.7	92 31	52.0	7
8	15 40.5	92 31	54.1	16 08.5	92 31	53.9	16 36.5	92 31	53.7	17 32.5	92 31	53.3	19 24.3	92 31	52.5	21 15.8	92 31	51.8	21 43.7	92 30	51.6	22 39.4	92 30	51.2	8
9	15 21.6	92 31	53.2	15 49.7	92 31	53.0	16 17.7	92 31	52.8	17 13.8	92 31	52.5	19 05.7	92 30	51.7	20 57.5	92 30	50.9	21 25.4	92 30	50.7	22 21.2	92 30	50.3	9
120	15 03.0	94 31	52.4	15 31.1	94 31	52.2	15 59.1	94 31	52.0	16 55.3	94 30	51.6	18 47.4	94 30	50.9	20 39.4	94 30	50.1	21 07.4	94 30	49.9	22 03.3	94 30	49.5	120
1	14 44.5	94 30	51.5	15 12.7	94 30	51.3	15 40.8	94 30	51.1	16 37.0	94 30	50.8	18 29.4	94 30	50.0	20 21.5	94 29	49.3	20 49.6	94 29	49.1	21 45.5	94 29	48.7	1
2	14 26.3	94 30	50.6	14 54.5	94 30	50.5	15 22.6	94 30	50.3	16 19.0	94 30	49.9	18 11.5	94 29	49.2	20 03.9	94 29	48.5	20 32.0	94 29	48.3	21 28.0	94 29	47.9	2
3	14 08.3	94 30	49.8	14 36.5	94 30	49.6	15 04.7	94 30	49.4	16 01.1	94 29	49.1	17 53.9	94 29	48.4	19 46.5	94 29	47.6	20 14.6	94 29	47.4	21 10.8	94 28	47.1	3
4	13 50.5	94 29	48.9	14 18.8	94 29	48.8	14 47.0	94 29	48.6	15 43.5	94 29	48.2	17 36.5	94 29	47.5	19 29.2	94 28	46.8	19 57.4	94 28	46.6	20 53.7	94 28	46.3	4
125	13 32.9	94 29	48.1	14 01.2	94 29	47.9	14 29.6	94 29	47.7	15 26.2	94 29	47.4	17 19.3	94 28	46.7	19 12.3	94 28	46.0	19 40.5	94 28	45.8	20 36.9	94 28	45.4	125
6	13 15.6	94 28	47.2	13 44.0	94 28	47.0	14 12.3	94 28	46.9	15 09.0	94 28	46.5	17 02.4	94 28	45.9	18 55.5	94 28	45.2	19 23.8	94 27	45.0	20 20.3	94 27	44.6	6
7	12 58.5	94 28	46.4	13 26.9	94 28	46.2	13 55.3	94 28	46.0	14 52.1	94 28	45.7	16 45.6	94 27	45.0	18 39.0	94 27	44.3	19 07.3	94 27	44.2	20 04.0	94 27	43.8	7
8	12 41.7	94 28	45.5	13 10.1	94 28	45.3	13 38.6	94 28	45.2	14 35.5	94 27	44.8	16 29.2	94 27	44.2	18 22.8	94 27	43.5	18 51.1	94 27	43.3	19 47.9	94 26	43.0	8
9	12 25.1	94 27	44.6	12 53.6	94 27	44.5	13 22.1	94 27	44.3	14 19.1	94 27	44.0	16 13.0	94 27	43.3	18 06.8	94 26	42.7	18 35.2	94 26	42.5	19 32.0	94 26	42.2	9
130	12 08.7	94 27	43.8	12 37.3	94 27	43.6	13 05.8	94 27	43.5	14 02.9	94 26	43.1	15 57.0	94 26	42.5	17 51.0	94 26	41.9	18 19.5	94 26	41.7	19 16.4	94 26	41.4	130
1	11 52.6	94 26	42.9	12 21.2	94 26	42.8	12 49.8	94 26	42.6	13 47.0	94 26	42.3	15 41.3	94 26	41.7	17 35.5	94 26	41.0	18 04.0	94 26					

DECLINATION SAME NAME AS LATITUDE

Lat. 67°

Table with columns for H.A., 86° 00', 87° 00', 88° 30', 40° 00', 42° 00', 42° 30', 43° 00', 45° 00', and H.A. Each column contains numerical data for declination and latitude. The table is organized into groups of 5 rows for each declination value.

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00'		37° 00'		38° 30'		40° 00'		42° 00'		42° 30'		48° 00'		H.A.										
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.											
91	32 22.8	89 37	73.3	33 16.0	88 37	72.7	34 35.4	88 37	71.9	35 54.4	88 37	71.0	37 39.1	87 37	69.8	38 05.2	87 36	69.5	38 31.2	87 36	69.2	40 14.8	86 36	67.9	91
2	32 00.4	89 37	72.5	32 53.6	89 37	71.9	34 13.1	88 37	71.1	35 32.3	88 37	70.2	37 17.2	87 36	69.0	37 43.3	87 36	68.7	38 09.4	87 36	68.4	39 53.1	86 36	67.1	2
3	31 38.1	89 37	71.6	32 31.4	89 37	71.1	33 51.0	88 37	70.2	35 10.3	88 36	69.4	36 55.4	87 36	68.2	37 21.5	87 36	67.9	37 47.7	87 36	67.6	39 31.6	86 36	66.3	3
4	31 15.9	89 37	70.8	32 09.3	89 37	70.2	33 29.0	88 36	69.4	34 48.4	88 36	68.5	36 33.7	87 36	67.4	36 59.9	87 36	67.1	37 26.0	87 36	66.8	39 10.2	86 35	65.5	4
95	30 53.9	89 37	69.9	31 47.3	89 36	69.4	33 07.1	89 36	68.6	34 26.6	89 36	67.7	36 12.1	88 36	66.6	36 38.4	87 36	66.3	37 04.6	87 36	65.9	38 48.9	87 35	64.7	95
6	30 31.9	89 36	69.1	31 25.4	89 36	68.6	32 45.4	89 36	67.7	34 05.0	89 36	66.9	35 50.7	88 36	65.7	36 17.0	88 35	65.5	36 43.2	87 35	65.2	38 27.8	87 35	63.9	6
7	30 10.1	89 36	68.2	31 03.6	89 36	67.7	32 23.7	89 36	66.9	33 43.5	89 36	66.1	35 29.4	88 35	64.9	35 55.7	88 35	64.7	36 22.0	88 35	64.4	38 06.8	87 35	63.1	7
8	29 48.4	90 36	67.4	30 42.0	89 36	66.9	32 02.2	89 36	66.1	33 22.2	89 35	65.3	35 08.2	88 35	64.1	35 34.6	88 35	63.9	35 01.0	88 35	63.6	37 46.0	87 34	62.3	8
9	29 26.8	90 36	66.6	30 20.5	89 36	66.1	31 40.9	89 35	65.3	33 00.9	89 35	64.5	34 47.2	88 35	63.3	35 13.6	88 35	63.1	35 40.0	88 35	62.8	37 25.3	87 34	61.6	9
100	29 05.3	90 36	65.7	29 59.2	90 35	65.2	31 19.6	89 35	64.5	32 39.8	89 35	63.7	34 26.3	88 35	62.5	34 52.8	88 34	62.3	35 19.3	88 34	62.0	37 04.8	88 34	60.8	100
1	28 44.0	90 35	64.9	29 37.9	90 35	64.4	30 58.6	89 35	63.6	32 18.9	89 35	62.8	34 05.6	89 34	61.7	34 32.1	88 34	61.5	34 58.7	88 34	61.2	36 44.1	88 34	60.0	1
2	28 22.9	90 35	64.1	29 16.9	90 35	63.6	30 37.6	90 35	62.8	31 58.1	89 34	62.0	33 45.0	89 34	61.0	34 11.6	88 34	60.7	34 38.2	88 34	60.4	36 24.1	88 33	59.2	2
3	28 01.9	90 35	63.3	28 55.9	90 35	62.8	30 16.9	90 34	62.0	31 37.5	89 34	61.2	33 24.6	89 34	60.2	33 51.2	89 34	59.9	34 17.9	88 34	59.6	36 04.1	88 33	58.5	3
4	27 41.0	90 34	62.4	28 35.2	90 34	61.9	29 56.2	90 34	61.2	31 17.0	90 34	60.4	33 04.3	89 34	59.4	33 31.1	89 33	59.1	33 57.8	89 33	58.8	35 44.2	88 33	57.7	4
105	27 20.3	91 34	61.6	28 14.6	91 34	61.1	29 35.8	90 34	60.4	30 56.7	90 34	59.6	32 44.2	89 33	58.6	33 11.0	89 33	58.3	33 37.8	89 33	58.0	35 24.4	89 33	56.9	105
6	26 59.8	91 34	60.8	27 54.1	91 34	60.3	29 15.5	90 34	59.6	30 36.6	90 33	58.8	32 32.4	90 33	57.8	32 51.2	89 33	57.5	33 18.0	89 33	57.3	35 04.9	89 32	56.2	6
7	26 39.4	91 34	60.0	27 33.8	91 34	59.5	28 55.3	90 33	58.8	30 16.6	90 33	58.0	32 04.6	90 33	57.0	32 31.5	90 33	56.7	32 58.3	89 32	56.5	34 45.5	89 32	55.4	7
8	26 19.2	91 33	59.1	27 13.7	91 33	58.7	28 35.4	91 33	58.0	29 56.8	90 33	57.2	31 45.0	90 32	56.2	32 11.9	90 32	56.0	32 38.9	90 32	55.7	34 26.3	89 32	54.6	8
9	25 59.1	91 33	58.3	26 53.8	91 33	57.9	28 15.6	91 33	57.2	29 37.2	91 32	56.4	31 25.6	90 32	55.4	31 52.6	90 32	55.2	32 19.6	90 32	54.9	34 07.3	89 31	53.9	9
110	25 39.3	91 33	57.5	26 34.0	91 33	57.0	27 56.0	91 32	56.3	29 17.7	91 32	55.6	31 06.4	90 32	54.6	31 33.5	90 32	54.4	32 00.5	90 32	54.1	33 48.4	90 31	53.1	110
1	25 19.6	91 32	56.7	26 14.4	91 32	56.2	27 36.6	91 32	55.5	28 57.5	91 32	54.8	30 47.3	91 31	53.9	31 14.5	90 31	53.6	31 41.6	90 31	53.4	33 29.8	90 31	52.3	1
2	25 00.1	92 32	55.9	25 55.1	92 32	55.4	27 17.3	91 32	54.7	28 39.4	91 31	54.0	30 28.5	91 31	53.1	30 55.7	91 31	52.8	31 22.9	91 31	52.6	33 11.3	90 30	51.6	2
3	24 40.8	92 32	55.0	25 35.8	92 32	54.6	26 58.3	91 31	53.9	28 20.5	91 31	53.2	30 09.9	91 31	52.3	30 37.1	91 31	52.1	31 04.4	91 31	51.8	32 53.0	90 30	50.8	3
4	24 21.7	92 32	54.2	25 16.8	92 31	53.8	26 39.4	92 31	53.1	28 01.8	91 31	52.4	29 51.4	91 30	51.5	30 18.7	91 30	51.3	30 46.0	91 30	51.0	32 35.0	91 30	50.1	4
115	24 02.7	92 31	53.4	24 58.0	92 31	53.0	26 20.8	92 31	52.3	27 43.4	92 30	51.7	29 33.2	91 30	50.7	30 00.5	91 30	50.5	30 27.9	91 30	50.3	32 17.1	91 29	49.3	115
6	23 44.0	92 31	52.6	24 39.4	92 31	52.2	26 02.3	92 30	51.5	27 25.1	92 30	50.9	29 15.1	92 30	50.0	29 42.6	91 30	49.7	30 10.0	91 30	49.5	31 59.4	91 29	48.5	6
7	23 25.5	93 31	51.8	24 21.0	92 30	51.4	25 44.1	92 30	50.7	27 07.0	92 30	50.1	28 57.3	92 29	49.2	29 24.8	92 29	48.9	29 52.3	92 29	48.7	31 42.0	91 29	47.8	7
8	23 07.2	93 30	51.0	24 02.8	93 30	50.5	25 26.0	92 30	49.9	26 49.1	92 29	49.3	28 39.6	92 29	48.4	29 07.2	92 29	48.2	29 34.7	92 29	47.9	31 24.7	91 28	47.0	8
9	22 49.1	93 30	50.1	23 44.8	93 30	49.7	25 08.2	92 29	49.1	26 31.5	92 29	48.5	28 22.2	92 29	47.6	28 49.8	92 29	47.4	29 17.4	92 28	47.2	31 07.7	92 28	46.3	9
120	22 31.2	93 29	49.3	23 27.0	93 29	48.9	24 50.6	93 29	48.3	26 14.0	93 29	47.7	28 05.0	92 28	46.8	28 37.2	92 28	46.6	29 00.4	92 28	46.4	30 50.8	92 28	45.5	120
1	22 13.5	93 29	48.5	23 09.4	93 29	48.1	24 33.2	93 29	47.5	25 56.8	93 28	46.9	27 41.8	93 28	46.1	28 15.8	92 28	45.8	28 43.5	92 28	45.6	30 34.2	92 27	44.7	1
2	21 56.1	93 29	47.7	22 52.1	93 29	47.3	24 16.0	93 28	46.7	25 39.8	93 28	46.1	27 31.2	93 28	45.3	27 59.0	93 27	45.1	28 26.8	93 27	44.9	30 17.8	92 27	44.0	2
3	21 38.8	94 28	46.9	22 35.0	93 28	46.5	23 59.0	93 28	45.9	25 23.0	93 28	45.3	27 14.7	93 27	44.5	27 42.6	93 27	44.3	28 10.4	93 27	44.1	30 01.7	93 27	43.2	3
4	21 21.8	94 28	46.1	22 18.1	94 28	45.7	23 42.3	94 28	45.1	25 06.4	93 27	44.5	26 58.4	93 27	43.7	27 26.3	93 27	43.5	27 54.2	93 27	43.3	29 45.7	93 26	42.5	4
125	21 05.1	94 28	45.3	22 01.4	94 27	44.9	23 25.8	94 27	44.3	24 50.1	94 27	43.7	26 42.3	93 26	43.0	27 10.3	93 26	42.8	27 38.3	93 26	42.6	29 30.0	93 26	41.7	125
6	20 48.5	94 27	44.4	21 45.0	94 27	44.1	23 09.6	94 27	43.5	24 34.0	94 26	43.0	26 26.4	94 26	42.2	26 54.5	94 26	42.0	27 22.5	93 26	41.8	29 14.5	93 26	41.0	6
7	20 32.2	94 27	43.6	21 28.8	94 27	43.3	22 53.5	94 26	42.7	24 18.2	94 26	42.2	26 10.8	94 26	41.4	26 38.9	94 26	41.2	27 07.0	94 25	41.0	28 59.3	93 25	40.2	7
8	20 16.2	94 26	42.8	21 12.9	94 26	42.5	22 37.7	94 26	41.9	24 02.5	94 26	41.4	25 55.4	94 25	40.6	26 23.6	94 25	40.4	26 51.7	94 25	40.2	28 44.2	94 25	39.5	8
9	20 00.4	95 26	42.0	20 57.1	95 26	41.7	22 22.2	94 25	41.1	23 47.2	94 25	40.6	25 40.3	94 25	39.8	26 08.5	94 25	39.7	26 36.7	94 25	39.5	28 29.5	94 24	38.7	9
130	19 44.8	95 26	41.2	20 41.7	95 25	40.8	22 06.9	95 25	40.3	23 32.0	95 25	39.8	25 25.4	94 24	39.1	25 53.7	94 24	38.9	26 21.9	94 24	38.7	28 14.9	94 24	37.9	130
1	19 29.5	95 25	40.4	20 26.5	95 25	40.0	21 51.9	95 25	39.5	23 17.2	95 24	39.0	25 10.7	95 24	38.3	25 39.1	94 24	38.1	26 07.4	94 24	37.9	28 00.6			

Lat. 67°

H.A.	46° 00'		47° 00'		48° 30'		49° 30'		50° 30'		51° 30'		52° 30'		54° 00'		H.A.																			
	Alt.	Ad Alt.																																		
00	69 00.0	1.001	180.0	70 00.0	1.001	180.0	71 30.0	1.001	180.0	72 30.0	1.001	180.0	73 30.0	1.001	180.0	74 30.0	1.001	180.0	75 30.0	1.001	180.0	76 30.0	1.001	180.0	77 00.0	1.001	180.0	78 00.0	1.001	180.0	79 00.0	1.001	180.0	80 00.0	1.001	180.0
1	68 59.6	1.002	178.1	69 59.6	1.002	178.0	71 29.6	1.002	177.9	72 29.6	1.002	177.8	73 29.5	1.002	177.7	74 29.5	1.002	177.6	75 29.5	1.002	177.6	76 29.5	1.002	177.6	77 00.0	1.002	175.4	78 00.0	1.002	174.4	79 00.0	1.002	174.4	80 00.0	1.002	174.4
2	68 58.4	1.003	176.1	69 58.4	1.003	176.0	71 28.3	1.003	175.8	72 28.2	1.003	175.7	73 28.2	1.003	175.5	74 28.1	1.003	175.3	75 28.0	1.003	175.1	76 28.0	1.003	175.1	77 00.0	1.003	173.4	78 00.0	1.003	172.4	79 00.0	1.003	172.4	80 00.0	1.003	172.4
3	68 56.4	1.004	174.2	69 56.3	1.004	174.0	71 26.2	1.004	173.7	72 26.0	1.004	173.5	73 25.9	1.004	173.3	74 25.7	1.004	173.0	75 25.5	1.004	172.7	76 25.5	1.004	172.7	77 00.0	1.004	170.8	78 00.0	1.004	169.8	79 00.0	1.004	169.8	80 00.0	1.004	169.8
4	68 53.7	1.005	172.3	69 53.5	1.005	172.0	71 23.2	1.005	171.7	72 23.0	1.005	171.4	73 22.9	1.005	171.1	74 22.4	1.005	170.7	75 22.1	1.005	170.3	76 22.1	1.005	170.3	77 00.0	1.005	168.4	78 00.0	1.005	167.4	79 00.0	1.005	167.4	80 00.0	1.005	167.4
5	68 50.1	1.006	170.3	69 49.8	1.006	170.1	71 19.4	1.006	169.6	72 19.0	1.006	169.3	73 18.6	1.006	168.9	74 18.2	1.006	168.4	75 17.7	1.006	167.9	76 17.7	1.006	167.9	77 00.0	1.006	166.1	78 00.0	1.006	165.1	79 00.0	1.006	165.1	80 00.0	1.006	165.1
6	68 45.8	1.007	168.4	69 45.4	1.007	168.1	71 14.7	1.007	167.6	72 14.2	1.007	167.1	73 13.7	1.007	166.7	74 13.0	1.007	166.2	75 12.3	1.007	165.6	76 12.3	1.007	165.6	77 00.0	1.007	163.8	78 00.0	1.007	162.8	79 00.0	1.007	162.8	80 00.0	1.007	162.8
7	68 40.7	1.008	166.5	69 40.2	1.008	166.2	71 09.3	1.008	165.5	72 08.6	1.008	165.0	73 07.8	1.008	164.5	74 07.0	1.008	163.9	75 06.0	1.008	163.2	76 06.0	1.008	163.2	77 00.0	1.008	161.6	78 00.0	1.008	160.6	79 00.0	1.008	160.6	80 00.0	1.008	160.6
8	68 34.9	1.009	164.6	69 34.2	1.009	164.2	71 03.0	1.009	163.5	72 02.1	1.009	163.0	73 01.1	1.009	162.4	74 00.0	1.009	161.7	75 00.0	1.009	161.0	76 00.0	1.009	161.0	77 00.0	1.009	159.6	78 00.0	1.009	158.6	79 00.0	1.009	158.6	80 00.0	1.009	158.6
9	68 28.3	1.010	162.8	69 27.4	1.010	162.3	70 56.0	1.010	161.5	71 54.9	1.010	160.9	72 53.6	1.010	160.2	73 52.2	1.010	159.5	74 50.7	1.010	158.6	75 50.7	1.010	158.6	77 00.0	1.010	157.2	78 00.0	1.010	156.2	79 00.0	1.010	156.2	80 00.0	1.010	156.2
10	68 21.0	1.011	160.9	69 19.9	1.011	160.4	70 48.1	1.011	159.5	71 46.8	1.011	158.9	72 45.3	1.011	158.1	73 43.6	1.011	157.3	74 41.7	1.011	156.4	75 41.7	1.011	156.4	77 00.0	1.011	155.0	78 00.0	1.011	154.0	79 00.0	1.011	154.0	80 00.0	1.011	154.0
1	68 13.0	1.012	159.1	69 11.7	1.012	158.5	70 39.6	1.012	157.8	71 37.9	1.012	156.8	72 36.2	1.012	155.8	73 34.1	1.012	155.2	74 31.9	1.012	154.2	75 31.9	1.012	154.2	77 00.0	1.012	152.8	78 00.0	1.012	151.8	79 00.0	1.012	151.8	80 00.0	1.012	151.8
2	68 04.3	1.013	157.2	69 02.8	1.013	156.6	70 30.3	1.013	155.6	71 28.4	1.013	154.9	72 26.3	1.013	154.0	73 23.9	1.013	153.1	74 21.3	1.013	152.0	75 21.3	1.013	152.0	77 00.0	1.013	150.6	78 00.0	1.013	149.6	79 00.0	1.013	149.6	80 00.0	1.013	149.6
3	67 54.9	1.014	155.4	68 53.1	1.014	154.8	70 20.2	1.014	154.3	71 18.0	1.014	153.2	72 15.6	1.014	152.0	73 12.9	1.014	150.9	74 09.9	1.014	149.9	75 09.9	1.014	149.9	77 00.0	1.014	148.4	78 00.0	1.014	147.4	79 00.0	1.014	147.4	80 00.0	1.014	147.4
4	67 44.8	1.015	153.7	68 42.8	1.015	153.0	70 09.5	1.015	152.1	71 07.0	1.015	150.9	72 04.2	1.015	149.0	73 01.2	1.015	147.0	74 00.0	1.015	146.0	75 00.0	1.015	146.0	77 00.0	1.015	144.8	78 00.0	1.015	143.8	79 00.0	1.015	143.8	80 00.0	1.015	143.8
15	67 34.1	1.016	151.9	68 31.8	1.016	151.2	69 58.1	1.016	150.0	70 55.3	1.016	149.1	71 52.2	1.016	148.1	72 48.7	1.016	147.0	73 44.9	1.016	145.7	74 44.9	1.016	145.7	77 00.0	1.016	144.3	78 00.0	1.016	143.3	79 00.0	1.016	143.3	80 00.0	1.016	143.3
6	67 22.7	1.017	150.1	68 20.2	1.017	149.4	69 46.0	1.017	148.1	70 42.9	1.017	147.2	71 39.4	1.017	146.1	72 35.6	1.017	145.0	73 31.4	1.017	143.7	74 31.4	1.017	143.7	77 00.0	1.017	142.3	78 00.0	1.017	141.3	79 00.0	1.017	141.3	80 00.0	1.017	141.3
7	67 10.7	1.018	148.4	68 08.0	1.018	147.6	69 33.3	1.018	146.3	70 29.9	1.018	145.3	71 26.1	1.018	144.3	72 21.9	1.018	143.1	73 17.2	1.018	141.8	74 17.2	1.018	141.8	77 00.0	1.018	140.4	78 00.0	1.018	139.4	79 00.0	1.018	139.4	80 00.0	1.018	139.4
8	66 58.2	1.019	146.7	67 55.1	1.019	145.9	69 20.0	1.019	144.5	70 16.2	1.019	143.5	71 12.1	1.019	142.4	72 07.5	1.019	141.2	73 02.4	1.019	139.8	74 02.4	1.019	139.8	77 00.0	1.019	138.4	78 00.0	1.019	137.4	79 00.0	1.019	137.4	80 00.0	1.019	137.4
9	66 45.0	1.020	145.0	67 41.7	1.020	144.2	69 06.1	1.020	142.8	70 02.0	1.020	141.7	70 57.5	1.020	140.6	71 52.5	1.020	139.3	72 47.0	1.020	138.0	73 47.0	1.020	138.0	77 00.0	1.020	136.6	78 00.0	1.020	135.6	79 00.0	1.020	135.6	80 00.0	1.020	135.6
20	66 31.3	1.021	143.4	67 27.7	1.021	142.5	68 51.7	1.021	141.1	69 47.2	1.021	140.0	70 42.3	1.021	138.8	71 36.9	1.021	137.5	72 31.0	1.021	136.1	73 31.0	1.021	136.1	77 00.0	1.021	134.7	78 00.0	1.021	133.7	79 00.0	1.021	133.7	80 00.0	1.021	133.7
1	66 17.1	1.022	141.8	67 13.2	1.022	140.9	68 36.7	1.022	139.4	69 31.9	1.022	138.3	70 36.9	1.022	137.1	71 29.8	1.022	135.8	72 24.5	1.022	134.3	73 24.5	1.022	134.3	77 00.0	1.022	132.9	78 00.0	1.022	131.9	79 00.0	1.022	131.9	80 00.0	1.022	131.9
2	66 02.3	1.023	140.2	66 58.1	1.023	139.2	68 21.2	1.023	137.7	69 16.0	1.023	136.6	70 10.4	1.023	135.4	71 04.2	1.023	134.0	72 10.4	1.023	132.6	73 10.4	1.023	132.6	77 00.0	1.023	131.2	78 00.0	1.023	130.2	79 00.0	1.023	130.2	80 00.0	1.023	130.2
3	65 47.0	1.024	138.6	66 42.5	1.024	137.6	68 05.1	1.024	136.1	68 59.7	1.024	134.9	69 53.7	1.024	133.7	70 47.1	1.024	132.3	71 40.0	1.024	130.9	72 40.0	1.024	130.9	77 00.0	1.024	129.4	78 00.0	1.024	128.4	79 00.0	1.024	128.4	80 00.0	1.024	128.4
4	65 31.3	1.025	137.0	66 26.5	1.025	136.0	67 48.6	1.025	134.5	68 42.8	1.025	133.3	69 36.5	1.025	132.1	70 29.6	1.025	130.7	71 22.0	1.025	129.2	72 22.0	1.025	129.2	77 00.0	1.025	127.8	78 00.0	1.025	126.8	79 00.0	1.025	126.8	80 00.0	1.025	126.8
25	65 15.1	1.026	135.5	66 10.0	1.026	134.5	67 31.7	1.026	132.9	68 25.5	1.026	131.7	69 18.9	1.026	130.4	70 11.6	1.026	129.1	71 03.6	1.026	127.6	72 03.6	1.026	127.6	77 00.0	1.026	126.2	78 00.0	1.026	125.2	79 00.0	1.026	125.2	80 00.0	1.026	125.2
6	64 58.4	1.027	134.0	65 53.1	1.027	133.0	67 14.3	1.027	131.3	68 07.8	1.027	130.2	69 00.8	1.027	128.9	69 53.2	1.027	127.5	70 45.7	1.027	126.0	71 45.7	1.027	126.0	77 00.0	1.027	124.6	78 00.0	1.027	123.6	79 00.0	1.027	123.6	80 00.0	1.027	123.6
7	64 41.3	1.028	132.5	65 35.7	1.028	131.5	66 56.5	1.028	129.8	67 49.7	1.028	128.6	68 42.4	1.028	127.3	69 34.6	1.028	125.9	70 25.																	

Main table with columns for H.A., latitude (46° 00' to 54° 00'), and declination values. Includes sub-headers for Alt., Az., and Δd Δt.

Lat. 67°

Lat. 68°

Lat. 69°

Lat. 67°

H.A.	54° 30'		55° 00'		56° 00'		56° 30'		57° 00'		57° 30'		59° 00'		59° 30'		H.A.
	Alt.	Az.															
00	77 30.0	1.001 180.0	77 30.0	1.001 180.0	77 30.0	1.001 180.0	77 30.0	1.001 180.0	77 30.0	1.001 180.0	77 30.0	1.001 180.0	77 30.0	1.001 180.0	77 30.0	1.001 180.0	00
1	77 29.5	1.008 177.3	77 29.5	1.008 177.2	77 29.5	1.008 177.2	77 29.5	1.008 177.0	77 29.5	1.008 176.9	77 29.5	1.008 176.7	77 29.5	1.008 176.3	77 29.5	1.008 176.1	1
2	77 27.8	1.008 174.6	77 27.8	1.008 174.5	77 27.8	1.008 174.2	77 27.5	1.008 174.0	77 27.5	1.008 173.7	77 27.5	1.008 173.5	77 27.5	1.008 172.6	77 27.5	1.008 172.3	2
3	77 25.1	1.006 172.0	77 25.1	1.006 171.8	77 25.1	1.006 171.2	77 24.4	1.007 171.0	77 24.4	1.007 170.6	77 24.4	1.007 170.3	77 24.4	1.007 169.0	77 24.4	1.007 168.4	3
4	77 21.3	09 08 169.3	77 21.3	09 08 169.0	77 21.3	09 08 168.4	77 20.2	09 09 168.0	77 20.2	09 09 167.6	77 20.2	09 09 167.1	77 20.2	09 09 165.4	77 20.2	09 09 164.7	4
05	77 16.4	09 10 166.7	77 16.4	09 10 166.4	77 16.4	09 11 165.5	77 14.7	09 11 165.1	77 14.7	09 11 164.5	77 14.7	09 12 164.0	77 14.7	09 12 161.9	77 14.7	09 12 161.0	05
6	77 10.5	08 12 164.1	77 10.5	08 12 163.7	77 10.5	08 12 162.7	77 08.1	08 13 162.2	77 08.1	08 13 161.6	77 08.1	08 13 161.0	77 08.1	08 13 158.5	77 08.1	08 13 157.5	6
7	77 03.6	08 13 161.6	77 03.6	08 14 161.1	77 03.6	08 14 160.0	77 00.9	08 15 159.3	77 00.9	08 15 158.7	77 00.9	08 15 157.9	77 00.9	08 15 155.2	77 00.9	08 15 154.0	7
8	76 55.7	07 15 159.1	76 55.7	07 16 158.5	76 55.7	07 16 157.3	76 51.6	07 16 156.6	76 51.6	07 16 155.8	76 51.6	07 16 155.0	76 51.6	07 16 152.0	76 51.6	07 16 150.7	8
9	76 46.8	06 16 156.6	76 46.8	06 17 156.0	76 46.8	06 18 155.6	76 41.7	06 18 153.9	76 41.7	06 19 153.0	76 41.7	06 19 152.1	76 41.7	06 21 148.9	76 41.7	06 21 147.5	9
10	76 37.1	06 18 154.2	76 37.1	06 18 153.5	76 37.1	06 19 152.0	76 30.9	06 20 151.2	76 30.9	06 20 150.3	76 30.9	06 21 149.4	76 30.9	06 21 145.9	76 30.9	06 21 144.5	10
1	76 26.4	06 19 151.1	76 26.4	06 20 151.1	76 26.4	06 21 149.5	76 19.2	06 21 148.7	76 19.2	06 22 147.7	76 19.2	06 22 146.7	76 19.2	06 22 143.0	76 19.2	06 22 141.5	1
2	76 14.9	06 20 149.5	76 14.9	06 21 148.7	76 14.9	06 22 147.1	76 06.6	06 22 146.2	76 06.6	06 23 145.2	76 06.6	06 23 144.1	76 06.6	06 23 140.3	76 06.6	06 23 138.7	2
3	76 02.6	06 22 147.2	76 02.6	06 22 146.4	76 02.6	06 23 144.7	75 53.1	06 24 143.7	75 53.1	06 24 142.7	75 53.1	06 24 141.6	75 53.1	06 24 137.6	75 53.1	06 24 136.1	3
4	75 49.6	06 23 145.0	75 49.6	06 23 144.2	75 49.6	06 24 142.4	75 38.8	06 25 141.4	75 38.8	06 25 140.3	75 38.8	06 25 139.2	75 38.8	06 25 135.1	75 38.8	06 25 133.5	4
15	75 35.7	06 24 142.8	75 35.7	06 25 142.0	75 35.7	06 26 140.1	75 23.8	06 26 139.1	75 23.8	06 27 138.0	75 23.8	06 27 136.8	75 23.8	06 27 132.7	75 23.8	06 27 131.1	15
6	75 21.2	06 25 140.7	75 21.2	06 26 139.9	75 21.2	06 27 137.9	75 08.2	06 27 136.9	75 08.2	06 28 135.8	75 08.2	06 28 134.6	75 08.2	06 28 130.4	75 08.2	06 28 128.8	6
7	75 06.1	06 26 138.7	75 06.1	06 27 137.8	75 06.1	06 28 135.8	74 51.8	06 28 134.8	74 51.8	06 29 133.6	74 51.8	06 29 132.4	74 51.8	06 29 128.2	74 51.8	06 29 126.6	7
8	74 50.3	06 27 136.7	74 50.3	06 28 135.8	74 50.3	06 29 133.8	74 34.9	06 29 132.7	74 34.9	06 30 131.5	74 34.9	06 30 130.3	74 34.9	06 30 126.1	74 34.9	06 30 124.5	8
9	74 33.9	06 28 134.7	74 33.9	06 29 133.8	74 33.9	06 30 131.8	74 17.4	06 30 130.7	74 17.4	06 31 129.5	74 17.4	06 31 128.3	74 17.4	06 31 124.1	74 17.4	06 31 122.5	9
20	74 17.0	06 29 132.8	74 17.0	06 30 131.9	74 17.0	06 31 129.9	73 59.3	06 31 128.8	73 59.3	06 32 127.6	73 59.3	06 32 126.3	73 59.3	06 32 122.1	73 59.3	06 32 120.5	20
1	73 59.6	06 30 131.0	73 59.6	06 31 130.1	73 59.6	06 32 128.0	73 40.8	06 32 126.9	73 40.8	06 33 125.7	73 40.8	06 33 124.5	73 40.8	06 33 120.3	73 40.8	06 33 118.7	1
2	73 41.6	06 31 129.2	73 41.6	06 31 128.3	73 41.6	06 32 126.2	73 21.9	06 32 125.1	73 21.9	06 33 123.9	73 21.9	06 33 122.7	73 21.9	06 33 118.5	73 21.9	06 33 116.9	2
3	73 23.2	06 31 127.5	73 23.2	06 32 126.5	73 23.2	06 33 124.5	73 02.5	06 33 123.3	73 02.5	06 34 122.2	73 02.5	06 34 121.0	73 02.5	06 34 116.8	73 02.5	06 34 115.2	3
4	73 04.4	06 32 125.8	73 04.4	06 33 124.8	73 04.4	06 34 122.8	72 42.7	06 34 121.6	72 42.7	06 35 120.5	72 42.7	06 35 119.2	72 42.7	06 35 115.1	72 42.7	06 35 113.6	4
25	72 45.2	06 33 124.1	72 45.2	06 34 123.2	72 45.2	06 35 121.1	72 22.6	06 35 120.0	72 22.6	06 36 118.8	72 22.6	06 36 117.6	72 22.6	06 36 113.5	72 22.6	06 36 112.0	25
6	72 25.6	06 33 122.5	72 25.6	06 34 121.6	72 25.6	06 35 119.5	72 02.1	06 35 118.4	72 02.1	06 36 117.2	72 02.1	06 36 116.0	72 02.1	06 36 111.9	72 02.1	06 36 110.5	6
7	72 05.7	06 34 121.0	72 05.7	06 34 120.0	72 05.7	06 35 118.0	71 41.3	06 35 116.9	71 41.3	06 36 115.7	71 41.3	06 36 114.5	71 41.3	06 36 110.4	71 41.3	06 36 108.9	7
8	71 45.4	06 34 119.4	71 45.4	06 35 118.5	71 45.4	06 36 116.4	71 20.3	06 36 115.4	71 20.3	06 37 114.2	71 20.3	06 37 113.0	71 20.3	06 37 108.9	71 20.3	06 37 107.7	8
9	71 24.8	06 35 118.0	71 24.8	06 35 117.0	71 24.8	06 36 115.0	70 59.0	06 36 113.9	70 59.0	06 37 112.8	70 59.0	06 37 111.6	70 59.0	06 37 107.7	70 59.0	06 37 106.3	9
30	71 04.0	06 35 116.5	71 04.0	06 36 115.6	71 04.0	06 37 113.5	70 37.4	06 37 112.5	70 37.4	06 38 111.4	70 37.4	06 38 110.2	70 37.4	06 38 106.4	70 37.4	06 38 105.0	30
1	70 42.9	06 36 115.1	70 42.9	06 36 114.2	70 42.9	06 37 112.2	70 15.6	06 37 111.1	70 15.6	06 38 110.0	70 15.6	06 38 108.8	70 15.6	06 38 104.6	70 15.6	06 38 103.7	1
2	70 21.6	06 36 113.7	70 21.6	06 37 112.8	70 21.6	06 38 110.8	71 31.7	06 37 109.8	71 31.7	06 38 108.7	71 31.7	06 38 107.5	71 31.7	06 38 103.3	71 31.7	06 38 102.5	2
3	70 00.0	06 36 112.4	70 00.0	06 37 111.4	70 00.0	06 38 109.5	71 09.1	06 37 108.4	71 09.1	06 38 107.4	71 09.1	06 38 106.2	71 09.1	06 38 102.0	71 09.1	06 38 101.3	3
4	69 38.2	06 37 111.1	69 38.2	06 37 110.1	69 38.2	06 38 108.2	70 46.9	06 37 107.2	70 46.9	06 38 106.1	70 46.9	06 38 105.0	70 46.9	06 38 100.8	70 46.9	06 38 100.1	4
35	69 16.2	06 37 109.8	69 16.2	06 37 108.9	69 16.2	06 38 106.9	70 24.6	06 38 105.9	70 24.6	06 39 104.9	70 24.6	06 39 103.8	70 24.6	06 39 99.2	70 24.6	06 39 98.5	35
6	68 54.1	06 37 108.5	68 54.1	06 37 107.6	68 54.1	06 38 105.7	70 02.1	06 38 104.7	70 02.1	06 39 103.7	70 02.1	06 39 102.6	70 02.1	06 39 98.0	70 02.1	06 39 97.9	6
7	68 31.8	06 37 107.3	68 31.8	06 38 106.4	68 31.8	06 39 104.5	69 39.4	06 38 103.5	69 39.4	06 39 102.5	69 39.4	06 39 101.4	69 39.4	06 39 96.8	69 39.4	06 39 96.8	7
8	68 09.3	06 38 106.1	68 09.3	06 38 105.2	68 09.3	06 39 103.3	69 16.7	06 38 102.4	69 16.7	06 39 101.4	69 16.7	06 39 100.3	69 16.7	06 39 95.0	69 16.7	06 39 95.8	8
9	67 46.7	06 38 104.9	67 46.7	06 38 104.0	67 46.7	06 39 102.2	68 53.8	06 38 101.2	68 53.8	06 39 100.2	68 53.8	06 39 99.2	68 53.8	06 39 93.6	68 53.8	06 39 93.7	9
40	67 24.0	06 38 103.8	67 24.0	06 38 102.9	67 24.0	06 39 101.1	68 30.9	06 38 100.1	68 30.9	06 39 99.1	68 30.9	06 39 98.1	68 30.9	06 39 92.5	68 30.9	06 39 92.7	40
1	67 01.2	06 38 102.6	67 01.2	06 38 101.8	67 01.2	06 39 100.0	68 07.8	06 38 99.0	68 07.8	06 39 98.0	68 07.8	06 39 97.0	68 07.8	06 39 91.4	68 07.8	06 39 91.8	1
2	66 38.3	06 38 101.5	66 38.3	06 39 100.7	66 38.3	06 40 98.9	67 44.7	06 39 97.9	67 44.7	06 40 96.9	67 44.7	06 40 95.9	67 44.7	06 40 90.3	67 44.7	06 40 90.8	2
3	66 15.2	06 38 100.4	66 15.2	06 39 99.6	66 15.2	06 40 97.8	67 21.5	06 39 96.8	67 21.5	06 40 95.8	67 21.5	06 40 94.8	67 21.5	06 40 89.2	67 21.5	06 40 89.8	3
4	65 52.2	06 39 99.4	65 52.2	06 39 98.5	65 52.2	06 40 96.8	66 58.2	06 39 95.8	66 58.2	06 40 94.8	66 58.2	06 40 93.8	66 58.2	06 40 88.2	66 58.2	06 40 88.9	4
45	65 29.0	06 39 98.3	65 29.0	06 39 97.5	65 29.0	06 40 95.8	66 34.9	06 39 94.8	66 34.9	06 40 93.8	66 34.9	06 40 92.8	66 34.9	06 40 87.2	66 34.9	06 40 87.8	

Main table with columns for H.A., Alt., Az., and values for various declination angles (54° 30', 55° 00', 56° 00', 56° 30', 57° 00', 57° 30', 59° 00', 59° 30').

Lat. 67°

Lat. 68°

Lat. 69°

Lat. 67°

H.A.	60° 00'		60° 30'		62° 00'		62° 30'		63° 00'		63° 00'		69° 00'		69° 30'		74° 30'		H.A.						
	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.	Alt.	As.							
00	83 00.0	1.001	180.0	83 30.0	1.002	180.0	85 00.0	1.002	180.0	85 30.0	1.002	180.0	86 00.0	1.002	180.0	88 00.0	1.008	00.0	87 30.0	1.008	00.0	82 30.0	1.001	00.0	00
1	82 59.2	1.004	175.9	83 29.1	1.004	175.7	84 58.9	1.005	174.6	85 28.8	1.005	174.1	85 58.7	1.007	173.5	87 57.9	0.981	10.1	87 28.4	0.981	10.1	82 29.6	1.002	02.0	1
2	82 56.7	0.997	171.8	83 26.5	0.997	171.3	84 55.6	0.999	169.3	85 25.2	0.999	168.4	85 54.7	0.981	167.2	87 51.9	0.931	19.6	87 23.6	0.931	19.6	82 28.3	0.998	04.1	2
3	82 52.5	0.991	167.8	83 22.1	0.991	167.1	84 50.2	0.971	164.2	85 19.4	0.971	162.8	85 48.3	0.915	161.0	87 42.4	0.862	27.9	87 15.9	0.862	27.9	82 26.2	0.995	06.1	3
4	82 46.8	0.981	163.9	83 16.0	0.981	163.0	84 42.9	0.961	159.2	85 11.4	0.961	157.4	85 39.6	0.915	155.3	87 30.1	0.824	35.0	87 05.7	0.824	35.0	82 23.4	0.986	08.1	4
05	82 39.5	0.961	160.1	83 08.4	0.961	158.9	84 33.6	0.938	154.4	85 01.4	0.920	152.4	85 28.8	0.901	149.9	87 15.7	0.872	40.8	86 53.4	0.872	40.8	82 19.6	0.977	10.0	05
6	82 30.8	0.941	156.4	82 59.2	0.941	155.1	84 22.7	0.912	149.9	84 49.9	0.892	147.2	85 16.1	0.874	144.9	86 59.6	0.829	45.6	86 39.4	0.829	45.6	82 15.2	0.959	12.0	6
7	82 20.8	0.919	152.8	82 48.6	0.919	151.3	84 10.2	0.882	145.7	84 36.4	0.864	143.0	85 01.9	0.846	140.3	86 42.3	0.800	49.5	86 24.1	0.800	49.5	82 09.9	0.941	13.8	7
8	82 09.4	0.892	149.3	82 36.8	0.892	147.8	83 56.3	0.856	141.8	84 21.7	0.837	139.2	84 46.2	0.818	136.1	86 24.1	0.772	52.6	86 07.6	0.772	52.6	82 04.0	0.921	15.6	8
9	81 56.9	0.869	146.1	82 23.7	0.869	144.4	83 41.2	0.831	138.1	84 05.8	0.812	135.4	84 29.4	0.793	132.3	86 05.1	0.747	55.2	85 50.3	0.747	55.2	81 57.3	0.902	17.4	9
10	81 43.2	0.842	142.9	82 09.5	0.842	141.2	83 25.0	0.804	134.7	83 48.8	0.785	131.9	84 11.6	0.766	128.8	85 45.6	0.720	57.3	85 32.3	0.720	57.3	81 50.0	0.883	19.1	10
1	81 28.6	0.826	139.9	81 54.3	0.826	138.1	83 07.9	0.787	131.5	83 30.9	0.768	128.7	83 52.9	0.749	125.6	85 25.7	0.703	59.1	85 13.7	0.703	59.1	81 42.0	0.864	20.7	1
2	81 13.1	0.817	137.1	81 38.2	0.817	135.3	82 50.0	0.769	128.5	83 12.3	0.750	125.8	83 33.5	0.731	122.7	85 05.4	0.687	60.5	84 54.0	0.687	60.5	81 33.4	0.845	22.2	2
3	80 56.7	0.809	134.4	81 21.3	0.809	132.5	82 31.3	0.751	125.8	82 52.9	0.732	123.0	83 13.5	0.713	120.0	84 44.9	0.669	61.7	84 35.2	0.669	61.7	81 24.3	0.826	23.7	3
4	80 39.6	0.801	131.8	81 03.7	0.801	129.9	82 12.0	0.732	123.2	82 33.0	0.713	120.5	82 53.0	0.694	117.6	84 24.1	0.651	62.7	84 15.5	0.651	62.7	81 14.6	0.807	25.1	4
15	80 21.8	0.801	129.4	80 45.4	0.801	127.5	81 52.1	0.734	120.8	82 12.6	0.715	118.2	82 32.0	0.696	115.3	84 03.2	0.653	63.6	83 55.5	0.653	63.6	81 04.4	0.788	26.5	15
6	80 03.4	0.782	127.0	80 26.5	0.782	125.2	81 31.7	0.735	118.6	81 51.7	0.716	116.0	82 10.6	0.697	113.2	83 42.2	0.654	64.2	83 35.4	0.654	64.2	80 53.7	0.769	27.7	6
7	79 44.4	0.773	124.8	80 07.1	0.773	123.0	81 10.9	0.736	116.4	81 30.4	0.717	113.8	81 48.6	0.698	111.2	83 21.0	0.655	64.8	83 15.0	0.655	64.8	80 42.6	0.750	28.9	7
8	79 24.9	0.753	122.7	79 47.2	0.753	120.9	80 49.7	0.736	114.5	81 08.8	0.717	112.0	81 26.9	0.699	109.4	82 59.8	0.656	65.3	82 54.5	0.656	65.3	80 31.0	0.731	30.1	8
9	79 05.0	0.744	120.7	79 26.9	0.744	118.9	80 28.2	0.736	112.6	80 47.0	0.717	110.2	81 04.7	0.699	107.6	82 38.4	0.656	65.6	82 33.3	0.656	65.6	80 19.1	0.712	31.2	9
20	78 44.6	0.735	118.8	79 06.2	0.735	117.0	80 06.5	0.737	110.8	80 24.8	0.718	108.5	80 42.2	0.699	106.0	82 17.1	0.659	65.9	82 13.2	0.659	65.9	80 06.8	0.693	32.2	20
1	78 23.9	0.726	117.0	78 45.1	0.726	115.2	79 44.4	0.737	109.2	80 02.5	0.718	106.9	80 19.6	0.699	104.5	81 55.6	0.660	66.1	81 52.4	0.660	66.1	79 54.1	0.674	33.1	1
2	78 02.9	0.717	115.3	78 23.8	0.717	113.5	79 22.2	0.737	107.1	79 40.0	0.718	105.4	79 56.8	0.699	103.0	81 34.2	0.660	66.3	81 31.6	0.660	66.3	79 41.2	0.655	34.0	2
3	77 41.5	0.708	113.6	78 02.1	0.708	111.9	78 59.7	0.737	105.1	79 17.3	0.718	103.9	79 33.9	0.699	101.6	81 12.7	0.660	66.4	81 10.7	0.660	66.4	79 27.9	0.646	34.8	3
4	77 19.9	0.699	112.0	77 40.3	0.699	110.3	78 37.1	0.737	104.6	78 54.5	0.718	102.5	79 10.9	0.699	100.3	80 51.2	0.660	66.5	80 49.8	0.660	66.5	79 14.4	0.637	35.6	4
25	76 58.0	0.687	110.4	77 18.2	0.687	108.8	78 14.4	0.737	103.2	78 31.5	0.718	101.2	78 47.8	0.699	99.1	80 29.7	0.660	66.5	80 28.8	0.660	66.5	79 00.6	0.618	36.3	25
6	76 36.0	0.678	109.0	76 55.9	0.678	107.3	77 51.5	0.737	101.9	78 08.5	0.718	99.9	78 24.6	0.699	97.9	80 08.2	0.660	66.5	80 07.2	0.660	66.5	78 46.6	0.609	37.0	6
7	76 13.7	0.670	107.5	76 33.4	0.670	105.9	77 28.5	0.737	100.6	77 45.4	0.718	98.7	78 01.4	0.699	96.7	79 46.7	0.660	66.5	79 46.8	0.660	66.5	78 32.4	0.590	37.6	7
8	75 51.3	0.661	106.2	76 10.8	0.661	104.6	77 05.4	0.737	99.4	77 22.1	0.718	97.5	77 38.1	0.699	95.6	79 25.2	0.660	66.4	79 25.8	0.660	66.4	78 18.0	0.571	38.2	8
9	75 28.7	0.652	104.8	75 48.2	0.652	103.2	76 42.2	0.737	98.2	76 58.9	0.718	96.4	77 14.7	0.699	94.5	79 03.7	0.660	66.3	79 04.8	0.660	66.3	78 03.4	0.552	38.8	9
30	75 05.9	0.643	103.5	75 25.2	0.643	102.0	76 19.0	0.737	97.1	76 35.6	0.718	95.3	76 51.3	0.699	93.5	78 42.3	0.660	66.2	78 43.8	0.660	66.2	77 48.6	0.533	39.3	30
1	74 43.1	0.634	102.3	75 02.2	0.634	100.8	75 55.7	0.737	96.0	76 12.2	0.718	94.3	76 27.9	0.699	92.5	78 20.8	0.660	66.0	78 22.8	0.660	66.0	77 33.7	0.514	39.7	1
2	74 20.1	0.625	101.1	74 39.1	0.625	99.6	75 32.4	0.737	94.9	75 48.8	0.718	93.2	76 04.5	0.699	91.5	77 59.4	0.660	66.0	77 40.8	0.660	66.0	77 18.7	0.495	40.1	2
3	73 57.1	0.616	99.9	74 16.0	0.616	98.5	75 09.0	0.737	93.9	75 25.4	0.718	92.3	75 41.0	0.699	90.5	77 38.1	0.660	65.7	77 01.8	0.660	65.7	77 03.5	0.476	40.5	3
4	73 34.0	0.607	98.8	73 52.7	0.607	97.4	74 45.6	0.737	92.9	75 01.9	0.718	91.3	75 17.6	0.699	89.6	77 16.7	0.660	65.5	77 19.9	0.660	65.5	76 48.2	0.457	40.9	4
35	73 10.8	0.598	97.6	73 29.5	0.598	96.3	74 22.2	0.737	91.9	74 38.5	0.718	90.3	74 54.1	0.699	88.7	76 55.4	0.660	65.3	76 50.0	0.660	65.3	76 32.8	0.438	41.2	35
6	72 47.5	0.589	96.7	73 06.1	0.589	95.3	73 58.7	0.737	91.0	74 15.1	0.718	89.4	74 30.7	0.699	87.8	76 34.1	0.660	65.1	76 38.1	0.660	65.1	76 17.3	0.419	41.5	6
7	72 24.2	0.580	95.5	72 42.8	0.580	94.2	73 35.3	0.737	90.0	73 51.6	0.718	88.5	74 07.3	0.699	87.0	76 12.9	0.660	64.8	76 17.2	0.660	64.8	76 01.8	0.400	41.8	7
8	72 00.8	0.571	94.5	72 19.4	0.571	93.2	73 11.9	0.737	89.1	73 28.2	0.718	87.7	73 43.9	0.699	86.1	75 51.7	0.660	64.6	75 56.4	0.660	64.6	75 46.1	0.381	42.0	8
9	71 37.4	0.562	93.5	71 56.0	0.562	92.3	72 48.4	0.737	88.2	73 04.8	0.718	86.8	73 20.5	0.699	85.3	75 30.5	0.660	64.3	75 35.6	0.660	64.3	75 30.4	0.362	42.2	9
40	71 14.0	0.553	92.5	71																					

DECLINATION SAME NAME AS LATITUDE

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 60° 00' to 69° 00'.

Lat. 67°

Lat. 68°

Lat. 69°

# STAR IDENTIFICATION TABLE

208

ALTITUDE

Lat.  
67°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.																					
00	27	180	31	180	35	180	39	180	43	180	47	180	51	180	55	180	59	180	63	180	67	180	00
4	27	176	31	175	35	175	39	175	43	175	47	175	51	174	55	174	59	174	63	173	67	173	4
8	27	171	31	171	35	170	39	170	43	170	47	169	51	169	55	168	59	167	63	167	67	165	8
12	26	167	30	166	34	166	38	165	42	165	46	164	50	163	54	162	58	161	62	160	66	158	12
16	26	162	30	162	34	161	38	160	42	160	46	159	50	158	54	157	58	155	62	154	65	151	16
20	25	158	29	157	33	156	37	156	41	155	45	154	49	153	53	151	57	150	61	148	65	145	20
24	25	153	29	153	33	152	37	151	41	150	44	149	48	147	52	146	56	144	60	142	64	139	24
28	24	149	28	148	32	147	36	146	40	145	44	144	47	142	51	140	55	138	59	136	63	133	28
32	23	145	27	144	31	143	35	142	39	140	43	139	46	137	50	135	54	133	58	131	61	127	32
36	22	141	26	140	30	138	34	137	38	136	42	134	45	132	49	130	53	128	56	125	60	122	36
40	21	137	25	135	29	134	33	133	37	131	40	130	44	128	48	126	52	123	55	120	59	117	40
44	20	132	24	131	28	130	32	128	35	127	39	125	43	123	47	121	50	119	54	116	57	112	44
48	19	128	23	127	27	126	30	124	34	123	38	121	42	119	45	117	49	114	52	111	56	108	48
52	18	124	21	123	25	122	29	120	33	118	36	116	40	114	44	112	47	110	51	107	54	104	52
56	16	120	20	119	24	118	28	116	31	114	35	112	39	110	42	108	46	106	49	103	53	99	56
60	15	117	19	115	22	114	26	112	30	110	34	108	37	106	41	104	44	102	48	99	51	95	60
64	14	113	17	111	21	110	25	108	28	106	32	104	36	102	39	100	43	98	46	95	50	92	64
68	12	109	16	107	20	106	23	104	27	102	31	100	34	98	38	96	41	94	45	91	48	88	68
72	11	105	14	104	18	102	22	100	25	99	29	97	33	95	36	92	40	90	43	87	47	84	72
76	09	101	13	100	16	98	20	97	24	95	27	93	31	91	35	89	38	86	42	84	45	81	76
80	08	98	11	96	15	94	19	93	22	91	26	89	29	87	33	85	37	83	40	80	43	78	80
84	06	94	10	92	13	91	17	89	21	87	24	86	28	84	31	82	35	79	39	77	42	74	84
88	04	90	08	89	12	87	15	85	19	84	23	82	26	80	30	78	34	76	37	74	40	71	88
92	03	87	07	85	10	83	14	82	18	80	21	78	25	77	28	75	32	72	36	70	39	68	92
96	01	83	05	81	09	80	12	78	16	77	20	75	23	73	27	71	31	69	34	67	38	65	96
100	00	79	03	78	07	76	11	75	15	73	18	71	22	70	25	68	29	66	33	64	36	61	100
104	02	76	02	74	06	73	09	71	13	69	17	68	20	66	24	64	28	62	31	60	35	58	104
108	03	72	00	70	04	69	08	67	12	66	15	64	19	63	23	61	26	59	30	57	34	55	108
112	05	68	01	67	03	65	06	64	10	62	14	61	18	59	21	58	25	56	29	54	32	52	112
116	06	64	02	63	01	62	05	60	09	59	13	57	16	56	20	54	24	53	27	51	31	49	116
120	08	61	04	59	00	58	04	57	08	55	11	54	15	52	19	51	23	49	26	48	30	46	120
124	09	57	05	56	01	54	02	53	06	52	10	50	14	49	18	48	21	46	25	45	29	43	124
128	10	53	06	52	03	50	01	49	05	48	09	47	13	45	16	44	20	43	24	41	28	40	128
132	11	49	08	48	04	47	00	46	05	44	08	43	12	42	15	41	19	40	23	38	27	37	132
136	12	45	09	44	05	43	01	42	03	41	07	40	11	39	14	37	18	36	22	35	26	34	136
140	14	41	10	40	06	39	02	38	02	37	06	36	10	35	14	34	17	33	21	32	25	31	140
144	15	37	11	36	07	35	03	34	01	34	05	33	09	32	13	31	17	30	20	29	24	28	144
148	15	33	12	32	08	32	04	31	00	30	04	29	08	28	12	27	16	26	20	26	24	25	148
152	16	29	12	28	08	28	04	27	01	26	03	25	07	25	11	24	15	23	19	22	23	22	152
156	17	25	13	24	09	24	05	23	01	22	03	22	07	21	11	21	15	20	19	19	22	18	156
160	18	21	14	20	10	20	06	19	02	19	02	18	06	18	10	17	14	17	18	16	22	15	160
164	18	17	14	16	10	16	06	15	02	15	02	15	06	14	10	14	14	13	18	13	22	12	164
168	18	13	14	12	11	12	07	12	03	11	01	11	05	11	09	10	13	10	17	10	21	09	168
172	19	08	15	08	11	08	07	08	03	08	01	07	05	07	09	07	13	07	17	06	21	06	172
176	19	04	15	04	11	04	07	04	03	04	01	04	05	04	09	03	13	03	17	03	21	03	176
180	19	00	15	00	11	00	07	00	03	00	01	00	05	00	09	00	13	00	17	00	21	00	180

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

# STAR IDENTIFICATION TABLE

## ALTITUDE

209

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.	Lat. 67°
	Dec.	H.A.																						
00	71	180	75	180	79	180	83	180	87	180	89	00	85	00	81	00	77	00	73	00	69	00	00	
4	71	172	75	171	79	168	83	164	87	149	88	55	85	14	81	06	77	03	73	01	69	00	4	
8	71	164	74	161	78	157	82	149	86	128	87	68	84	26	81	12	77	06	73	03	69	01	8	
12	70	156	74	153	78	147	81	137	84	116	85	72	83	35	80	17	77	09	73	04	69	01	12	
16	69	149	73	144	77	138	80	127	83	107	84	73	83	41	80	22	76	12	73	06	69	02	16	
20	68	142	72	137	76	130	79	119	81	101	82	73	81	45	79	26	76	14	73	07	69	02	20	
24	67	135	71	130	74	123	77	112	80	96	81	73	80	48	78	29	76	16	72	08	69	02	24	
28	66	129	70	124	73	116	76	106	78	91	79	72	79	50	78	32	75	18	72	09	69	03	28	
32	65	123	68	118	72	111	74	101	77	88	78	71	78	51	77	34	75	20	72	10	69	03	32	
36	64	118	67	113	70	106	73	97	75	85	76	69	77	52	76	36	74	22	72	11	69	03	36	
40	62	113	65	108	69	101	71	93	73	82	75	68	75	52	75	37	73	23	71	12	68	04	40	
44	61	108	64	103	67	97	70	89	72	79	73	66	74	52	74	38	73	24	71	13	68	04	44	
48	59	104	62	99	65	93	68	85	70	76	72	65	73	52	73	38	72	25	71	13	68	04	48	
52	58	100	61	95	64	89	67	82	69	73	71	63	72	51	72	38	71	26	70	14	68	04	52	
56	56	96	59	91	62	86	65	79	67	71	69	61	71	50	71	38	71	26	70	15	68	04	56	
60	55	92	58	87	61	82	63	76	66	69	68	60	69	49	70	38	70	26	69	15	68	05	60	
64	53	88	56	84	59	79	62	73	64	66	67	58	68	48	69	38	69	26	69	15	68	05	64	
68	51	85	55	80	58	76	61	70	63	64	65	56	67	47	68	37	69	26	69	15	68	05	68	
72	50	81	53	77	56	73	59	68	62	61	64	54	66	46	67	37	68	26	68	15	68	05	72	
76	48	78	52	74	55	70	58	65	60	59	63	53	65	45	66	36	67	26	68	16	67	05	76	
80	47	74	50	71	53	67	56	62	59	57	62	51	64	43	65	35	67	26	67	15	67	05	80	
84	45	71	49	68	52	64	55	60	58	55	60	49	63	42	65	34	66	25	67	15	67	05	84	
88	44	68	47	65	50	61	54	57	56	52	59	47	62	40	64	33	65	25	66	15	67	05	88	
92	42	65	46	62	49	59	52	55	55	50	58	45	61	39	63	32	65	24	66	15	67	05	92	
96	41	62	44	59	48	56	51	52	54	48	57	43	60	37	62	31	64	23	66	15	67	05	96	
100	40	59	43	56	46	53	50	50	53	46	56	41	59	36	61	30	63	23	65	14	67	05	100	
104	38	56	42	53	45	50	49	47	52	43	55	39	58	34	60	28	63	22	65	14	66	05	104	
108	37	53	41	50	44	48	47	45	51	41	54	37	57	33	60	27	62	21	65	13	66	05	108	
112	36	50	39	48	43	45	46	42	50	39	53	35	56	31	59	26	62	20	64	13	66	05	112	
116	35	47	38	45	42	42	45	40	49	37	52	33	55	29	58	25	61	19	64	12	66	04	116	
120	34	44	37	42	41	40	44	37	48	34	51	31	55	28	58	23	61	18	64	12	66	04	120	
124	33	41	36	39	40	37	43	35	47	32	51	29	54	26	57	22	60	17	63	11	66	04	124	
128	32	38	35	36	39	35	43	32	46	30	50	27	53	24	57	20	60	16	63	10	66	04	128	
132	31	35	34	34	38	32	42	30	45	28	49	25	53	22	56	19	59	15	63	10	66	04	132	
136	30	32	34	31	37	29	41	27	45	25	48	23	52	20	56	17	59	14	62	09	66	03	136	
140	29	29	33	28	37	27	40	25	44	23	48	21	52	19	55	16	59	12	62	08	65	03	140	
144	28	27	32	25	36	24	40	22	44	21	47	19	51	17	55	14	58	11	62	08	65	03	144	
148	28	24	31	22	35	21	39	20	43	19	47	17	51	15	54	13	58	10	62	07	65	03	148	
152	27	21	31	20	35	19	39	17	43	16	46	15	50	13	54	11	58	09	62	06	65	02	152	
156	26	18	30	17	34	16	38	15	42	14	46	13	50	11	54	10	58	08	61	05	65	02	156	
160	26	15	30	14	34	13	38	13	42	12	46	11	50	09	54	08	57	06	61	04	65	02	160	
164	26	12	30	11	34	11	38	10	42	09	45	08	49	08	53	06	57	05	61	03	65	01	164	
168	25	09	29	08	33	08	37	08	41	07	45	06	49	06	53	05	57	04	61	03	65	01	168	
172	25	06	29	06	33	05	37	05	41	05	45	04	49	04	53	03	57	03	61	02	65	01	172	
176	25	03	29	03	33	03	37	03	41	02	45	02	49	02	53	02	57	01	61	01	65	00	176	
180	25	00	29	00	33	00	37	00	41	00	45	00	49	00	53	00	57	00	61	00	65	00	180	

Lat.  
67°

Lat.  
68°

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

16-16320

Lat.  
69°

Lat. 68°

H.A.	0° 00'			0° 30'			1° 00'			1° 30'			2° 00'			2° 30'			3° 00'			3° 30'			H.
	Alt.	Ad At	Az.																						
00	22 00.0	1.000	180.0	22 30.0	1.000	180.0	23 00.0	1.000	180.0	23 30.0	1.000	180.0	24 00.0	1.000	180.0	24 30.0	1.000	180.0	25 00.0	1.000	180.0	25 30.0	1.000	180.0	00
1	21 59.1	1.001	178.9	22 29.1	1.001	178.9	22 59.1	1.001	178.9	23 29.1	1.001	178.9	23 59.1	1.001	178.9	24 29.1	1.001	178.9	24 59.1	1.001	178.9	25 29.1	1.001	178.9	1
2	21 58.2	1.002	177.8	22 28.2	1.002	177.8	22 58.2	1.002	177.8	23 28.2	1.002	177.8	23 58.2	1.002	177.8	24 28.2	1.002	177.8	24 58.2	1.002	177.8	25 28.2	1.002	177.8	2
3	21 57.3	1.003	176.8	22 27.3	1.003	176.8	22 57.3	1.003	176.8	23 27.3	1.003	176.8	23 57.3	1.003	176.8	24 27.3	1.003	176.8	24 57.3	1.003	176.8	25 27.3	1.003	176.8	3
4	21 56.4	1.004	175.7	22 26.4	1.004	175.7	22 56.4	1.004	175.7	23 26.4	1.004	175.7	23 56.4	1.004	175.7	24 26.4	1.004	175.7	24 56.4	1.004	175.7	25 26.4	1.004	175.7	4
5	21 54.7	1.004	174.6	22 24.7	1.004	174.6	22 54.7	1.004	174.6	23 24.7	1.004	174.6	23 54.7	1.004	174.6	24 24.7	1.004	174.6	24 54.7	1.004	174.6	25 24.7	1.004	174.6	5
6	21 52.4	1.006	173.5	22 22.4	1.006	173.5	22 52.3	1.006	173.5	23 22.3	1.006	173.5	23 52.3	1.006	173.5	24 22.3	1.006	173.5	24 52.3	1.006	173.5	25 22.3	1.006	173.5	6
7	21 49.7	1.006	172.5	22 19.6	1.006	172.4	22 49.6	1.006	172.4	23 19.5	1.006	172.4	23 49.5	1.006	172.4	24 19.5	1.006	172.4	24 49.4	1.006	172.3	25 19.4	1.006	172.3	7
8	21 46.5	1.006	171.4	22 16.4	1.006	171.4	22 46.4	1.006	171.3	23 16.3	1.006	171.3	23 46.3	1.006	171.3	24 16.3	1.006	171.2	24 46.2	1.006	171.2	25 16.2	1.006	171.2	8
9	21 42.9	1.007	170.3	22 12.9	1.007	170.3	22 42.8	1.007	170.2	23 12.7	1.007	170.2	23 42.7	1.007	170.2	24 12.6	1.007	170.1	24 42.6	1.007	170.1	25 12.5	1.007	170.1	9
10	21 38.9	1.007	169.2	22 08.9	1.007	169.2	22 38.8	1.007	169.2	23 08.7	1.007	169.1	23 38.6	1.007	169.1	24 08.6	1.007	169.0	24 38.5	1.007	169.0	25 08.4	1.007	169.0	10
1	21 34.5	1.008	168.2	22 04.4	1.008	168.1	22 34.3	1.008	168.1	23 04.3	1.008	168.0	23 34.2	1.008	168.0	24 04.1	1.008	167.9	24 34.0	1.008	167.9	25 03.9	1.008	167.9	1
2	21 29.7	1.009	167.1	21 59.6	1.009	167.0	22 29.5	1.009	167.0	23 09.4	1.009	167.0	23 39.3	1.009	166.9	24 09.2	1.009	166.9	24 39.1	1.009	166.8	25 08.9	1.009	166.8	2
3	21 24.5	1.009	166.0	21 54.4	1.009	166.0	22 24.2	1.009	165.9	23 04.1	1.009	165.9	23 34.0	1.010	165.8	24 03.8	1.010	165.8	24 33.7	1.010	165.7	25 03.6	1.010	165.7	3
4	21 18.8	1.010	164.9	21 48.7	1.010	164.8	22 18.6	1.010	164.8	22 48.4	1.010	164.8	23 18.3	1.010	164.7	23 48.1	1.010	164.7	24 18.0	1.010	164.6	25 18.0	1.010	164.6	4
15	21 12.8	09 11	163.9	21 42.6	09 11	163.8	22 12.5	09 11	163.8	22 42.3	09 11	163.7	23 12.1	09 11	163.7	23 42.0	09 11	163.6	24 11.8	09 11	163.5	25 11.6	09 11	163.5	15
6	21 06.4	09 11	162.8	21 36.2	09 11	162.8	22 06.0	09 11	162.7	22 35.8	09 11	162.6	23 05.6	09 11	162.6	23 35.4	09 11	162.5	24 05.2	09 11	162.5	25 05.0	09 11	162.4	6
7	20 59.5	09 12	161.8	21 29.3	09 12	161.7	21 59.1	09 12	161.6	22 28.9	09 12	161.6	22 58.7	09 12	161.5	23 28.5	09 12	161.4	23 58.3	09 12	161.4	24 28.0	09 12	161.3	7
8	20 52.5	09 13	160.7	21 22.1	09 13	160.6	21 51.8	09 13	160.6	22 21.6	09 13	160.5	22 51.3	09 13	160.4	23 21.1	09 13	160.4	23 50.9	09 13	160.3	24 20.6	09 13	160.2	8
9	20 44.7	09 13	159.6	21 14.4	09 13	159.6	21 44.1	09 13	159.5	22 13.9	09 14	159.4	22 43.6	09 14	159.3	23 13.4	09 14	159.3	23 43.1	09 14	159.2	24 12.8	09 14	159.1	9
20	20 36.6	09 14	158.6	21 06.4	09 14	158.5	21 36.1	09 14	158.4	22 05.8	09 14	158.3	22 35.5	09 14	158.3	23 05.2	09 14	158.2	23 34.9	09 14	158.1	24 04.6	09 14	158.0	20
1	20 28.2	09 15	157.5	20 57.9	09 15	157.4	21 27.6	09 15	157.4	21 57.3	09 15	157.3	22 27.0	09 15	157.2	22 56.7	09 15	157.1	23 26.3	09 15	157.0	24 03.3	09 15	157.0	1
2	20 19.4	09 15	156.5	20 49.1	09 15	156.4	21 18.8	09 15	156.3	21 48.4	09 15	156.2	22 17.8	09 15	156.1	22 47.7	09 15	156.0	23 17.4	09 15	156.0	24 01.9	09 15	155.9	2
3	20 10.3	09 16	155.4	20 39.9	09 16	155.3	21 09.5	09 16	155.2	21 39.2	09 16	155.1	22 08.8	09 16	155.1	22 38.4	09 16	155.0	23 08.0	09 16	154.9	23 37.6	09 16	154.8	3
4	20 00.7	09 17	154.4	20 30.3	09 17	154.3	20 59.9	09 17	154.2	21 29.5	09 17	154.1	21 59.1	09 17	154.0	22 28.7	09 17	153.9	22 58.3	09 17	153.8	23 27.9	09 17	153.7	4
25	19 50.8	09 17	153.3	20 20.4	09 17	153.2	20 50.0	09 17	153.1	21 19.5	09 17	153.0	21 49.1	09 17	152.9	22 18.6	09 17	152.8	22 48.2	09 17	152.8	23 17.8	09 17	152.7	25
6	19 40.5	09 18	152.3	20 10.1	09 18	152.2	20 39.6	09 18	152.1	21 09.1	09 18	152.0	21 38.7	09 18	151.9	22 08.2	09 18	151.8	22 37.7	09 18	151.7	23 07.2	09 18	151.6	6
7	19 29.9	09 18	151.2	19 59.4	09 18	151.1	20 28.9	09 18	151.0	20 58.4	09 18	150.9	21 27.9	09 18	150.8	21 57.4	09 18	150.7	22 26.9	09 18	150.6	22 56.4	09 18	150.5	7
8	19 18.9	09 19	150.2	19 48.4	09 19	150.1	20 17.8	09 19	150.0	20 47.3	09 19	149.9	21 16.8	09 19	149.8	21 46.2	09 19	149.7	22 15.7	09 19	149.6	22 45.1	09 19	149.5	8
9	19 07.5	09 20	149.1	19 37.0	09 20	148.9	20 06.4	09 20	148.8	20 35.8	09 20	148.7	21 05.3	09 20	148.7	21 34.7	09 20	148.6	22 04.1	09 20	148.5	22 33.5	09 20	148.4	9
30	18 55.8	09 20	148.1	19 25.2	09 20	148.0	19 54.6	09 20	147.9	20 24.0	09 20	147.8	20 53.4	09 20	147.7	21 22.8	09 20	147.6	21 52.2	09 20	147.5	22 21.6	09 20	147.3	30
1	18 43.8	09 21	147.1	19 13.1	09 21	146.9	19 42.5	09 21	146.8	20 11.9	09 21	146.7	20 41.2	09 21	146.6	21 10.6	09 21	146.5	21 39.9	09 21	146.4	22 09.3	09 21	146.3	1
2	18 31.4	09 21	146.0	19 00.7	09 21	145.9	19 30.0	09 21	145.8	19 59.4	09 21	145.7	20 28.7	09 21	145.6	20 58.0	09 21	145.5	21 27.3	09 21	145.3	21 56.6	09 21	145.2	2
3	18 18.6	09 22	145.0	18 47.9	09 22	144.9	19 17.2	09 22	144.8	19 46.5	09 22	144.6	20 15.8	09 22	144.5	20 45.1	09 22	144.4	21 14.4	09 22	144.3	21 43.6	09 22	144.2	3
4	18 05.6	09 22	144.0	18 34.8	09 22	143.8	19 04.1	09 22	143.7	19 33.4	09 22	143.6	20 02.6	09 22	143.5	20 31.8	09 22	143.4	21 01.1	09 22	143.3	21 30.3	09 22	143.1	4
35	17 52.2	09 23	142.9	18 21.4	09 23	142.8	18 50.6	09 23	142.7	19 19.9	09 23	142.6	19 49.1	09 23	142.5	20 18.3	09 23	142.3	20 47.5	09 23	142.2	21 16.7	09 23	142.1	35
6	17 38.5	09 23	141.9	18 07.7	09 23	141.8	18 36.9	09 23	141.7	19 06.0	09 23	141.6	19 35.2	09 23	141.4	20 04.4	09 23	141.3	20 33.5	09 23	141.2	21 02.7	09 23	141.1	6
7	17 24.5	09 24	140.9	17 53.6	09 24	140.8	18 22.8	09 24	140.6	18 51.9	09 24	140.5	19 21.0	09 24	140.4	19 50.2	09 24	140.3	20 19.3	09 24	140.1	20 48.4	09 24	140.0	7
8	17 10.7	09 24	139.9	17 39.3	09 24	139.8	18 08.4	09 24	139.6	18 37.5	09 24	139.5	19 06.6	09 24	139.4	19 35.7	09 24	139.2	20 04.7	09 24	139.1	20 33.8	09 24	139.0	8
9	16 55.5	09 25	138.9	17 24.6	09 25	138.7	17 53.7	09 25	138.6	18 22.7	09 25	138.5													

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Ait.	Az.	Ait.	Az.													
00	22 00.0	1.000 180.0	21 30.0	1.000 180.0	21 00.0	1.000 180.0	20 30.0	1.000 180.0	20 00.0	1.000 180.0	19 30.0	1.000 180.0	19 00.0	1.000 180.0	18 30.0	1.000 180.0	00
1	21 59.8	1.001 178.9	21 29.8	1.001 178.9	20 59.8	1.001 178.9	20 29.8	1.001 178.9	19 59.8	1.001 178.9	19 29.8	1.001 178.9	18 59.8	1.001 178.9	18 29.8	1.001 178.9	1
2	21 59.2	1.002 177.8	21 29.2	1.002 177.9	20 59.2	1.002 177.9	20 29.2	1.002 177.9	19 59.2	1.002 177.9	19 29.2	1.002 177.9	18 59.2	1.002 177.9	18 29.2	1.002 177.9	2
3	21 58.1	1.003 176.8	21 28.1	1.003 176.8	20 58.1	1.003 176.8	20 28.1	1.003 176.8	19 58.1	1.003 176.8	19 28.1	1.003 176.8	18 58.1	1.003 176.8	18 28.1	1.003 176.8	3
4	21 56.6	1.003 175.7	21 26.6	1.003 175.7	20 56.6	1.003 175.7	20 26.6	1.003 175.7	19 56.7	1.003 175.7	19 26.7	1.003 175.8	18 56.7	1.003 175.8	18 26.7	1.003 175.8	4
05	21 54.7	1.004 174.6	21 24.7	1.004 174.6	20 54.8	1.004 174.6	20 24.8	1.004 174.7	19 54.8	1.004 174.7	19 24.8	1.004 174.7	18 54.8	1.004 174.7	18 24.8	1.004 174.7	05
6	21 52.4	1.005 173.5	21 22.4	1.005 173.6	20 52.4	1.005 173.6	20 22.5	1.004 173.6	19 52.5	1.004 173.6	19 22.5	1.004 173.6	18 52.6	1.004 173.7	18 22.6	1.004 173.7	6
7	21 49.7	1.006 172.5	21 19.7	1.006 172.5	20 49.7	1.006 172.5	20 19.8	1.006 172.5	19 49.8	1.006 172.6	19 19.8	1.006 172.6	18 49.9	1.006 172.6	18 19.9	1.006 172.6	7
8	21 46.5	1.006 171.4	21 16.5	1.006 171.4	20 46.6	1.006 171.4	20 16.6	1.006 171.5	19 46.7	1.006 171.5	19 16.7	1.006 171.5	18 46.8	1.006 171.6	18 16.8	1.006 171.6	8
9	21 42.9	1.007 170.3	21 13.0	1.007 170.3	20 43.0	1.007 170.4	20 13.1	1.007 170.4	19 43.2	1.007 170.4	19 13.2	1.007 170.5	18 43.3	1.007 170.5	18 13.3	1.007 170.5	9
10	21 38.9	1.007 169.2	21 09.0	1.007 169.3	20 39.1	1.007 169.3	20 09.1	1.007 169.3	19 39.2	1.007 169.4	19 09.3	1.007 169.4	18 39.4	1.007 169.5	18 09.4	1.007 169.5	10
1	21 34.5	1.008 168.2	21 04.6	1.008 168.2	20 34.7	1.008 168.2	20 04.8	1.008 168.3	19 34.9	1.008 168.3	19 05.0	1.008 168.4	18 35.0	1.008 168.4	18 05.1	1.008 168.4	1
2	21 29.7	1.009 167.1	20 59.8	1.009 167.1	20 29.9	1.009 167.2	20 00.0	1.009 167.2	19 30.1	1.009 167.3	19 00.2	1.009 167.3	18 30.3	1.009 167.4	18 00.4	1.009 167.4	2
3	21 24.5	1.009 166.0	20 54.6	1.009 166.1	20 24.7	1.009 166.1	19 54.8	1.009 166.2	19 25.0	1.009 166.2	18 55.1	1.009 166.3	18 25.2	1.009 166.3	17 55.3	1.009 166.3	3
4	21 18.8	1.010 164.9	20 49.1	1.010 165.0	20 19.1	1.010 165.1	19 49.3	1.010 165.2	19 19.4	1.010 165.2	18 49.5	1.010 165.2	18 19.7	1.010 165.3	17 49.8	1.010 165.3	4
15	21 12.8	99 11 163.9	20 43.0	99 11 163.9	20 13.1	99 11 164.0	19 43.3	99 11 164.0	19 13.4	99 11 164.1	18 43.6	99 11 164.2	18 13.8	99 11 164.2	17 43.9	99 11 164.3	15
6	21 06.4	99 11 162.8	20 36.5	99 11 162.9	20 06.7	99 11 162.9	19 36.9	99 11 163.0	19 07.1	99 11 163.0	18 37.3	99 11 163.1	18 07.4	99 11 163.2	17 37.6	99 11 163.2	6
7	20 59.5	99 12 161.8	20 29.7	99 12 161.8	19 59.9	99 12 161.9	19 30.1	99 12 161.9	19 00.3	99 12 162.0	18 30.5	99 12 162.1	18 00.7	99 12 162.1	17 30.9	99 12 162.2	7
8	20 52.3	99 13 160.7	20 22.5	99 13 160.8	19 52.7	99 13 160.8	19 23.0	99 13 160.9	18 53.2	99 13 160.9	18 23.4	99 13 161.0	17 53.6	99 13 161.1	17 23.9	99 13 161.1	8
9	20 44.7	99 13 159.6	20 14.9	99 13 159.7	19 45.2	99 13 159.8	19 15.4	99 13 159.8	18 45.7	99 13 159.9	18 15.9	99 13 160.0	17 46.2	99 13 160.0	17 16.4	99 13 160.1	9
20	20 36.6	99 14 158.6	20 06.9	99 14 158.6	19 37.2	99 14 158.7	19 07.5	99 14 158.8	18 37.8	99 14 158.9	18 08.0	99 14 159.0	17 38.3	99 14 159.0	17 08.6	99 14 159.1	20
1	20 28.2	99 15 157.5	19 58.5	99 15 157.6	19 28.8	99 15 157.7	18 59.2	99 15 157.7	18 29.5	99 15 157.8	17 59.8	99 15 157.9	17 30.1	99 15 158.0	17 00.4	99 15 158.0	1
2	20 19.4	99 15 156.5	19 49.8	99 15 156.5	19 20.1	99 15 156.6	18 50.4	99 15 156.6	18 20.8	99 15 156.8	17 51.1	99 15 156.8	17 21.4	99 15 156.9	16 51.8	99 15 157.0	2
3	20 10.3	99 16 155.4	19 40.6	99 16 155.5	19 11.0	99 16 155.6	18 41.4	99 16 155.6	18 11.7	99 16 155.7	17 42.1	99 16 155.8	17 12.4	99 16 155.9	16 42.8	99 16 156.0	3
4	20 00.7	99 17 154.4	19 31.1	99 16 154.4	19 01.5	99 16 154.5	18 31.9	99 16 154.6	18 02.3	99 16 154.7	17 32.7	99 16 154.8	17 03.1	99 16 154.9	16 33.5	99 16 154.9	4
25	19 50.8	99 17 153.3	19 21.2	99 17 153.4	18 51.7	99 17 153.5	18 22.1	99 17 153.6	17 52.5	99 17 153.7	17 22.9	99 17 153.7	16 53.3	99 17 153.8	16 23.8	99 17 153.9	25
6	19 40.5	98 18 152.3	19 11.0	98 18 152.3	18 41.4	98 18 152.4	18 11.9	98 18 152.5	17 42.4	98 18 152.6	17 12.8	98 18 152.7	16 43.2	98 18 152.8	16 13.7	98 18 152.9	6
7	19 29.9	98 18 151.2	19 00.4	98 18 151.3	18 30.9	98 18 151.4	18 01.9	98 18 151.5	17 31.8	98 18 151.6	17 02.3	98 18 151.7	16 32.8	98 18 151.8	16 03.3	98 18 151.9	7
8	19 18.9	98 19 150.2	18 49.4	98 19 150.3	18 19.9	98 19 150.4	17 50.5	98 19 150.5	17 21.0	98 19 150.6	16 51.5	98 19 150.7	16 22.0	98 19 150.7	15 52.5	98 19 150.8	8
9	19 07.5	98 20 149.1	18 38.1	98 19 149.2	18 08.6	98 19 149.3	17 39.2	98 19 149.4	17 09.7	98 19 149.5	16 40.3	98 19 149.6	16 10.8	98 19 149.7	15 41.4	98 19 149.8	9
30	18 55.8	98 20 148.1	18 26.4	98 20 148.2	17 57.0	98 20 148.3	17 27.6	98 20 148.4	16 58.2	98 20 148.5	16 28.8	98 20 148.6	15 59.3	98 20 148.7	15 29.8	98 20 148.8	30
1	18 43.8	98 21 147.1	18 14.4	98 21 147.2	17 45.0	98 21 147.3	17 15.6	98 21 147.4	16 46.3	98 20 147.5	16 16.9	98 20 147.6	15 47.5	98 20 147.7	15 18.1	98 20 147.8	1
2	18 31.4	98 21 146.0	18 02.0	98 21 146.1	17 32.7	98 21 146.2	17 03.4	98 21 146.4	16 34.0	98 21 146.5	16 04.7	98 21 146.6	15 35.3	98 21 146.7	15 08.9	98 21 146.8	2
3	18 18.6	98 22 145.0	17 49.3	98 22 145.1	17 20.0	98 22 145.2	16 50.7	98 22 145.3	16 21.4	98 22 145.4	15 52.1	98 21 145.6	15 22.8	98 21 145.7	14 53.5	98 21 145.8	3
4	18 05.6	98 22 144.0	17 36.3	98 22 144.1	17 07.1	98 22 144.2	16 37.8	98 22 144.3	16 08.5	98 22 144.4	15 39.2	98 22 144.5	15 09.9	98 22 144.6	14 40.7	98 22 144.8	4
35	17 52.2	97 23 142.9	17 23.0	97 23 143.1	16 53.7	97 23 143.2	16 24.5	97 23 143.3	15 55.3	97 23 143.4	15 26.0	97 23 143.5	14 56.8	97 23 143.6	14 27.5	97 23 143.8	35
6	17 38.5	97 23 141.9	17 09.3	97 23 142.0	16 40.1	97 23 142.2	16 10.9	97 23 142.3	15 41.7	97 23 142.4	15 12.5	97 23 142.5	14 43.3	97 23 142.6	14 14.1	97 23 142.8	6
7	17 24.5	97 24 140.9	16 55.3	97 24 141.0	16 26.2	97 24 141.1	15 57.0	97 24 141.3	15 27.8	97 24 141.4	14 58.7	97 24 141.5	14 29.5	97 24 141.6	14 00.3	97 23 141.8	7
8	17 10.2	97 24 139.9	16 41.0	97 24 140.0	16 11.9	97 24 140.1	15 42.8	97 24 140.3	15 13.7	97 24 140.4	14 44.5	97 24 140.5	14 15.4	97 24 140.6	13 46.3	97 24 140.8	8
9	16 55.5	97 25 138.9	16 26.4	97 25 139.0	15 57.4	97 25 139.1	15 28.3	97 25 139.3	14 59.2	97 25 139.4	14 30.1	97 25 139.5	14 01.0	97 24 139.6	13 31.9	97 24 139.8	9
40	16 40.6	97 25 137.9	16 11.5	97 25 138.0	15 42.5	97 25 138.1	15 13.5	97 25 138.2	14 44.4	97 25 138.4	14 15.3	97 25 138.5	13 46.3	97 25 138.6	13 17.2	97 25 138.8	40
1	16 25.4	97 26 136.8	15 56.4	97 26 137.0	15 27.3	97 26 137.1	14 58.3	97 26 137.2	14 29.3	97 26 137.4	14 00.3	97 26 137.5	13 31.3	97 26 137.6	13 02.2	97 26 137.8	1
2	16 09.8	97 26 135.8	15 40.9	97 26 136.0	15 11.9	97 26 136.1	14 42.9	97 26 136.2	14 14.0	97 26 136.4	13 45.0	97 26 136.5	13 16.0	97 26 136.6	12 47.0	97 26 136.8	2
3	15 54.0	97 27 134.8	15 25.1	97 27 135.0	14 56.2	97 27 135.1	14 27.2	97 27 135.2	13 58.3	97 27 135.4	13 29.4	97 27 135.5	13 00.4	97 27 135.7	12 31.5	97 27 135.8	3
4	15 38.0	97 27 133.8	15 09.1	97 27 134.0	14 40.2	97 27 134.1	14 11.3	97 27 134.3	13 42.4	97 27 134.4	13 13.5	97 27 134.5	12 44.6	97 27 134.7	12 15.7	97 27 134.8	4
45	15 21.6	96 28 132.8	14 52.8	96 28 133.0	14 23.9	96 28 133.1	13 55.1	96 28 133.3	13 26.2	96 27 133.4	12 57.3	96 27 133.5	12 28.4	96 27 133.7	11 59.6</		

Lat. 68°

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.
	Alt.	Az.															
00	26 00.0	180.0	26 30.0	180.0	27 00.0	180.0	27 30.0	180.0	28 00.0	180.0	28 30.0	180.0	29 00.0	180.0	29 30.0	180.0	00
1	25 59.8	178.9	26 29.8	178.9	26 59.8	178.9	27 29.8	178.9	27 59.8	178.9	28 29.8	178.9	28 59.8	178.9	29 29.8	178.9	1
2	25 59.1	177.8	26 29.1	177.8	26 59.1	177.8	27 29.1	177.8	27 59.1	177.8	28 29.1	177.8	28 59.1	177.8	29 29.1	177.8	2
3	25 58.0	176.7	26 28.0	176.7	26 58.0	176.7	27 28.0	176.7	27 58.0	176.7	28 28.0	176.7	28 58.0	176.7	29 28.0	176.7	3
4	25 56.5	175.6	26 26.5	175.6	26 56.5	175.6	27 26.5	175.6	27 56.5	175.6	28 26.5	175.6	28 56.5	175.6	29 26.5	175.6	4
05	25 54.6	174.5	26 24.5	174.5	26 54.5	174.5	27 24.5	174.5	27 54.5	174.5	28 24.5	174.5	28 54.5	174.5	29 24.5	174.5	05
6	25 52.1	173.3	26 22.1	173.3	26 52.1	173.3	27 22.1	173.3	27 52.1	173.3	28 22.0	173.2	28 52.0	173.2	29 22.0	173.2	6
7	25 49.4	172.2	26 19.3	172.2	26 49.3	172.2	27 19.2	172.2	27 49.2	172.2	28 19.2	172.1	28 49.1	172.1	29 19.1	172.0	7
8	25 46.1	171.1	26 16.1	171.1	26 46.0	171.1	27 16.0	171.0	27 45.9	171.0	28 15.8	170.9	28 45.8	170.9	29 15.7	170.9	8
9	25 42.4	170.0	26 12.4	170.0	26 42.3	170.0	27 12.2	169.9	27 42.2	169.9	28 12.1	169.8	28 42.0	169.8	29 12.0	169.8	9
10	25 38.3	168.9	26 08.2	168.9	26 38.2	168.9	27 08.1	168.8	27 38.0	168.8	28 07.9	168.7	28 37.8	168.7	29 07.8	168.7	10
1	25 33.8	167.8	26 03.7	167.8	26 33.6	167.8	27 03.5	167.7	27 33.4	167.7	28 03.3	167.6	28 33.2	167.6	29 03.1	167.6	1
2	25 28.8	166.7	25 58.7	166.7	26 28.6	166.7	26 58.5	166.6	27 28.4	166.6	27 58.3	166.5	28 28.1	166.5	28 58.0	166.5	2
3	25 23.5	165.6	25 53.3	165.6	26 23.2	165.6	26 53.1	165.5	27 22.9	165.5	27 52.8	165.4	28 22.7	165.4	28 52.5	165.4	3
4	25 17.7	164.5	25 47.5	164.5	26 17.4	164.5	26 47.2	164.4	27 17.1	164.3	27 46.9	164.2	28 16.7	164.2	28 46.6	164.2	4
15	25 11.5	163.4	25 41.3	163.4	26 11.1	163.3	26 40.9	163.2	27 10.8	163.2	27 40.6	163.1	28 10.4	163.1	28 40.2	163.0	15
6	25 04.8	162.3	25 34.6	162.3	26 04.4	162.2	26 34.2	162.1	27 04.0	162.1	27 33.8	162.0	28 03.6	162.0	28 33.4	161.9	6
7	24 57.8	161.2	25 27.6	161.2	25 57.4	161.1	26 27.1	161.0	26 56.9	161.0	27 26.7	160.9	27 56.5	160.9	28 26.2	160.8	7
8	24 50.4	160.1	25 20.1	160.1	25 49.9	160.0	26 19.6	159.9	26 49.4	159.9	27 19.1	159.8	27 48.9	159.8	28 18.6	159.8	8
9	24 42.5	159.1	25 12.3	159.0	25 42.0	158.9	26 11.7	158.8	26 41.4	158.8	27 11.2	158.7	27 40.9	158.7	28 10.6	158.7	9
20	24 34.3	158.0	25 04.0	157.9	25 33.7	157.8	26 03.4	157.7	26 33.1	157.7	27 02.8	157.6	27 32.5	157.5	28 02.2	157.4	20
1	24 25.7	156.9	24 55.4	156.8	25 25.0	156.7	25 54.7	156.6	26 24.4	156.6	26 54.0	156.5	27 23.7	156.4	27 53.3	156.3	1
2	24 16.7	155.8	24 46.3	155.7	25 15.9	155.6	25 45.6	155.5	26 15.2	155.5	26 44.8	155.4	27 14.5	155.3	27 44.1	155.2	2
3	24 07.3	154.7	24 36.9	154.6	25 06.5	154.5	25 36.1	154.4	26 05.7	154.4	26 35.3	154.3	27 04.9	154.2	27 34.5	154.1	3
4	23 57.5	153.6	24 27.0	153.5	24 56.6	153.5	25 26.2	153.4	25 55.8	153.3	26 25.3	153.2	26 54.9	153.1	27 24.4	153.0	4
25	23 47.3	152.6	24 16.8	152.5	24 46.4	152.4	25 15.9	152.3	25 45.6	152.2	26 15.0	152.1	26 44.5	152.0	27 14.0	151.9	25
6	23 36.8	151.5	24 06.3	151.4	24 35.8	151.3	25 05.3	151.2	25 34.8	151.2	26 04.3	151.1	26 33.8	151.0	27 03.3	150.9	6
7	23 25.8	150.4	23 55.3	150.3	24 24.8	150.2	24 54.3	150.1	25 23.7	150.0	25 53.2	149.9	26 22.7	149.8	26 52.1	149.7	7
8	23 14.6	149.4	23 44.0	149.3	24 13.5	149.2	24 42.9	149.1	25 12.3	149.0	25 41.7	148.9	26 11.2	148.8	26 40.6	148.7	8
9	23 02.9	148.3	23 32.3	148.2	24 01.7	148.1	24 31.1	148.0	25 00.5	147.9	25 29.9	147.8	25 59.3	147.7	26 28.7	147.6	9
30	22 50.9	147.2	23 20.3	147.1	23 49.7	147.0	24 19.0	146.9	24 48.4	146.8	25 17.8	146.7	25 47.1	146.6	26 16.4	146.5	30
1	22 38.6	146.2	23 07.9	146.1	23 37.3	146.0	24 06.6	145.9	24 35.9	145.8	25 05.2	145.7	25 34.5	145.6	26 03.8	145.5	1
2	22 25.9	145.1	22 55.2	145.0	23 24.5	144.9	23 53.8	144.8	24 23.1	144.7	24 52.4	144.6	25 21.6	144.5	25 50.9	144.4	2
3	22 12.9	144.1	22 42.2	144.0	23 11.4	143.9	23 40.7	143.8	24 09.9	143.7	24 39.1	143.6	25 08.4	143.5	25 37.6	143.4	3
4	21 59.5	143.0	22 28.8	142.9	22 58.0	142.8	23 27.2	142.7	23 56.4	142.6	24 25.6	142.5	24 54.8	142.4	25 24.0	142.3	4
35	21 45.9	142.0	22 15.0	141.8	22 44.2	141.7	23 13.4	141.6	23 42.6	141.5	24 11.7	141.4	24 40.9	141.3	25 10.0	141.2	35
6	21 31.9	140.9	22 01.0	140.8	22 30.1	140.7	22 59.3	140.6	23 28.4	140.5	23 57.5	140.4	24 26.6	140.3	24 55.7	140.2	6
7	21 17.5	139.9	21 46.6	139.8	22 15.7	139.7	22 44.8	139.6	23 13.9	139.5	23 43.0	139.4	24 12.1	139.3	24 41.1	139.2	7
8	21 02.9	138.8	21 32.0	138.7	22 01.0	138.6	22 30.1	138.5	22 59.1	138.4	23 28.2	138.3	23 57.2	138.2	24 26.2	138.1	8
9	20 47.9	137.8	21 17.0	137.7	21 46.0	137.6	22 15.0	137.5	22 44.0	137.4	23 13.0	137.3	23 42.0	137.2	24 11.0	137.1	9
40	20 32.7	136.8	21 01.7	136.6	21 30.7	136.5	21 59.6	136.4	22 28.6	136.3	22 57.6	136.2	23 26.5	136.1	23 55.5	136.0	40
1	20 17.2	135.8	20 46.1	135.6	21 15.1	135.5	21 44.0	135.4	22 12.9	135.3	22 41.8	135.2	23 10.7	135.1	23 39.7	135.0	1
2	20 01.3	134.7	20 30.2	134.6	20 59.2	134.5	21 28.0	134.4	21 56.9	134.3	22 25.8	134.2	22 54.7	134.1	23 23.5	134.0	2
3	19 45.2	133.7	20 14.1	133.6	20 43.0	133.5	21 11.8	133.4	21 40.7	133.3	22 09.5	133.2	22 38.3	133.1	23 07.2	133.0	3
4	19 28.8	132.7	19 57.7	132.5	20 26.5	132.4	20 55.3	132.3	21 24.1	132.2	21 52.9	132.1	22 21.7	132.0	22 50.5	131.9	4
45	19 12.2	131.7	19 41.0	131.5	20 09.8	131.4	20 38.5	131.2	21 07.3	131.1	21 36.1	131.0	22 04.8	130.8	22 33.6	130.6	45
6	18 55.3	130.7	19 24.0	130.5	19 52.8	130.4	20 21.5	130.2	20 50.2	130.1	21 19.0	129.9	21 47.7	129.7	22 16.4	129.6	6
7	18 38.1	129.7	19 06.8	129.5	19 35.5	129.4	20 04.2	129.2	20 32.9	129.0	21 01.6	128.9	21 30.3	128.7	21 58.9	128.6	7
8	18 20.7	128.6	18 49.3	128.5	19 18.0	128.3	19 46.7	128.2	20 15.3	128.0	20 44.0	127.9	21 12.6	127.7	21 41.2	127.5	8
9	18 03.0	127.6	18 31.6	127.5	19 00.3	127.3	19 28.9	127.2	19 57.5	127.0	20 26.1	126.8	20 54.7	126.7	21 23.3	126.5	9
50	17 45.1	126.6	18 13.7	126.5	18 42.3	126.3	19 10.8	126.2	19 39.4	126.0	20 08.0	125.8	20 36.6	125.7	21 05.1	125.5	50
1	17 26.9	125.6	17 55.5	125.5	18 24.0	125.3	18 52.6	125.2	19 21.1	125.0	19 49.7	124.8	20 18.2	124.7	20 46.7	124.5	1
2	17 08.5	124.7	17 37.1	124.5	18 05.6	124.3	18 34.1	124.2	19 02.6	124.0	19 31.1	123.8	19 59.6	123.7	20 28.1	123.5	2
3	16 49.9	123.7	17 18.4	123.5	17 46.9	123.3	18 15.4	123.2	18 43.9	123.0	19 12.3	122.8	19 40.8	122.7	20 09.2	122.5	3
4	16 31.1	122.7	16 59.6	122.5	17 28.0	122.3	17 56.5	122.2	18 24.9	122.0	18 53.3	121.8	19 21.7	121.7	19 50.2	121.5	4
55	16 12.1	121.7	16 40.5	121.5	17 08.9	121.4	17 37.3	121.2	18 05.7	121.0	18 34.1	120.8	19 02.5	120.7	19 30.9	120.5	55
6	15																

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	18 00.0	1.000	180.0	17 30.0	1.000	180.0	17 00.0	1.000	180.0	16 30.0	1.000	180.0	16 00.0	1.000	180.0	15 30.0	1.000	180.0	00
1	17 59.8	1.001	179.0	17 29.8	1.001	179.0	16 59.8	1.001	179.0	16 29.8	1.001	179.0	15 59.8	1.001	179.0	15 29.8	1.001	179.0	1
2	17 59.2	1.002	177.9	17 29.2	1.002	177.9	16 59.2	1.002	177.9	16 29.2	1.002	177.9	15 59.2	1.002	177.9	15 29.2	1.002	177.9	2
3	17 58.1	1.002	176.9	17 28.2	1.002	176.9	16 58.2	1.002	176.9	16 28.2	1.002	176.9	15 58.2	1.002	176.9	15 28.2	1.002	176.9	3
4	17 56.7	1.003	175.8	17 26.7	1.003	175.8	16 56.7	1.003	175.8	16 26.7	1.003	175.8	15 56.8	1.003	175.9	15 26.8	1.003	175.9	4
05	17 54.9	1.004	174.8	17 24.9	1.004	174.8	16 54.9	1.004	174.8	16 24.9	1.004	174.8	15 54.9	1.004	174.8	15 24.9	1.004	174.8	05
6	17 52.6	1.004	173.7	17 22.6	1.004	173.7	16 52.7	1.004	173.8	16 22.7	1.004	173.8	15 52.7	1.004	173.8	15 22.7	1.004	173.8	6
7	17 49.9	1.005	172.7	17 20.0	1.005	172.7	16 50.0	1.005	172.7	16 20.0	1.005	172.7	15 50.1	1.005	172.8	15 20.1	1.005	172.8	7
8	17 46.9	1.006	171.6	17 16.9	1.006	171.6	16 47.0	1.006	171.7	16 17.0	1.006	171.7	15 47.0	1.006	171.8	15 17.1	1.006	171.8	8
9	17 43.4	1.006	170.6	17 13.4	1.006	170.6	16 43.5	1.006	170.7	16 13.6	1.006	170.7	15 43.6	1.006	170.7	15 13.7	1.006	170.8	9
10	17 39.5	1.007	169.5	17 09.6	1.007	169.6	16 39.6	1.007	169.6	16 09.7	1.007	169.6	15 39.8	1.007	169.7	15 09.8	1.007	169.7	10
1	17 35.2	1.008	168.5	17 05.3	1.008	168.5	16 35.4	1.008	168.6	16 05.5	1.008	168.6	15 35.5	1.008	168.7	15 05.6	1.008	168.7	1
2	17 30.7	1.008	167.4	17 00.6	1.008	167.5	16 30.7	1.008	167.5	16 00.8	1.008	167.6	15 30.9	1.008	167.7	15 01.0	1.008	167.7	2
3	17 25.4	1.009	166.4	16 55.6	1.009	166.4	16 25.7	1.009	166.5	15 55.8	1.009	166.5	15 25.9	1.009	166.6	14 56.0	1.009	166.6	3
4	17 20.0	1.010	165.4	16 50.1	1.010	165.4	16 20.2	1.010	165.5	15 50.4	1.010	165.5	15 20.5	1.010	165.6	14 50.6	1.010	165.6	4
15	17 14.1	0.991	164.3	16 44.2	0.991	164.4	16 14.4	0.991	164.4	15 44.5	0.991	164.5	15 14.7	0.991	164.5	14 44.8	0.991	164.6	15
6	17 07.8	0.991	163.3	16 38.0	0.991	163.3	16 08.1	0.991	163.4	15 38.3	0.991	163.4	15 08.5	0.991	163.5	14 38.7	0.991	163.6	6
7	17 01.1	0.992	162.2	16 31.3	0.992	162.3	16 01.5	0.992	162.4	15 31.7	0.992	162.4	15 01.9	0.992	162.5	14 32.1	0.992	162.5	7
8	16 54.1	0.992	161.2	16 24.3	0.992	161.3	15 54.5	0.992	161.3	15 24.7	0.992	161.4	14 55.0	0.992	161.5	14 25.2	0.992	161.6	8
9	16 46.7	0.993	160.2	16 16.9	0.993	160.2	15 47.1	0.993	160.3	15 17.4	0.993	160.4	14 47.6	0.993	160.5	14 17.9	0.993	160.6	9
20	16 38.8	0.994	159.1	16 09.1	0.994	159.2	15 39.4	0.994	159.3	15 09.6	0.994	159.3	14 39.9	0.994	159.4	14 10.2	0.994	159.5	20
1	16 30.6	0.994	158.1	16 00.9	0.994	158.2	15 31.2	0.994	158.3	15 01.5	0.994	158.3	14 31.8	0.994	158.4	14 02.1	0.994	158.5	1
2	16 22.1	0.995	157.1	15 52.4	0.995	157.2	15 22.7	0.995	157.2	14 53.0	0.995	157.3	14 23.4	0.995	157.4	13 53.7	0.995	157.5	2
3	16 13.1	0.995	156.1	15 43.5	0.995	156.1	15 13.8	0.995	156.2	14 44.2	0.995	156.3	14 14.5	0.995	156.4	13 44.9	0.995	156.4	3
4	16 03.8	0.996	155.0	15 34.2	0.996	155.1	15 04.6	0.996	155.2	14 35.0	0.996	155.3	14 05.3	0.996	155.4	13 35.7	0.996	155.4	4
25	15 54.2	0.997	154.0	15 24.6	0.997	154.1	14 55.0	0.997	154.2	14 25.4	0.997	154.3	13 55.8	0.997	154.3	13 26.2	0.997	154.4	25
6	15 44.1	0.997	153.0	15 14.6	0.997	153.1	14 45.0	0.997	153.2	14 15.4	0.997	153.2	13 45.9	0.997	153.3	13 16.3	0.997	153.4	6
7	15 33.7	0.998	152.0	15 04.2	0.998	152.0	14 34.7	0.998	152.1	14 05.1	0.998	152.2	13 35.6	0.998	152.3	13 06.1	0.998	152.4	7
8	15 23.0	0.998	150.9	14 53.5	0.998	151.0	14 24.0	0.998	151.1	13 54.5	0.998	151.2	13 25.0	0.998	151.3	12 55.5	0.998	151.4	8
9	15 11.9	0.999	149.9	14 42.4	0.999	150.0	14 13.0	0.999	150.1	13 43.5	0.999	150.2	13 14.0	0.999	150.3	12 44.6	0.999	150.4	9
30	15 00.5	0.999	148.9	14 31.0	0.999	149.0	14 01.6	0.999	149.1	13 32.2	0.999	149.2	13 02.7	0.999	149.3	12 33.3	0.999	149.4	30
1	14 48.7	0.999	147.9	14 19.3	0.999	148.0	13 49.9	0.999	148.1	13 20.5	0.999	148.2	12 51.1	0.999	148.3	12 21.7	0.999	148.4	1
2	14 36.6	0.999	146.9	14 07.2	0.999	147.0	13 37.9	0.999	147.1	13 08.5	0.999	147.2	12 39.1	0.999	147.3	12 09.7	0.999	147.4	2
3	14 24.1	0.999	145.9	13 54.8	0.999	146.0	13 25.8	0.999	146.1	12 56.1	0.999	146.2	12 26.8	0.999	146.3	11 57.5	0.999	146.4	3
4	14 11.4	0.999	144.9	13 42.1	0.999	145.0	13 12.8	0.999	145.1	12 43.5	0.999	145.2	12 14.2	0.999	145.3	11 44.9	0.999	145.4	4
35	13 58.3	0.999	143.9	13 29.0	0.999	144.0	12 59.8	0.999	144.1	12 30.5	0.999	144.2	12 01.2	0.999	144.3	11 32.0	0.999	144.4	35
6	13 44.9	0.999	142.9	13 15.6	0.999	143.0	12 46.4	0.999	143.1	12 17.2	0.999	143.2	11 48.0	0.999	143.3	11 18.7	0.999	143.4	6
7	13 31.1	0.999	141.9	13 02.0	0.999	142.0	12 32.8	0.999	142.1	12 03.6	0.999	142.2	11 34.4	0.999	142.3	11 05.2	0.999	142.4	7
8	13 17.1	0.999	140.9	12 48.0	0.999	141.0	12 18.8	0.999	141.1	11 49.5	0.999	141.2	11 20.3	0.999	141.3	10 51.3	0.999	141.4	8
9	13 02.8	0.999	139.9	12 33.7	0.999	140.0	12 04.6	0.999	140.1	11 35.4	0.999	140.2	11 06.3	0.999	140.3	10 37.2	0.999	140.4	9
40	12 48.1	0.999	138.9	12 19.1	0.999	139.0	11 50.0	0.999	139.1	11 20.9	0.999	139.2	10 51.8	0.999	139.3	10 22.7	0.999	139.4	40
1	12 33.2	0.999	137.9	12 04.2	0.999	138.0	11 35.1	0.999	138.1	11 06.1	0.999	138.2	10 37.1	0.999	138.3	10 08.0	0.999	138.4	1
2	12 18.0	0.999	136.9	11 49.0	0.999	137.0	11 20.0	0.999	137.1	10 51.0	0.999	137.2	10 22.0	0.999	137.3	9 53.0	0.999	137.4	2
3	12 02.5	0.999	135.9	11 33.5	0.999	136.0	11 04.6	0.999	136.1	10 35.6	0.999	136.2	10 06.6	0.999	136.3	9 37.7	0.999	136.4	3
4	11 46.7	0.999	134.9	11 17.8	0.999	135.1	10 48.9	0.999	135.2	10 20.0	0.999	135.3	9 51.0	0.999	135.4	9 22.1	0.999	135.5	4
45	11 30.7	0.999	134.0	11 01.8	0.999	134.1	10 32.9	0.999	134.2	10 04.0	0.999	134.3	9 35.1	0.999	134.4	9 06.2	0.999	134.5	45
6	11 14.4	0.999	133.0	10 45.5	0.999	133.1	10 16.7	0.999	133.2	9 47.8	0.999	133.3	9 19.0	0.999	133.4	8 50.1	0.999	133.5	6
7	10 57.8	0.999	132.0	10 29.0	0.999	132.1	10 00.2	0.999	132.2	9 31.4	0.999	132.3	9 02.5	0.999	132.4	8 33.7	0.999	132.5	7
8	10 41.0	0.999	131.0	10 12.2	0.999	131.2	9 43.4	0.999	131.3	9 14.6	0.999	131.5	8 45.9	0.999	131.6	8 17.1	0.999	131.7	8
9	10 23.9	0.999	130.1	9 55.2	0.999	130.2	9 26.4	0.999	130.3	8 57.7	0.999	130.5	8 28.9	0.999	130.6	8 00.2	0.999	130.7	9
50	10 06.6	0.999	129.1	9 37.9	0.999	129.2	9 09.2	0.999	129.4	8 40.5	0.999	129.5	8 11.7	0.999	129.7	7 43.0	0.999	129.8	50
1	9 49.0	0.999	128.1	9 20.3	0.999	128.3	8 51.7	0.999	128.4	8 23.0	0.999	128.6	7 54.3	0.999	128.7	7 25.7	0.999	128.9	1

Lat. 68°

Table with columns for H.A., 8° 00', 8° 30', 9° 00', 9° 30', 10° 00', 10° 30', 11° 00', 11° 30', and H.A. Each column contains two sub-columns for Alt. and Az. The table lists astronomical data for various declinations and altitudes.

Lat. 68°

Main table for Declination Contrary Name to Latitude, showing data for latitudes 68° to 69° across various declination angles (8° 00' to 11° 30').

DECLINATION SAME NAME AS LATITUDE

Main table for Declination Same Name as Latitude, showing data for latitudes 69° to 105° across various declination angles (8° 00' to 11° 30').

Lat. 69°

Lat. 68°

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.
	Alt.	Az.															
00	34 00.0	1.00 180.0	34 30.0	1.00 180.0	35 00.0	1.00 180.0	35 30.0	1.00 180.0	36 00.0	1.00 180.0	36 30.0	1.00 180.0	37 00.0	1.00 180.0	37 30.0	1.00 180.0	00
1	33 59.8	1.00 178.8	34 29.8	1.00 178.8	34 59.8	1.00 178.8	35 29.8	1.00 178.8	35 59.8	1.00 178.8	36 29.8	1.00 178.8	36 59.8	1.00 178.8	37 29.8	1.00 178.8	1
2	33 59.1	1.00 177.6	34 29.1	1.00 177.6	34 59.1	1.00 177.6	35 29.1	1.00 177.6	35 59.1	1.00 177.6	36 29.1	1.00 177.6	36 59.1	1.00 177.6	37 29.1	1.00 177.6	2
3	33 57.9	1.00 176.5	34 27.9	1.00 176.5	34 57.9	1.00 176.5	35 27.9	1.00 176.5	35 57.9	1.00 176.5	36 27.9	1.00 176.5	36 57.9	1.00 176.5	37 27.9	1.00 176.5	3
4	33 56.3	1.00 175.3	34 26.3	1.00 175.3	34 56.3	1.00 175.3	35 26.3	1.00 175.3	35 56.3	1.00 175.3	36 26.3	1.00 175.3	36 56.3	1.00 175.3	37 26.3	1.00 175.3	4
05	33 54.2	1.00 174.1	34 24.2	1.00 174.1	34 54.2	1.00 174.1	35 24.2	1.00 174.1	35 54.2	1.00 174.1	36 24.2	1.00 174.1	36 54.2	1.00 174.1	37 24.2	1.00 174.1	05
6	33 51.7	1.00 172.9	34 21.6	1.00 172.9	34 51.6	1.00 172.9	35 21.6	1.00 172.9	35 51.5	1.00 172.8	36 21.5	1.00 172.8	36 51.5	1.00 172.8	37 21.4	1.00 172.7	6
7	33 48.7	1.00 171.8	34 18.6	1.00 171.7	34 48.6	1.00 171.7	35 18.5	1.00 171.6	35 48.5	1.00 171.6	36 18.5	1.00 171.6	36 48.4	1.00 171.5	37 18.4	1.00 171.5	7
8	33 45.2	1.00 170.6	34 15.2	1.00 170.5	34 45.1	1.00 170.5	35 15.1	1.00 170.5	35 45.0	1.00 170.4	36 14.9	1.00 170.4	36 44.9	1.00 170.3	37 14.8	1.00 170.3	8
9	33 41.3	1.00 169.4	34 11.3	1.00 169.3	34 41.2	1.00 169.3	35 11.1	1.00 169.2	35 41.0	1.00 169.2	36 10.9	1.00 169.2	36 40.9	1.00 169.1	37 10.8	1.00 169.1	9
10	33 37.0	1.00 168.2	34 06.9	1.00 168.2	34 36.8	1.00 168.1	35 06.7	1.00 168.1	35 36.6	1.00 168.0	36 06.5	1.00 168.0	36 36.4	1.00 167.9	37 06.3	1.00 167.9	10
1	33 32.2	1.00 167.0	34 02.0	1.00 167.0	34 31.9	1.00 167.0	35 01.8	1.00 166.9	35 31.7	1.00 166.9	36 01.6	1.00 166.8	36 31.5	1.00 166.7	37 01.4	1.00 166.7	1
2	33 26.9	1.00 165.8	33 56.8	1.00 165.8	34 26.6	1.00 165.8	34 56.5	1.00 165.7	35 26.4	1.00 165.7	35 56.2	1.00 165.6	36 26.1	1.00 165.5	36 55.9	1.00 165.5	2
3	33 21.2	1.00 164.7	33 51.0	1.00 164.7	34 20.9	1.00 164.6	34 50.7	1.00 164.5	35 20.6	1.00 164.5	35 50.4	1.00 164.4	36 20.3	1.00 164.4	36 50.1	1.00 164.3	3
4	33 15.1	1.00 163.6	33 44.9	1.00 163.5	34 14.7	1.00 163.4	34 44.5	1.00 163.3	35 14.3	1.00 163.3	35 44.2	1.00 163.2	36 14.0	1.00 163.2	36 43.8	1.00 163.1	4
15	33 08.5	1.00 162.4	33 38.3	1.00 162.3	34 08.1	1.00 162.3	34 37.9	1.00 162.2	35 07.7	1.00 162.1	35 37.4	1.00 162.0	36 07.2	1.00 162.0	36 37.0	1.00 161.9	15
6	33 01.5	1.00 161.2	33 31.2	1.00 161.2	34 01.0	1.00 161.1	34 30.8	1.00 161.0	35 00.5	1.00 160.9	35 30.3	1.00 160.9	36 00.1	1.00 160.8	36 29.8	1.00 160.7	6
7	32 54.0	1.00 160.1	33 23.8	1.00 160.0	33 53.5	1.00 159.9	34 23.2	1.00 159.8	34 53.0	1.00 159.8	35 22.7	1.00 159.7	35 52.4	1.00 159.6	36 22.2	1.00 159.5	7
8	32 46.2	1.00 158.9	33 15.9	1.00 158.8	33 45.6	1.00 158.8	34 15.3	1.00 158.7	34 45.0	1.00 158.6	35 14.7	1.00 158.5	35 44.4	1.00 158.4	36 14.1	1.00 158.3	8
9	32 37.9	1.00 157.7	33 07.6	1.00 157.7	33 37.2	1.00 157.6	34 06.9	1.00 157.5	34 36.6	1.00 157.4	35 06.2	1.00 157.3	35 35.9	1.00 157.2	36 05.6	1.00 157.2	9
20	32 29.2	1.00 156.6	32 58.8	1.00 156.5	33 28.5	1.00 156.5	33 58.1	1.00 156.4	34 27.7	1.00 156.3	34 57.4	1.00 156.2	35 27.0	1.00 156.1	35 56.6	1.00 156.0	20
1	32 20.0	1.00 155.5	32 49.7	1.00 155.4	33 19.3	1.00 155.3	33 48.9	1.00 155.2	34 18.5	1.00 155.1	34 48.1	1.00 155.0	35 17.7	1.00 154.9	35 47.3	1.00 154.8	1
2	32 10.5	1.00 154.3	32 40.1	1.00 154.2	33 09.7	1.00 154.2	33 39.2	1.00 154.1	34 08.8	1.00 154.0	34 38.4	1.00 153.9	35 07.9	1.00 153.7	35 37.5	1.00 153.6	2
3	32 00.6	1.00 153.2	32 30.1	1.00 153.1	32 59.7	1.00 153.0	33 29.2	1.00 152.9	33 58.7	1.00 152.8	34 28.3	1.00 152.7	34 57.8	1.00 152.6	35 27.3	1.00 152.5	3
4	31 50.3	1.00 152.1	32 19.8	1.00 152.0	32 49.3	1.00 151.9	33 18.8	1.00 151.8	33 48.3	1.00 151.6	34 17.8	1.00 151.5	34 47.2	1.00 151.4	35 16.7	1.00 151.3	4
25	31 39.5	1.00 150.9	32 09.0	1.00 150.8	32 38.5	1.00 150.7	33 07.9	1.00 150.6	33 37.4	1.00 150.5	34 06.8	1.00 150.4	34 36.3	1.00 150.3	35 05.7	1.00 150.1	25
6	31 28.4	1.00 149.8	31 57.9	1.00 149.7	32 27.3	1.00 149.6	32 56.7	1.00 149.5	33 26.1	1.00 149.4	33 55.5	1.00 149.2	34 24.9	1.00 149.1	34 54.3	1.00 149.0	6
7	31 16.9	1.00 148.7	31 46.3	1.00 148.6	32 15.7	1.00 148.5	32 45.1	1.00 148.3	33 14.5	1.00 148.2	33 43.9	1.00 148.1	34 13.2	1.00 148.0	34 42.6	1.00 147.8	7
8	31 05.1	1.00 147.6	31 34.4	1.00 147.5	32 03.8	1.00 147.3	32 33.3	1.00 147.2	33 02.5	1.00 147.1	33 31.8	1.00 147.0	34 01.1	1.00 146.8	34 30.4	1.00 146.7	8
9	30 52.8	1.00 146.5	31 22.2	1.00 146.3	31 51.5	1.00 146.2	32 20.8	1.00 146.1	32 50.1	1.00 145.8	33 19.3	1.00 145.7	33 48.6	1.00 145.5	34 17.9	1.00 145.4	9
30	30 40.2	1.00 145.3	31 09.5	1.00 145.2	31 38.8	1.00 145.1	32 08.0	1.00 145.0	32 37.3	1.00 144.8	33 06.5	1.00 144.7	33 35.8	1.00 144.6	34 05.0	1.00 144.4	30
1	30 27.3	1.00 144.2	30 56.5	1.00 144.1	31 25.7	1.00 144.0	31 55.0	1.00 143.8	32 24.2	1.00 143.7	33 23.4	1.00 143.6	33 22.6	1.00 143.4	33 51.7	1.00 143.3	1
2	30 14.0	1.00 143.1	30 43.2	1.00 143.0	31 12.3	1.00 142.9	31 41.5	1.00 142.7	32 10.7	1.00 142.6	32 39.8	1.00 142.5	33 09.0	1.00 142.3	33 38.1	1.00 142.2	2
3	30 00.3	1.00 142.0	30 29.5	1.00 141.9	30 58.6	1.00 141.8	31 27.7	1.00 141.6	31 56.9	1.00 141.5	32 26.0	1.00 141.3	32 55.1	1.00 141.2	33 24.2	1.00 141.0	3
4	29 46.3	1.00 140.9	30 15.4	1.00 140.8	30 44.5	1.00 140.7	31 13.6	1.00 140.5	31 42.7	1.00 140.4	32 11.8	1.00 140.2	32 40.8	1.00 140.1	33 09.9	1.00 139.9	4
35	29 32.0	1.00 139.8	30 01.1	1.00 139.7	30 30.1	1.00 139.6	30 59.2	1.00 139.4	31 28.3	1.00 139.3	31 57.2	1.00 139.1	32 26.2	1.00 139.0	32 55.2	1.00 138.8	35
6	29 17.3	1.00 138.8	29 46.4	1.00 138.6	30 15.4	1.00 138.5	30 44.4	1.00 138.3	31 13.4	1.00 138.2	31 42.4	1.00 138.0	32 11.3	1.00 137.9	32 40.3	1.00 137.7	6
7	29 02.4	1.00 137.7	29 31.3	1.00 137.5	30 00.3	1.00 137.4	30 29.3	1.00 137.2	30 58.2	1.00 137.1	31 27.2	1.00 136.9	31 56.1	1.00 136.8	32 25.0	1.00 136.6	7
8	28 47.1	1.00 136.6	29 16.0	1.00 136.4	29 44.9	1.00 136.3	30 13.8	1.00 136.1	30 42.8	1.00 136.0	31 11.6	1.00 135.8	31 40.5	1.00 135.7	32 09.4	1.00 135.5	8
9	28 31.5	1.00 135.5	29 00.4	1.00 135.4	29 29.2	1.00 135.2	29 58.1	1.00 135.1	30 27.0	1.00 134.9	30 55.8	1.00 134.7	31 24.7	1.00 134.6	31 53.5	1.00 134.4	9
40	28 15.6	1.00 134.5	28 44.4	1.00 134.3	29 13.3	1.00 134.1	29 42.1	1.00 133.9	30 10.9	1.00 133.8	30 39.7	1.00 133.7	31 08.5	1.00 133.5	31 37.3	1.00 133.3	40
1	27 59.4	1.00 133.4	28 28.2	1.00 133.2	28 57.0	1.00 133.1	29 25.8	1.00 132.9	29 54.6	1.00 132.7	30 23.3	1.00 132.6	30 52.1	1.00 132.4	31 20.8	1.00 132.2	1
2	27 42.9	1.00 132.3	28 11.7	1.00 132.2	28 40.4	1.00 132.0	29 09.2	1.00 131.8	29 37.9	1.00 131.7	30 06.6	1.00 131.5	30 35.3	1.00 131.3	31 04.0	1.00 131.2	2
3	27 26.2	1.00 131.3	27 54.9	1.00 131.1	28 23.6	1.00 130.9	28 52.3	1.00 130.8	29 21.0	1.00 130.6	29 49.7	1.00 130.4	30 18.3	1.00 130.3	30 47.0	1.00 130.1	3
4	27 09.1	1.00 130.2	27 37.8	1.00 130.0	28 06.5	1.00 129.9	28 35.1	1.00 129.7	29 03.8	1.00 129.5	29 32.4	1.00 129.4	30 01.0	1.00 129.2	30 29.6	1.00 129.0	4
45	26 51.8	1.00 129.2	27 20.5	1.00 129.0	27 49.1	1.00 128.8	28 17.7	1.00 128.7	28 46.3	1.00 128.5	29 14.9	1.00 128.3	29 43.5	1.00 128.1	30 12.0	1.00 128.0	45
6	26 34.3	1.00 128.1	27 02.9	1.00 128.0	27 31.5	1.00 127.8	28 00.0	1.00 127.6	28 28.6	1.00 127.4	28 57.1	1.00 127.3	29 25.7	1.00 127.1	29 54.2	1.00 126.9	6
7	26 16.5	1.00 127.1	26 45.0														

Lat. 68°

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.																																														
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.																																															
00	10 00.0	1.000	180.0	9 30.0	1.000	180.0	9 00.0	1.000	180.0	8 30.0	1.000	180.0	8 00.0	1.000	180.0	7 30.0	1.000	180.0	7 00.0	1.000	180.0	6 30.0	1.000	180.0	6 00.0	1.000	180.0	5 30.0	1.000	180.0	5 00.0	1.000	180.0	4 30.0	1.000	180.0	4 00.0	1.000	180.0	3 30.0	1.000	180.0	3 00.0	1.000	180.0	2 30.0	1.000	180.0	2 00.0	1.000	180.0	1 30.0	1.000	180.0	1 00.0	1.000	180.0	0 30.0	1.000	180.0	0 00.0	1.000	180.0
1	9 59.8	1.001	179.0	9 29.8	1.001	179.0	8 59.8	1.001	179.0	8 29.8	1.001	179.0	7 59.8	1.001	179.0	7 29.8	1.001	179.0	6 59.8	1.001	179.0	6 29.8	1.001	179.0	5 59.8	1.001	179.0	5 29.8	1.001	179.0	4 59.8	1.001	179.0	4 29.8	1.001	179.0	3 59.8	1.001	179.0	3 29.8	1.001	179.0	2 59.8	1.001	179.0	2 29.8	1.001	179.0	1 59.8	1.001	179.0	1 29.8	1.001	179.0	0 59.8	1.001	179.0	0 29.8	1.001	179.0			
2	9 59.2	1.002	178.0	9 29.2	1.002	178.0	8 59.2	1.002	178.0	8 29.2	1.002	178.0	7 59.2	1.002	178.0	7 29.2	1.002	178.0	6 59.2	1.002	178.0	6 29.2	1.002	178.0	5 59.2	1.002	178.0	5 29.2	1.002	178.0	4 59.2	1.002	178.0	4 29.2	1.002	178.0	3 59.2	1.002	178.0	3 29.2	1.002	178.0	2 59.2	1.002	178.0	2 29.2	1.002	178.0	1 59.2	1.002	178.0	1 29.2	1.002	178.0	0 59.2	1.002	178.0	0 29.2	1.002	178.0			
3	9 58.2	1.002	177.0	9 28.3	1.002	177.0	8 58.3	1.002	177.0	8 28.3	1.002	177.0	7 58.3	1.002	177.0	7 28.3	1.002	177.0	6 58.3	1.002	177.0	6 28.3	1.002	177.0	5 58.3	1.002	177.0	5 28.3	1.002	177.0	4 58.3	1.002	177.0	4 28.3	1.002	177.0	3 58.3	1.002	177.0	3 28.3	1.002	177.0	2 58.3	1.002	177.0	2 28.3	1.002	177.0	1 58.3	1.002	177.0	1 28.3	1.002	177.0	0 58.3	1.002	177.0	0 28.3	1.002	177.0			
4	9 56.9	1.003	176.0	9 26.9	1.003	176.0	8 56.9	1.003	176.1	8 26.9	1.003	176.1	7 56.9	1.003	176.1	7 26.9	1.003	176.1	6 56.9	1.003	176.1	6 26.9	1.003	176.1	5 56.9	1.003	176.1	5 26.9	1.003	176.1	4 56.9	1.003	176.1	4 26.9	1.003	176.1	3 56.9	1.003	176.1	3 26.9	1.003	176.1	2 56.9	1.003	176.1	2 26.9	1.003	176.1	1 56.9	1.003	176.1	1 26.9	1.003	176.1	0 56.9	1.003	176.1	0 26.9	1.003	176.1			
05	9 55.1	1.004	175.0	9 25.1	1.004	175.1	8 55.2	1.004	175.1	8 25.2	1.004	175.1	7 55.2	1.004	175.1	7 25.2	1.004	175.1	6 55.2	1.004	175.1	6 25.2	1.004	175.1	5 55.2	1.004	175.1	5 25.2	1.004	175.1	4 55.2	1.004	175.1	4 25.2	1.004	175.1	3 55.2	1.004	175.1	3 25.2	1.004	175.1	2 55.2	1.004	175.1	2 25.2	1.004	175.1	1 55.2	1.004	175.1	1 25.2	1.004	175.1	0 55.2	1.004	175.1	0 25.2	1.004	175.1			
6	9 53.0	1.004	174.0	9 23.0	1.004	174.1	8 53.0	1.004	174.1	8 23.1	1.004	174.1	7 53.1	1.004	174.1	7 23.1	1.004	174.1	6 53.1	1.004	174.1	6 23.1	1.004	174.2	5 53.1	1.004	174.2	5 23.1	1.004	174.2	4 53.1	1.004	174.2	4 23.1	1.004	174.2	3 53.1	1.004	174.2	3 23.1	1.004	174.2	2 53.1	1.004	174.2	2 23.1	1.004	174.2	1 53.1	1.004	174.2	1 23.1	1.004	174.2	0 53.1	1.004	174.2	0 23.1	1.004	174.2			
7	9 50.5	1.005	173.1	9 20.5	1.005	173.1	8 50.5	1.005	173.1	8 20.6	1.005	173.1	7 50.6	1.005	173.1	7 20.6	1.005	173.1	6 50.7	1.005	173.2	6 20.7	1.005	173.2	5 50.7	1.005	173.2	5 20.7	1.005	173.2	4 50.7	1.005	173.2	4 20.7	1.005	173.2	3 50.7	1.005	173.2	3 20.7	1.005	173.2	2 50.7	1.005	173.2	2 20.7	1.005	173.2	1 50.7	1.005	173.2	1 20.7	1.005	173.2	0 50.7	1.005	173.2	0 20.7	1.005	173.2			
8	9 47.6	1.005	172.1	9 17.6	1.005	172.1	8 47.6	1.005	172.1	8 17.7	1.005	172.1	7 47.7	1.005	172.2	7 17.8	1.005	172.2	6 47.8	1.005	172.2	6 17.8	1.005	172.2	5 47.8	1.005	172.2	5 17.8	1.005	172.2	4 47.8	1.005	172.2	4 17.8	1.005	172.2	3 47.8	1.005	172.2	3 17.8	1.005	172.2	2 47.8	1.005	172.2	2 17.8	1.005	172.2	1 47.8	1.005	172.2	1 17.8	1.005	172.2	0 47.8	1.005	172.2	0 17.8	1.005	172.2			
9	9 44.3	1.006	171.1	9 14.3	1.006	171.1	8 44.4	1.006	171.1	8 14.4	1.006	171.2	7 44.5	1.006	171.2	7 14.5	1.006	171.2	6 44.6	1.006	171.2	6 14.6	1.006	171.3	5 44.6	1.006	171.3	5 14.6	1.006	171.3	4 44.6	1.006	171.3	4 14.6	1.006	171.3	3 44.6	1.006	171.3	3 14.6	1.006	171.3	2 44.6	1.006	171.3	2 14.6	1.006	171.3	1 44.6	1.006	171.3	1 14.6	1.006	171.3	0 44.6	1.006	171.3	0 14.6	1.006	171.3			
10	9 40.6	1.007	170.1	9 10.6	1.007	170.1	8 40.7	1.007	170.1	8 10.8	1.007	170.2	7 40.8	1.007	170.2	7 10.9	1.007	170.2	6 41.0	1.007	170.3	6 11.0	1.007	170.3	5 41.0	1.007	170.3	5 11.0	1.007	170.3	4 41.0	1.007	170.3	4 11.0	1.007	170.3	3 41.0	1.007	170.3	3 11.0	1.007	170.3	2 41.0	1.007	170.3	2 11.0	1.007	170.3	1 41.0	1.007	170.3	1 11.0	1.007	170.3	0 41.0	1.007	170.3	0 11.0	1.007	170.3			
1	9 36.5	1.007	169.1	9 06.6	1.007	169.1	8 36.7	1.007	169.2	8 06.8	1.007	169.2	7 36.8	1.007	169.2	7 06.9	1.007	169.3	6 37.0	1.007	169.3	6 07.1	1.007	169.3	5 37.0	1.007	169.3	5 07.1	1.007	169.3	4 37.0	1.007	169.3	4 07.1	1.007	169.3	3 37.0	1.007	169.3	3 07.1	1.007	169.3	2 37.0	1.007	169.3	2 07.1	1.007	169.3	1 37.0	1.007	169.3	1 07.1	1.007	169.3	0 37.0	1.007	169.3	0 07.1	1.007	169.3			
2	9 32.1	1.008	168.1	9 02.2	1.008	168.1	8 32.3	1.008	168.2	8 02.3	1.008	168.2	7 32.4	1.008	168.3	7 02.5	1.008	168.3	6 32.6	1.008	168.3	6 02.7	1.008	168.4	5 32.6	1.008	168.4	5 02.7	1.008	168.4	4 32.6	1.008	168.4	4 02.7	1.008	168.4	3 32.6	1.008	168.4	3 02.7	1.008	168.4	2 32.6	1.008	168.4	2 02.7	1.008	168.4	1 32.6	1.008	168.4	1 02.7	1.008	168.4	0 32.6	1.008	168.4	0 02.7	1.008	168.4			
3	9 27.2	1.009	167.1	8 57.4	1.009	167.2	8 27.5	1.009	167.2	8 02.7	1.009	167.2	7 32.7	1.009	167.3	7 02.8	1.009	167.3	6 32.9	1.009	167.3	6 03.0	1.009	167.4	5 32.9	1.009	167.4	5 03.0	1.009	167.4	4 32.9	1.009	167.4	4 03.0	1.009	167.4	3 32.9	1.009	167.4	3 03.0	1.009	167.4	2 32.9	1.009	167.4	2 03.0	1.009	167.4	1 32.9	1.009	167.4	1 03.0	1.009	167.4	0 32.9	1.009	167.4	0 03.0	1.009	167.4			
4	9 22.0	1.009	166.1	8 52.2	1.009	166.2	8 22.3	1.009	166.2	8 02.3	1.009	166.3	7 32.5	1.009	166.3	7 02.5	1.009	166.4	6 32.8	1.009	166.4	6 02.8	1.009	166.4	5 32.8	1.009	166.4	5 02.9	1.009	166.4	4 32.8	1.009	166.4	4 02.9	1.009	166.4	3 32.8	1.009	166.4	3 02.9	1.009	166.4	2 32.8	1.009	166.4	2 02.9	1.009	166.4	1 32.8	1.009	166.4	1 02.9	1.009	166.4	0 32.8	1.009	166.4	0 02.9	1.009	166.4			
15	9 16.5	1.010	165.1	8 46.6	1.010	165.2	8 16.8	1.010	165.2	7 46.9	1.010	165.3	7 17.0	1.010	165.3	6 47.2	1.010	165.4	6 17.3	1.010	165.4	5 47.5	1.010	165.5	5 17.3	1.010	165.5	4 47.5	1.010	165.5	4 17.3	1.010	165.5	3 47.5	1.010	165.5	3 17.3	1.010	165.5	2 47.5	1.010	165.5	2 17.3	1.010	165.5	1 47.5	1.010	165.5	1 17.3	1.010	165.5	0 47.5	1.010	165.5	0 17.3	1.010	165.5						
6	9 10.5	09 11	164.2	8 40.7	09 11	164.2	8 10.8	09 10	164.3	7 41.0	09 10	164.3	7 11.2	09 10	164.4	6 41.3	09 10	164.4	6 11.5	09 10	164.5	5 41.7	09 10	164.5	5 11.5	09 10	164.5	4 41.7	09 10	164.5	4 11.5	09 10	164.5	3 41.7	09 10	164.5	3 11.5	09 10	164.5	2 41.7	09 10	164.5	2 11.5	09 10	164.5	1 41.7	09 10	164.5	1 11.5	09 10	164.5	0 41.7	09 10	164.5	0 11.5	09 10	164.5						
7	9 04.2	09 11	163.2	8 34.4	09 11	163.2	8 04.6	09 11	163.3	7 34.7	09 11	163.3	7 04.9	09 11	163.4																																																

Lat. 68°

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'												
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.											
00	38 00.0	1.0 00	180.0	38 30.0	1.0 00	180.0	39 00.0	1.0 00	180.0	39 30.0	1.0 00	180.0	40 00.0	1.0 00	180.0	40 30.0	1.0 00	180.0	41 00.0	1.0 00	180.0	41 30.0	1.0 00	180.0			
1	37 50.8	1.0 01	178.8	38 29.8	1.0 01	178.8	38 59.8	1.0 01	178.8	39 29.8	1.0 01	178.8	39 59.8	1.0 01	178.8	40 29.8	1.0 01	178.8	40 59.8	1.0 01	178.8	41 29.8	1.0 01	178.8	41 59.8	1.0 01	178.8
2	37 59.0	1.0 02	177.6	38 29.0	1.0 02	177.6	38 59.0	1.0 02	177.6	39 29.0	1.0 02	177.6	39 59.0	1.0 02	177.6	40 29.0	1.0 02	177.6	40 59.0	1.0 02	177.6	41 29.0	1.0 02	177.6	41 59.0	1.0 02	177.6
3	37 57.8	1.0 03	176.3	38 27.8	1.0 03	176.3	38 57.8	1.0 03	176.3	39 27.8	1.0 03	176.3	39 57.8	1.0 03	176.3	40 27.8	1.0 03	176.3	40 57.8	1.0 03	176.3	41 27.8	1.0 03	176.3	41 57.8	1.0 03	176.3
4	37 56.2	1.0 04	175.1	38 26.2	1.0 04	175.1	38 56.2	1.0 04	175.1	39 26.2	1.0 04	175.1	39 56.2	1.0 04	175.0	40 26.2	1.0 04	175.0	40 56.2	1.0 04	175.0	41 26.2	1.0 04	175.0	41 56.2	1.0 04	175.0
05	37 54.0	1.0 04	173.9	38 24.0	1.0 04	173.9	38 54.0	1.0 04	173.9	39 24.0	1.0 04	173.8	39 54.0	1.0 04	173.8	40 24.0	1.0 04	173.8	40 54.0	1.0 04	173.8	41 24.0	1.0 04	173.8	41 54.0	1.0 04	173.8
6	37 51.4	1.0 05	172.7	38 21.4	1.0 05	172.7	38 51.4	1.0 05	172.6	39 21.4	1.0 05	172.6	39 51.4	1.0 05	172.6	40 21.2	1.0 05	172.5	40 51.2	1.0 05	172.5	41 21.1	1.0 05	172.5	41 51.1	1.0 05	172.5
7	37 48.3	1.0 06	171.5	38 18.3	1.0 06	171.4	38 48.2	1.0 06	171.4	39 18.2	1.0 06	171.4	39 48.1	1.0 06	171.3	40 18.0	1.0 06	171.3	40 48.0	1.0 06	171.2	41 17.9	1.0 06	171.2	41 47.9	1.0 06	171.2
8	37 44.7	1.0 07	170.3	38 14.7	1.0 07	170.2	38 44.6	1.0 07	170.1	39 14.5	1.0 07	170.1	39 44.5	1.0 07	170.1	40 14.4	1.0 07	170.0	40 44.3	1.0 07	170.0	41 14.3	1.0 07	170.0	41 44.3	1.0 07	170.0
9	37 40.7	1.0 08	169.0	38 10.6	1.0 08	169.0	38 40.5	1.0 08	168.9	39 10.4	1.0 08	168.9	39 40.4	1.0 08	168.9	40 10.3	1.0 08	168.8	40 40.2	1.0 08	168.8	41 10.1	1.0 08	168.8	41 40.1	1.0 08	168.8
10	37 36.2	1.0 08	167.8	38 06.1	1.0 08	167.8	38 36.0	1.0 08	167.7	39 05.9	1.0 08	167.7	39 35.8	1.0 08	167.6	40 05.7	1.0 08	167.6	40 35.6	1.0 08	167.5	41 05.5	1.0 08	167.5	41 35.4	1.0 08	167.5
1	37 31.2	1.0 09	166.6	38 01.1	1.0 09	166.6	38 31.0	1.0 09	166.5	39 00.9	1.0 09	166.5	39 30.7	1.0 09	166.4	40 00.6	1.0 09	166.3	40 30.5	1.0 09	166.3	41 00.3	1.0 09	166.2	41 30.1	1.0 09	166.2
2	37 25.8	1.0 10	165.4	37 55.7	1.0 10	165.4	38 25.5	1.0 10	165.3	38 55.4	1.0 10	165.2	39 25.2	1.0 10	165.2	39 55.1	1.0 10	165.1	40 24.9	1.0 10	165.0	40 54.7	1.0 10	165.0	41 24.5	1.0 10	165.0
3	37 19.9	1.0 11	164.2	37 49.7	1.0 11	164.2	38 19.6	1.0 11	164.1	38 49.4	1.0 11	164.0	39 19.2	1.0 11	163.9	39 49.0	1.0 11	163.9	40 18.9	1.0 11	163.8	40 48.7	1.0 11	163.7	41 18.3	1.0 11	163.7
4	37 13.6	1.0 11	163.0	37 43.4	1.0 11	162.9	38 13.2	1.0 11	162.8	38 43.0	1.0 11	162.8	39 12.8	1.0 11	162.7	39 42.6	1.0 11	162.6	40 12.4	1.0 11	162.6	40 42.1	1.0 11	162.5	41 11.5	1.0 11	162.5
15	37 06.8	1.0 12	161.8	37 36.6	1.0 12	161.7	38 06.3	1.0 12	161.7	38 36.1	1.0 12	161.6	39 05.9	1.0 12	161.5	39 35.6	1.0 12	161.4	40 05.4	1.0 12	161.3	40 35.2	1.0 12	161.3	41 04.8	1.0 12	161.3
6	36 59.6	1.0 13	160.6	37 29.3	1.0 13	160.5	37 59.0	1.0 13	160.5	38 28.8	1.0 13	160.4	38 58.5	1.0 13	160.3	39 28.3	1.0 13	160.2	39 58.0	1.0 13	160.1	40 27.7	1.0 13	160.0	40 57.3	1.0 13	160.0
7	36 51.9	1.0 14	159.4	37 21.6	1.0 14	159.3	37 51.3	1.0 14	159.3	38 21.0	1.0 14	159.2	38 50.7	1.0 14	159.1	39 20.4	1.0 14	159.0	39 50.1	1.0 14	158.9	40 19.8	1.0 14	158.8	40 49.1	1.0 14	158.8
8	36 43.8	1.0 14	158.2	37 13.5	1.0 14	158.2	37 43.1	1.0 14	158.1	38 12.8	1.0 14	158.0	38 42.5	1.0 14	157.9	39 12.1	1.0 14	157.8	39 41.8	1.0 14	157.7	40 11.5	1.0 14	157.6	40 40.8	1.0 14	157.6
9	36 35.2	1.0 15	157.1	37 04.9	1.0 15	157.0	37 34.5	1.0 15	156.9	38 04.2	1.0 15	156.8	38 33.8	1.0 15	156.7	39 03.4	1.0 15	156.6	39 33.0	1.0 15	156.5	40 02.7	1.0 15	156.4	40 32.0	1.0 15	156.4
20	36 26.2	1.0 16	155.9	36 55.9	1.0 16	155.8	37 25.5	1.0 16	155.7	37 55.1	1.0 16	155.6	38 24.7	1.0 16	155.5	38 54.3	1.0 16	155.4	39 23.9	1.0 16	155.3	39 53.4	1.0 16	155.2	40 32.6	1.0 16	155.2
1	36 16.9	1.0 16	154.7	36 46.4	1.0 16	154.6	37 16.0	1.0 16	154.5	37 45.6	1.0 16	154.4	38 15.1	1.0 16	154.3	38 44.7	1.0 16	154.2	39 14.2	1.0 16	154.1	39 43.8	1.0 16	154.0	40 32.9	1.0 16	154.0
2	36 07.0	1.0 17	153.5	36 36.6	1.0 17	153.4	37 06.1	1.0 17	153.3	37 35.6	1.0 17	153.2	38 05.2	1.0 17	153.1	38 34.7	1.0 17	153.0	39 04.2	1.0 17	152.9	39 33.7	1.0 17	152.8	40 32.6	1.0 17	152.8
3	35 56.8	1.0 18	152.4	36 26.3	1.0 18	152.2	36 55.8	1.0 18	152.1	37 25.3	1.0 18	152.0	37 54.8	1.0 18	151.9	38 24.3	1.0 18	151.8	38 53.7	1.0 18	151.7	39 22.6	1.0 18	151.5	39 51.5	1.0 18	151.5
4	35 46.2	1.0 18	151.2	36 16.6	1.0 18	151.1	36 45.1	1.0 18	151.0	37 14.6	1.0 18	150.8	37 44.0	1.0 18	150.7	38 13.4	1.0 18	150.6	38 42.9	1.0 18	150.5	39 12.3	1.0 18	150.3	39 40.1	1.0 18	150.3
25	35 35.2	1.0 19	150.0	36 04.6	1.0 19	149.9	36 34.0	1.0 19	149.8	37 03.4	1.0 19	149.7	37 32.8	1.0 19	149.5	38 02.2	1.0 19	149.4	38 31.6	1.0 19	149.3	39 01.0	1.0 19	149.2	39 29.8	1.0 19	149.2
6	35 23.7	1.0 20	148.9	35 53.1	1.0 20	148.7	36 22.5	1.0 20	148.6	36 51.9	1.0 20	148.5	37 21.2	1.0 20	148.4	37 50.6	1.0 20	148.2	38 19.9	1.0 20	148.1	38 49.2	1.0 20	148.0	39 18.0	1.0 20	148.0
7	35 11.9	1.0 20	147.7	35 41.3	1.0 20	147.6	36 10.6	1.0 20	147.5	36 39.9	1.0 20	147.3	37 09.2	1.0 20	147.2	37 38.5	1.0 20	147.1	38 07.8	1.0 20	146.9	38 37.1	1.0 20	146.8	39 15.1	1.0 20	146.8
8	34 59.7	1.0 21	146.6	35 29.0	1.0 21	146.4	35 58.3	1.0 21	146.3	36 27.6	1.0 21	146.2	36 56.9	1.0 21	146.0	37 26.1	1.0 21	145.9	37 55.4	1.0 21	145.8	38 24.6	1.0 21	145.6	39 12.4	1.0 21	145.6
9	34 47.2	1.0 22	145.4	35 16.4	1.0 22	145.3	35 45.7	1.0 22	145.2	36 14.9	1.0 22	145.0	36 44.1	1.0 22	144.9	37 13.3	1.0 22	144.7	37 42.5	1.0 22	144.6	38 11.7	1.0 22	144.4	38 9.9	1.0 22	144.4
30	34 34.2	1.0 23	144.3	35 03.4	1.0 23	144.2	35 32.6	1.0 23	144.0	36 01.8	1.0 23	143.9	36 31.0	1.0 23	143.7	37 00.2	1.0 23	143.6	37 29.3	1.0 23	143.4	37 58.5	1.0 23	143.3	38 47.1	1.0 23	143.3
1	34 20.9	1.0 23	143.2	34 50.1	1.0 23	143.0	35 19.2	1.0 23	142.9	35 48.4	1.0 23	142.7	36 17.5	1.0 23	142.6	36 46.6	1.0 23	142.4	37 15.8	1.0 23	142.3	37 44.9	1.0 23	142.1	38 35.9	1.0 23	142.1
2	34 07.3	1.0 23	142.0	34 36.4	1.0 23	141.9	35 05.5	1.0 23	141.7	35 34.6	1.0 23	141.6	36 03.7	1.0 23	141.4	36 32.8	1.0 23	141.3	37 01.8	1.0 23	141.1	37 30.9	1.0 23	141.0	38 19.9	1.0 23	141.0
3	33 53.3	1.0 24	140.9	34 22.9	1.0 24	140.8	34 51.4	1.0 24	140.6	35 20.5	1.0 24	140.4	35 49.5	1.0 24	140.3	36 18.5	1.0 24	140.1	36 47.5	1.0 24	140.0	37 16.5	1.0 24	139.8	37 35.0	1.0 24	139.8
4	33 38.9	1.0 24	139.8	34 07.9	1.0 24	139.6	34 37.0	1.0 24	139.5	35 06.0	1.0 24	139.3	35 35.0	1.0 24	139.2	36 03.9	1.0 24	139.0	36 32.9	1.0 24	138.8	37 01.9	1.0 24	138.7	37 19.5	1.0 24	138.7
35	33 24.2	1.0 25	138.7	33 53.2	1.0 25	138.5	34 22.2	1.0 25	138.4	34 51.2	1.0 25	138.2	35 2														

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
00	600.0	1.00 180.0	530.0	1.00 180.0	500.0	1.00 180.0											00
1	559.8	1.001 179.0	529.8	1.001 179.0													1
2	559.2	1.002 178.1	529.2	1.002 178.1													2
3	558.3	1.003 177.1	528.3	1.003 177.1													3
4	557.0	1.003 176.1	527.0	1.003 176.1													4
05	555.3	1.003 175.2	525.3	1.003 175.2													05
6	553.2	1.004 174.2	523.2	1.004 174.2													6
7	550.7	1.005 173.2	520.8	1.005 173.3													7
8	547.9	1.005 172.3	517.9	1.005 172.3													8
9	544.7	1.006 171.3	514.7	1.006 171.3													9
10	541.1	1.007 170.3	511.2	1.007 170.4													10
1	537.1	1.007 169.4	507.2	1.007 169.4													1
2	532.8	1.008 168.4	502.9	1.008 168.5													2
3	528.1	1.008 167.5															3
4	523.0	1.009 166.5															4
15	517.6	1.010 165.5															15
6	511.8	1.010 164.6															6
7	505.7	1.011 163.6															7

Lat. 68°

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
91	1426.1	92 37 83.0	1453.8	92 37 82.8	1521.4	92 37 82.6	1549.1	92 37 82.4	1616.7	92 37 82.1	1644.3	92 37 81.9	1711.9	92 37 81.7	1739.5	92 37 81.5	91
2	1403.8	92 37 82.0	1431.5	92 37 81.8	1499.1	92 37 81.6	1526.8	92 37 81.4	1594.4	92 37 81.2	1622.1	92 37 81.0	1689.7	92 37 80.8	1717.3	92 37 80.6	2
3	1381.6	92 37 81.1	1409.3	92 37 80.9	1466.9	92 37 80.7	1504.6	92 37 80.5	1532.3	92 37 80.3	1559.9	92 37 80.1	1627.5	92 37 79.9	1655.1	92 37 79.7	3
4	1359.4	92 37 80.2	1387.1	92 37 80.0	1444.8	92 37 79.8	1482.5	92 37 79.6	1510.1	92 37 79.4	1537.8	92 37 79.2	1605.4	92 37 79.0	1633.1	92 37 78.8	4
95	1257.3	92 37 79.3	1325.0	92 37 79.1	1392.7	92 37 78.9	1420.4	92 37 78.7	1448.1	92 37 78.5	1515.7	92 37 78.3	1583.4	92 37 78.1	1651.0	92 37 77.9	95
6	1235.2	92 37 78.4	1303.0	92 37 78.2	1370.7	92 37 78.0	1398.4	92 37 77.8	1426.1	92 37 77.6	1493.7	92 37 77.4	1561.4	92 37 77.2	1629.0	92 37 77.0	6
7	1213.3	92 36 77.5	1281.0	92 36 77.3	1348.7	92 36 77.1	1376.4	92 36 76.9	1404.2	92 36 76.7	1471.8	92 36 76.5	1539.5	92 36 76.3	1607.1	92 36 76.1	7
8	1191.4	92 36 76.6	1259.1	92 36 76.4	1326.8	92 36 76.2	1354.5	92 36 76.0	1382.3	92 36 75.8	1449.9	92 36 75.6	1517.6	92 36 75.4	1585.2	92 36 75.2	8
9	1169.5	92 36 75.7	1237.2	92 36 75.5	1304.9	92 36 75.3	1332.6	92 36 75.1	1360.4	92 36 74.9	1428.0	92 36 74.7	1495.7	92 36 74.5	1563.3	92 36 74.3	9
100	1107.8	92 36 74.8	1175.5	92 36 74.6	1243.2	92 36 74.4	1270.9	92 36 74.2	1298.6	92 36 74.0	1366.2	92 36 73.8	1433.9	92 36 73.6	1501.5	92 36 73.4	100
1	1085.9	92 36 73.8	1153.6	92 36 73.6	1221.3	92 36 73.4	1249.0	92 36 73.2	1276.7	92 36 73.0	1344.3	92 36 72.8	1412.0	92 36 72.6	1479.6	92 36 72.4	1
2	1064.0	92 36 72.9	1131.7	92 36 72.7	1199.4	92 36 72.5	1227.1	92 36 72.3	1254.8	92 36 72.1	1322.4	92 36 71.9	1390.1	92 36 71.7	1457.7	92 36 71.5	2
3	1042.1	92 36 72.0	1109.8	92 36 71.8	1177.5	92 36 71.6	1205.2	92 36 71.4	1232.9	92 36 71.2	1300.5	92 36 71.0	1368.2	92 36 70.8	1435.8	92 36 70.6	3
4	1020.2	92 35 71.1	1087.9	92 35 70.9	1155.6	92 35 70.7	1183.3	92 35 70.5	1211.0	92 35 70.3	1278.6	92 35 70.1	1346.3	92 35 69.9	1413.9	92 35 69.7	4
105	920.7	92 35 70.2	988.4	92 35 70.0	1056.1	92 35 69.8	1083.8	92 35 69.6	1111.5	92 35 69.4	1179.1	92 35 69.2	1246.8	92 35 69.0	1314.4	92 35 68.8	105
6	898.8	92 35 69.3	966.5	92 35 69.1	1034.2	92 35 68.9	1061.9	92 35 68.7	1089.6	92 35 68.5	1157.2	92 35 68.3	1224.9	92 35 68.1	1292.5	92 35 67.9	6
7	876.9	92 35 68.4	944.6	92 35 68.2	1012.3	92 35 68.0	1040.0	92 35 67.8	1067.7	92 35 67.6	1135.3	92 35 67.4	1203.0	92 35 67.2	1270.6	92 35 67.0	7
8	855.0	92 34 67.5	922.7	92 34 67.3	990.4	92 34 67.1	1018.1	92 34 66.9	1045.8	92 34 66.7	1113.4	92 34 66.5	1181.1	92 34 66.3	1248.7	92 34 66.1	8
9	833.1	92 34 66.6	900.8	92 34 66.4	968.5	92 34 66.2	996.2	92 34 66.0	1023.9	92 34 65.8	1091.5	92 34 65.6	1159.2	92 34 65.4	1226.8	92 34 65.2	9
110	736.5	92 34 65.7	804.2	92 34 65.5	871.9	92 34 65.3	900.6	92 34 65.1	928.3	92 34 64.9	995.9	92 34 64.7	1063.6	92 34 64.5	1131.2	92 34 64.3	110
1	714.6	92 34 64.8	782.3	92 34 64.6	850.0	92 34 64.4	878.7	92 34 64.2	907.4	92 34 64.0	975.0	92 34 63.8	1042.7	92 34 63.6	1110.3	92 34 63.4	1
2	692.7	92 34 63.9	760.4	92 34 63.7	828.1	92 34 63.5	856.8	92 34 63.3	885.5	92 34 63.1	953.1	92 34 62.9	1020.8	92 34 62.7	1088.4	92 34 62.5	2
3	670.8	92 33 63.0	738.5	92 33 62.8	806.2	92 33 62.6	834.9	92 33 62.4	863.6	92 33 62.2	931.2	92 33 62.0	998.9	92 33 61.8	1066.5	92 33 61.6	3
4	648.9	92 33 62.1	716.6	92 33 61.9	784.3	92 33 61.7	813.0	92 33 61.5	841.7	92 33 61.3	909.3	92 33 61.1	977.0	92 33 60.9	1044.6	92 33 60.7	4
115	556.0	92 33 61.2	623.7	92 33 61.0	691.4	92 33 60.8	720.1	92 33 60.6	748.8	92 33 60.4	816.4	92 33 60.2	884.1	92 33 60.0	951.7	92 33 59.8	115
6	534.1	92 32 60.2	601.8	92 32 60.0	669.5	92 32 59.8	698.2	92 32 59.6	726.9	92 32 59.4	794.5	92 32 59.2	862.2	92 32 59.0	929.8	92 32 58.8	6
7	512.2	92 32 59.3	579.9	92 32 59.1	647.6	92 32 58.9	676.3	92 32 58.7	705.0	92 32 58.5	772.6	92 32 58.3	840.3	92 32 58.1	908.0	92 32 57.9	7
8	490.3	92 32 58.4	558.0	92 32 58.2	625.7	92 32 58.0	654.4	92 32 57.8	683.1	92 32 57.6	750.7	92 32 57.4	818.4	92 32 57.2	886.1	92 32 57.0	8
9	468.4	92 31 57.5	536.1	92 31 57.3	603.8	92 31 57.1	632.5	92 31 56.9	661.2	92 31 56.7	728.8	92 31 56.5	796.5	92 31 56.3	864.2	92 31 56.1	9
120					516.6	92 31 56.3	545.3	92 31 56.1	574.0	92 31 55.9	641.6	92 31 55.7	709.3	92 31 55.5	777.0	92 31 55.3	120
1							524.7	92 31 55.2	553.4	92 31 55.0	621.0	92 31 54.8	688.7	92 31 54.6	756.4	92 31 54.4	1
2							502.8	92 30 54.3	531.5	92 30 54.1	600.1	92 30 53.9	667.8	92 30 53.7	735.5	92 30 53.5	2
3									518.4	92 30 53.2	547.1	92 30 53.0	615.7	92 30 52.8	683.4	92 30 52.6	3
4									500.5	92 29 52.3	529.2	92 29 52.1	597.8	92 29 51.9	665.5	92 29 51.7	4
125											511.3	92 29 51.3	540.0	92 29 51.1	608.7	92 29 50.9	125
6													522.5	92 29 50.2	591.2	92 29 50.0	6
7													505.3	92 28 49.3	574.0	92 28 49.1	7
8															517.1	92 28 48.2	8
9															500.4	92 27 47.3	9



H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.
	Alt.	Az.															
91	18 07.1	81.3	18 34.6	81.1	19 02.2	80.9	19 29.7	80.7	19 57.2	80.5	20 24.8	80.3	20 52.2	80.1	21 19.7	79.8	91
2	17 44.9	80.4	18 12.5	80.2	18 40.0	80.0	19 07.6	79.8	19 35.1	79.6	20 02.6	79.4	20 30.1	79.2	20 57.6	78.9	2
3	17 22.7	79.5	17 50.3	79.3	18 17.9	79.1	18 45.5	78.9	19 13.0	78.7	19 40.6	78.5	20 08.1	78.3	20 35.6	78.0	3
4	17 00.7	78.6	17 28.3	78.4	17 55.9	78.2	18 23.5	78.0	18 51.0	77.8	19 18.6	77.6	19 46.1	77.4	20 13.7	77.2	4
95	16 38.7	77.7	17 06.3	77.5	17 33.9	77.3	18 01.5	77.1	18 29.1	76.9	18 56.7	76.7	19 24.2	76.5	19 51.8	76.3	95
6	16 16.8	76.8	16 44.4	76.6	17 12.0	76.4	17 39.6	76.2	18 07.3	76.0	18 34.8	75.8	19 02.4	75.6	19 30.0	75.4	6
7	15 54.9	75.9	16 22.6	75.7	16 50.2	75.5	17 17.9	75.3	17 45.5	75.1	18 13.1	74.9	18 40.7	74.7	19 08.3	74.5	7
8	15 33.2	75.0	16 00.8	74.8	16 28.5	74.6	16 56.2	74.4	17 23.8	74.2	17 51.5	74.0	18 19.1	73.8	18 46.7	73.6	8
9	15 11.5	74.1	15 39.2	73.9	16 06.9	73.7	16 34.6	73.5	17 02.2	73.3	17 29.9	73.1	17 57.5	72.9	18 25.2	72.7	9
100	14 49.9	73.2	15 17.7	73.0	15 45.4	72.8	16 13.1	72.6	16 40.8	72.4	17 08.4	72.2	17 36.1	72.0	18 03.8	71.8	100
1	14 28.5	72.3	14 56.2	72.1	15 24.0	71.9	15 51.7	71.7	16 19.4	71.5	16 47.1	71.3	17 14.8	71.1	17 42.5	70.9	1
2	14 07.1	71.4	14 34.9	71.2	15 02.6	71.0	15 30.4	70.8	15 58.1	70.6	16 25.9	70.4	16 53.6	70.2	17 21.3	70.0	2
3	13 45.9	70.5	14 13.7	70.3	14 41.4	70.1	15 09.2	69.9	15 37.0	69.7	16 04.7	69.5	16 32.5	69.3	17 00.2	69.1	3
4	13 24.7	69.6	13 52.6	69.4	14 20.4	69.2	14 48.2	69.0	15 16.0	68.8	15 43.8	68.6	16 11.5	68.4	16 39.3	68.2	4
105	13 03.7	68.7	13 31.6	68.5	13 59.4	68.3	14 27.2	68.1	14 55.1	67.9	15 22.9	67.7	15 50.7	67.5	16 18.5	67.3	105
6	12 42.8	67.8	13 10.7	67.6	13 38.6	67.4	14 06.5	67.2	14 34.3	67.0	15 02.1	66.8	15 30.0	66.6	15 57.8	66.4	6
7	12 22.1	66.9	12 50.0	66.7	13 17.9	66.5	13 45.8	66.3	14 13.7	66.1	14 41.5	65.9	15 09.4	65.7	15 37.3	65.5	7
8	12 01.5	66.0	12 29.4	65.8	12 57.4	65.6	13 25.3	65.4	13 53.2	65.2	14 21.1	65.0	14 49.0	64.8	15 16.9	64.6	8
9	11 41.0	65.1	12 09.0	64.9	12 37.0	64.7	13 04.9	64.5	13 32.8	64.3	14 00.8	64.1	14 28.7	63.9	14 56.6	63.7	9
110	11 20.7	64.2	11 48.7	64.0	12 16.7	63.8	12 44.7	63.6	13 12.7	63.4	13 40.6	63.2	14 08.6	63.0	14 36.5	62.8	110
1	11 00.5	63.3	11 28.6	63.1	11 56.6	62.9	12 24.6	62.7	12 52.6	62.5	13 20.6	62.3	13 48.6	62.1	14 16.6	61.9	1
2	10 40.5	62.5	11 08.6	62.3	11 36.7	62.1	12 04.7	61.9	12 32.7	61.7	13 00.8	61.5	13 28.8	61.3	13 56.8	61.1	2
3	10 20.7	61.6	10 48.8	61.4	11 16.9	61.2	11 45.0	61.0	12 13.0	60.8	12 41.1	60.6	13 09.2	60.4	13 37.2	60.2	3
4	10 01.0	60.7	10 29.1	60.5	10 57.3	60.3	11 25.4	60.1	11 53.5	60.0	12 21.6	59.8	12 49.7	59.6	13 17.8	59.4	4
115	9 41.5	59.8	10 09.7	59.6	10 37.8	59.4	11 06.0	59.2	11 34.1	59.0	12 02.3	58.8	12 30.4	58.6	12 58.5	58.4	115
6	9 22.2	58.9	9 50.4	58.7	10 18.6	58.5	10 46.7	58.3	11 14.9	58.1	11 43.1	57.9	12 11.3	57.7	12 39.4	57.5	6
7	9 03.0	58.0	9 31.3	57.8	9 59.5	57.6	10 27.7	57.4	10 55.9	57.2	11 24.1	57.0	11 52.3	56.8	12 20.5	56.6	7
8	8 44.1	57.1	9 12.3	56.9	9 40.6	56.7	10 08.9	56.5	10 37.1	56.3	11 05.4	56.1	11 33.6	55.9	12 01.8	55.7	8
9	8 25.3	56.2	8 53.6	56.0	9 21.9	55.8	9 50.2	55.6	10 18.5	55.4	10 46.8	55.2	11 15.0	55.0	11 43.3	54.8	9
120	8 06.7	55.3	8 35.1	55.1	9 03.4	54.9	9 31.7	54.7	10 00.1	54.5	10 28.4	54.3	10 56.7	54.1	11 25.0	53.9	120
1	7 48.3	54.4	8 16.7	54.2	8 45.1	54.0	9 13.5	53.8	9 41.8	53.6	10 10.2	53.4	10 38.6	53.2	11 06.9	53.0	1
2	7 30.2	53.5	7 58.6	53.3	8 27.0	53.1	8 55.4	52.9	9 23.8	52.7	9 52.2	52.5	10 20.6	52.3	10 49.0	52.1	2
3	7 12.2	52.6	7 40.7	52.4	8 09.1	52.2	8 37.6	52.0	9 06.0	51.8	9 34.4	51.6	10 02.9	51.4	10 31.3	51.2	3
4	6 54.5	51.7	7 23.0	51.5	7 51.4	51.3	8 19.9	51.1	8 48.4	50.9	9 16.9	50.7	9 45.4	50.5	10 13.8	50.3	4
125	6 36.9	50.8	7 05.5	50.6	7 34.0	50.4	8 02.5	50.2	8 31.0	50.0	8 59.6	49.8	9 28.1	49.6	9 56.6	49.4	125
6	6 19.6	49.9	6 48.2	49.7	7 16.8	49.5	7 45.3	49.3	8 13.9	49.1	8 42.5	48.9	9 11.0	48.7	9 39.6	48.5	6
7	6 02.6	49.0	6 31.2	48.8	6 59.8	48.6	7 28.4	48.4	7 57.0	48.2	8 25.6	48.0	8 54.2	47.8	9 22.8	47.6	7
8	5 45.7	48.1	6 14.4	47.9	6 43.0	47.7	7 11.6	47.5	7 40.3	47.3	8 08.9	47.1	8 37.6	46.9	9 06.2	46.7	8
9	5 29.1	47.2	5 57.8	47.0	6 26.5	46.8	6 55.2	46.6	7 23.8	46.4	7 52.5	46.2	8 21.2	46.0	8 49.9	45.7	9
130	5 12.7	46.3	5 41.5	46.1	6 10.2	45.9	6 38.9	45.7	7 07.6	45.5	7 36.3	45.3	8 05.1	45.1	8 33.8	44.9	130
1			5 25.4	45.2	5 54.1	45.0	6 22.9	44.8	6 51.7	44.6	7 20.4	44.4	7 49.2	44.2	8 17.9	44.0	1
2			5 09.5	44.3	5 38.3	44.1	6 07.1	43.9	6 35.9	43.7	7 04.7	43.5	7 33.5	43.3	8 02.3	43.1	2
3					5 22.8	43.3	5 51.6	43.1	6 20.5	42.9	6 49.3	42.7	7 18.2	42.5	7 47.0	42.3	3
4					5 07.5	42.4	5 36.4	42.2	6 05.3	42.0	6 34.2	41.8	7 03.0	41.6	7 31.9	41.4	4
135							5 21.4	41.4	5 50.3	41.2	6 19.2	41.0	6 48.2	40.8	7 17.1	40.6	135
6							5 06.7	40.5	5 35.7	40.3	6 04.6	40.1	6 33.6	39.9	7 02.5	39.7	6
7									5 21.2	39.4	5 50.2	39.2	6 19.2	39.0	6 48.2	38.8	7
8									5 07.1	38.5	5 36.1	38.3	6 05.2	38.1	6 34.2	37.9	8
9											5 22.3	37.5	5 51.4	37.3	6 20.5	37.1	9
140											5 08.8	36.6	5 37.9	36.4	6 07.0	36.2	140
1													5 24.7	35.6	5 53.8	35.4	1
2													5 11.7	34.7	5 40.9	34.5	2
3															5 28.3	33.7	3
4															5 16.0	32.8	4
145															5 04.0	31.9	145

Lat. 68°

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'	
	Alt.	As.														
00	46 00.0	1.00 180.0	46 30.0	1.00 180.0	47 00.0	1.00 180.0	47 30.0	1.00 180.0	48 00.0	1.00 180.0	48 30.0	1.00 180.0	49 00.0	1.00 180.0	49 30.0	1.00 180.0
1	45 59.7	1.001 178.7	46 29.7	1.001 178.7	46 59.7	1.001 178.7	47 29.7	1.001 178.7	47 59.7	1.001 178.7	48 29.7	1.001 178.7	48 59.7	1.001 178.7	49 29.7	1.001 178.7
2	45 59.0	1.002 177.4	46 29.0	1.002 177.4	46 59.0	1.002 177.3	47 29.0	1.002 177.3	47 58.9	1.002 177.3	48 28.9	1.002 177.3	48 58.9	1.002 177.3	49 28.9	1.002 177.3
3	45 57.7	1.003 176.1	46 27.7	1.003 176.0	46 57.7	1.003 176.0	47 27.7	1.003 176.0	47 57.6	1.003 176.0	48 27.6	1.003 176.0	48 57.6	1.003 176.0	49 27.6	1.003 176.0
4	45 55.9	1.004 174.7	46 25.9	1.004 174.7	46 55.8	1.004 174.7	47 25.8	1.004 174.7	47 55.8	1.004 174.6	48 25.8	1.004 174.6	48 55.7	1.004 174.6	49 25.7	1.004 174.5
06	45 53.6	1.005 173.4	46 23.5	1.005 173.4	46 53.5	1.005 173.4	47 23.5	1.005 173.3	47 53.4	1.005 173.3	48 23.4	1.005 173.3	48 53.4	1.005 173.2	49 23.3	1.005 173.2
6	45 50.7	1.006 172.1	46 20.6	1.006 172.1	46 50.6	1.006 172.0	47 20.6	1.006 172.0	47 50.5	1.006 172.0	48 20.5	1.006 172.0	48 50.4	1.006 172.0	49 20.4	1.006 171.8
7	45 47.4	1.006 170.8	46 17.3	1.006 170.8	46 47.3	1.006 170.7	47 17.2	1.006 170.7	47 47.1	1.007 170.6	48 17.1	1.007 170.6	48 47.0	1.007 170.5	49 16.9	1.007 170.5
8	45 43.6	1.007 169.5	46 13.5	1.007 169.5	46 43.4	1.007 169.4	47 13.3	1.007 169.3	47 43.2	1.007 169.3	48 13.1	1.007 169.2	48 43.0	1.007 169.2	49 12.9	1.007 169.1
9	45 39.2	1.008 168.2	46 09.1	1.008 168.1	46 39.0	1.008 168.1	47 08.9	1.008 168.0	47 38.8	1.008 168.0	48 08.7	1.008 167.9	48 38.5	1.008 167.8	49 08.4	1.008 167.8
10	45 34.1	1.009 166.9	46 04.2	1.009 166.8	46 34.1	1.009 166.8	47 04.0	1.009 166.7	47 33.8	1.009 166.6	48 03.7	1.009 166.6	48 33.5	1.009 166.5	49 03.4	1.009 166.4
1	45 29.0	99 10 165.6	45 58.9	99 10 165.5	46 28.7	99 10 165.5	46 58.5	99 10 165.4	47 28.4	99 10 165.3	47 58.2	99 10 165.2	48 28.0	99 10 165.1	48 57.9	99 10 165.1
2	45 23.9	99 11 164.3	45 53.0	99 11 164.2	46 22.8	99 11 164.1	46 52.6	99 11 164.1	47 22.4	99 11 164.0	47 52.2	99 11 163.9	48 22.0	99 11 163.8	48 51.8	99 11 163.7
3	45 18.9	99 11 163.0	45 47.7	99 11 162.9	46 16.4	99 11 162.8	46 46.2	99 11 162.8	47 16.0	99 11 162.7	47 45.7	99 11 162.6	48 15.5	99 11 162.5	48 45.3	99 11 162.4
4	45 10.1	99 12 161.7	45 39.8	99 12 161.6	46 09.6	99 12 161.5	46 39.3	99 12 161.5	47 09.0	99 12 161.4	47 38.8	99 12 161.3	48 08.5	99 12 161.2	48 38.2	99 12 161.1
15	45 02.8	99 13 160.4	45 32.5	99 13 160.4	46 02.2	99 13 160.3	46 31.9	99 13 160.1	47 01.6	99 13 160.0	47 31.3	99 13 159.9	48 01.0	99 13 159.8	48 30.7	99 13 159.7
6	44 55.0	99 14 159.2	45 24.7	99 14 159.1	45 54.4	99 14 159.0	46 24.0	99 14 158.9	46 53.7	99 14 158.7	47 23.3	99 14 158.6	47 53.0	99 14 158.5	48 22.6	99 14 158.4
7	44 46.8	99 14 157.9	45 16.4	99 15 157.8	45 46.1	99 15 157.7	46 15.7	99 15 157.6	46 45.3	99 15 157.4	47 14.9	99 15 157.3	47 44.5	99 15 157.2	48 14.1	99 15 157.1
8	44 38.1	99 15 156.6	45 07.7	99 15 156.5	45 37.3	99 15 156.4	46 06.9	99 15 156.3	46 36.5	99 15 156.2	47 06.0	99 15 156.0	47 35.6	99 15 155.9	48 05.1	99 15 155.8
9	44 29.0	99 16 155.4	44 58.5	99 16 155.2	45 28.1	99 16 155.1	45 57.6	99 16 155.0	46 27.1	99 16 154.9	46 56.7	99 16 154.7	47 26.2	99 16 154.6	47 55.7	99 16 154.5
20	44 19.4	98 17 154.1	44 48.9	98 17 154.0	45 18.4	98 17 153.8	45 47.9	98 17 153.7	46 17.4	98 17 153.6	46 46.8	98 17 153.5	47 16.3	98 17 153.3	47 45.8	98 17 153.2
1	44 09.3	98 17 152.9	44 38.8	98 18 152.7	45 08.3	98 18 152.6	45 37.7	98 18 152.4	46 07.1	98 18 152.3	46 36.6	98 18 152.2	47 06.0	98 18 152.0	47 35.4	98 18 151.9
2	43 58.9	98 18 151.6	44 28.3	98 18 151.5	44 57.7	98 18 151.3	45 27.1	98 18 151.2	45 56.5	98 18 151.0	46 25.9	98 19 150.9	46 55.2	98 19 150.7	47 24.6	98 19 150.6
3	43 48.0	98 19 150.4	44 17.3	98 19 150.2	44 46.7	98 19 150.1	45 16.0	98 19 149.9	45 45.4	98 19 149.8	46 14.7	98 19 149.6	46 44.0	98 19 149.5	47 13.3	98 19 149.3
4	43 36.6	98 20 149.1	44 06.0	98 20 149.0	44 35.3	98 20 148.8	45 04.6	98 20 148.7	45 33.9	98 20 148.5	46 03.1	98 20 148.4	46 32.4	98 20 148.2	47 01.6	98 20 148.0
25	43 24.9	98 20 147.9	43 54.2	98 20 147.7	44 23.4	98 20 147.6	44 52.7	98 21 147.4	45 21.9	98 21 147.3	45 51.1	98 21 147.1	46 20.3	98 21 146.9	46 49.5	98 21 146.8
6	43 12.7	98 21 146.7	43 42.0	98 21 146.5	44 11.2	98 21 146.4	44 40.4	98 21 146.2	45 09.6	98 21 146.0	45 38.7	98 21 145.9	46 07.9	98 21 145.7	46 37.0	98 21 145.5
7	43 00.2	98 22 145.5	43 29.4	98 22 145.3	43 58.5	98 22 145.1	44 27.7	98 22 145.0	44 56.8	98 22 144.8	45 25.9	98 22 144.6	45 55.0	98 22 144.4	46 24.1	98 22 144.3
8	42 47.3	98 22 144.2	43 16.4	98 22 144.1	43 45.5	98 22 143.9	44 14.6	98 22 143.7	44 43.6	98 22 143.6	45 12.7	98 22 143.4	45 41.7	98 22 143.2	46 10.8	98 22 143.0
9	42 33.9	98 23 143.0	43 03.0	98 23 142.9	43 32.0	98 23 142.7	44 01.1	98 23 142.5	44 30.1	98 23 142.3	44 59.1	98 23 142.2	45 28.1	98 23 142.0	45 57.1	98 23 141.8
30	42 20.2	98 23 141.8	42 49.2	98 24 141.7	43 18.2	98 24 141.5	43 47.2	98 24 141.3	44 16.2	98 24 141.1	44 45.1	98 24 140.9	45 14.1	98 24 140.8	45 43.0	98 24 140.6
1	42 06.2	98 24 140.6	42 35.1	98 24 140.5	43 04.1	98 24 140.3	43 33.0	98 24 140.1	44 01.9	98 24 139.9	44 30.8	98 25 139.7	44 59.7	98 25 139.5	45 28.5	98 25 139.3
2	41 51.7	98 25 139.5	42 20.6	98 25 139.3	42 49.5	98 25 139.1	43 18.4	98 25 138.9	43 47.2	98 25 138.7	44 16.1	98 25 138.5	44 44.9	98 25 138.3	45 13.7	98 25 138.1
3	41 36.9	98 25 138.3	42 05.8	98 25 138.1	42 34.6	98 25 137.9	43 03.4	98 25 137.7	43 32.2	98 25 137.5	44 01.0	98 25 137.3	44 29.8	98 25 137.1	44 58.5	98 25 136.9
4	41 21.8	98 26 137.1	41 50.6	98 26 136.9	42 19.4	98 26 136.7	42 48.1	98 26 136.5	43 16.9	98 26 136.3	43 45.6	98 26 136.1	44 14.3	98 26 135.9	44 43.0	98 26 135.7
35	41 06.3	98 26 135.9	41 35.1	98 26 135.8	42 03.8	98 26 135.6	42 32.5	98 27 135.4	43 01.2	98 27 135.2	43 29.9	98 27 135.0	43 58.5	98 27 134.8	44 27.1	98 27 134.5
6	40 50.5	98 27 134.8	41 19.2	98 27 134.6	41 47.9	98 27 134.4	42 16.6	98 27 134.2	42 45.2	98 27 134.0	43 13.8	98 27 133.8	43 42.4	98 27 133.6	44 11.0	98 27 133.4
7	40 34.4	98 27 133.6	41 03.1	98 27 133.4	41 31.7	98 28 133.2	42 00.3	98 28 133.0	42 28.9	98 28 132.8	42 57.4	98 28 132.6	43 25.9	98 28 132.4	43 54.5	98 28 132.2
8	40 18.0	98 28 132.5	40 46.6	98 28 132.3	41 15.2	98 28 132.1	41 43.7	98 28 131.9	42 12.2	98 28 131.7	42 40.7	98 28 131.5	43 09.2	98 28 131.2	43 37.6	98 28 131.0
9	40 01.3	98 28 131.3	40 29.8	98 28 131.1	40 58.3	98 29 130.9	41 26.8	98 29 130.7	41 55.3	98 29 130.5	42 23.7	98 29 130.3	42 52.1	98 29 130.1	43 20.5	98 29 129.9
40	39 44.3	98 29 130.2	40 12.8	98 29 130.0	40 41.2	98 29 129.8	41 09.6	98 29 129.6	41 38.1	98 29 129.4	42 06.4	98 29 129.2	42 34.8	98 29 129.0	43 03.1	98 29 128.7
1	39 27.9	98 29 129.1	39 55.4	98 29 128.9	40 23.8	98 29 128.7	40 52.2	98 29 128.5	41 20.5	98 30 128.3	41 48.9	98 30 128.0	42 17.2	98 30 127.8	42 45.5	98 30 127.6
2	39 09.0	98 30 128.0	39 37.8	98 30 127.8	40 06.1	98 30 127.5	40 34.4	98 30 127.3	41 02.8	98 30 127.1	41 31.0	98 30 126.9	41 59.3	98 30 126.7	42 27.0	98 30 126.4
3	38 51.5	98 30 126.9	39 19.9	98 30 126.6	39 48.2	98 30 126.4	40 16.4	98 30 126.2	40 44.7	98 31 126.0	41 12.9	98 31 125.8	41 41.1	98 31 125.5	42 09.3	98 31 125.3
4	38 33.4	98 31 125.8	39 01.7	98 31 125.5	39 29.9	98 31 125.3	39 58.2	98 31 125.1	40 26.4	98 31 124.9	40 54.6	98 31 124.7	41 22.7	98 31 124.4	41 50.8	98 31 124.2
45	38 15.1	98 31 124.7	38 43.3	98 31 124.4	39 11.5	98 31 124.2	39 39.7	98 31 124.0	40 07.8	98 31 123.8	40 36.0	98 31 123.5	41 04.1	98 31 123.3	41 32.1	98 31 123.0
6	37 56.4	98 31 123.6	38 24.6	98 31 123.3	38 52.8	98 31 123.1	39 20.9	98 31 122.9	39 49.0	98 31 122.7	40 17.1	98 31 122.4	40 45.2	98 31 122.2	41 13.0	98 31 122.0
7	37 37.6	98 32														

Main table with columns for HA, Azimuth (Az.), and Altitude (Alt.) for various declinations (24° 00' to 27° 30') and latitudes (91 to 180). Each declination column contains two sub-columns for Az. and Alt. values.

Lat. 68°

Lat. 69°

Lat. 68°

H.A.	28° 00'		28° 30'		29° 00'		30° 00'		32° 00'		34° 00'		34° 30'		35° 30'		H.A.					
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.						
00	50 00.0	1.00	180.0	50 30.0	1.00	180.0	51 00.0	1.00	180.0	52 00.0	1.00	180.0	54 00.0	1.00	180.0	56 00.0	1.00	180.0	57 30.0	1.00	180.0	00
1	49 59.7	1.00	178.6	50 29.7	1.00	178.6	50 59.7	1.00	178.6	51 59.7	1.00	178.6	53 59.7	1.00	178.6	55 59.7	1.00	178.5	57 29.7	1.00	178.5	01
2	49 58.9	1.02	177.3	50 28.9	1.02	177.2	50 58.9	1.02	177.2	51 58.9	1.02	177.2	53 58.9	1.02	177.1	55 58.8	1.02	177.0	57 28.8	1.02	177.0	02
3	49 57.6	1.03	175.9	50 27.6	1.03	175.9	50 57.6	1.03	175.8	51 57.6	1.03	175.8	53 57.6	1.03	175.7	55 57.4	1.03	175.5	57 27.3	1.03	175.5	03
4	49 55.7	1.04	174.5	50 25.7	1.04	174.5	50 55.6	1.04	174.4	51 55.6	1.04	174.4	53 55.5	1.04	174.2	55 55.4	1.04	174.0	57 25.3	1.04	173.9	04
05	49 53.3	1.05	173.1	50 23.2	1.05	173.1	50 53.2	1.05	173.0	51 53.1	1.05	172.9	53 52.9	1.05	172.8	55 52.7	1.05	172.6	57 22.7	1.05	172.4	05
6	49 50.3	1.06	171.8	50 20.3	1.06	171.7	50 50.2	1.06	171.6	51 50.1	1.06	171.5	53 49.8	1.06	171.4	55 49.6	1.06	171.1	57 19.5	1.06	170.9	06
7	49 46.8	1.07	170.4	50 16.8	1.07	170.4	50 46.7	1.07	170.3	51 46.5	1.07	170.2	53 46.2	1.07	169.9	55 45.8	1.07	169.6	57 15.5	1.07	169.4	07
8	49 42.8	1.08	169.0	50 12.7	1.08	169.0	50 42.6	1.08	168.9	51 42.4	1.08	168.8	53 42.0	1.08	168.5	55 41.5	1.08	168.2	57 11.1	1.08	167.9	08
9	49 38.3	1.08	167.6	50 08.2	1.08	167.6	50 38.1	1.09	167.5	51 37.8	1.09	167.4	53 37.2	1.09	167.1	55 36.6	09 09	166.7	57 06.1	09 09	166.4	09
10	49 33.2	09 09	166.3	50 03.1	09 09	166.3	50 32.9	09 09	166.2	51 32.6	09 10	166.0	53 31.9	09 10	165.7	55 31.2	09 10	165.2	56 01.0	09 10	165.0	10
1	49 27.7	09 10	165.0	49 57.5	09 10	164.8	50 27.3	09 10	164.8	51 26.9	09 10	164.6	53 26.1	09 11	163.8	55 25.2	09 11	163.3	55 54.9	09 11	163.5	01
2	49 21.6	09 11	163.6	49 51.4	09 11	163.5	50 21.2	09 11	163.4	51 20.7	09 11	163.2	53 19.7	09 12	162.8	55 18.6	09 12	162.4	55 48.4	09 12	162.0	02
3	49 15.0	09 12	162.3	49 44.8	09 12	162.2	50 14.5	09 12	162.1	51 14.0	09 12	161.9	53 12.8	09 13	160.9	55 11.6	09 13	160.9	55 41.2	09 13	160.5	03
4	49 07.9	09 13	160.9	49 37.6	09 13	160.8	50 07.3	09 13	160.7	51 06.7	09 13	160.5	53 05.4	09 13	160.0	55 04.0	09 14	159.5	55 33.6	09 14	159.1	04
15	49 00.3	09 13	159.6	49 30.0	09 14	159.5	49 59.7	09 14	159.4	50 59.0	09 14	159.1	52 57.5	09 14	158.6	54 55.8	09 14	158.1	55 25.4	09 15	157.9	15
6	48 52.3	09 14	158.3	49 21.9	09 14	158.2	49 51.5	09 14	158.0	50 50.7	09 15	157.8	52 49.9	09 15	157.2	54 47.2	09 15	156.7	55 16.7	09 15	156.5	06
7	48 43.7	09 15	157.0	49 13.3	09 15	156.8	49 42.9	09 15	156.7	50 42.0	09 15	156.4	52 40.1	09 16	155.9	54 38.0	09 16	155.2	55 07.5	09 16	155.1	07
8	48 34.7	09 16	155.6	49 04.2	09 16	155.5	49 33.7	09 16	155.4	50 32.7	09 16	155.1	52 30.6	09 17	154.5	54 28.4	09 17	153.8	54 57.7	09 17	153.3	08
9	48 25.2	09 17	154.3	48 54.7	09 17	154.2	49 24.1	09 17	154.1	50 23.0	09 17	153.8	52 20.7	09 17	153.1	54 18.2	09 18	152.4	54 47.5	09 18	152.3	09
20	48 15.2	09 17	153.0	48 44.6	09 18	152.9	49 14.1	09 18	152.8	50 12.9	09 18	152.4	52 10.3	09 18	151.8	54 07.6	09 19	151.1	54 36.8	09 19	150.9	20
1	48 04.8	09 18	151.7	48 34.2	09 18	151.6	49 03.5	09 18	151.5	50 02.2	09 18	151.1	51 59.5	09 19	150.4	53 56.5	09 19	149.5	54 25.7	09 19	149.5	01
2	47 53.9	09 19	150.4	48 23.2	09 19	150.3	48 52.6	09 19	150.1	49 51.2	09 19	149.8	51 48.2	09 20	149.1	53 44.9	09 20	148.3	54 14.0	09 20	148.1	02
3	47 42.6	09 20	149.2	48 11.9	09 20	149.0	48 41.1	09 20	148.8	49 39.6	09 20	148.5	51 36.4	09 20	147.8	53 32.8	09 21	147.0	54 01.9	09 21	146.8	03
4	47 30.9	09 20	147.9	48 00.1	09 20	147.7	48 29.3	09 20	147.5	49 27.7	09 21	147.2	51 24.2	09 21	146.4	53 20.4	09 21	145.6	53 49.4	09 22	145.4	04
25	47 18.7	09 21	146.6	47 47.9	09 21	146.4	48 17.0	09 21	146.3	49 15.3	09 21	145.9	51 11.5	09 22	145.1	53 07.5	09 22	144.3	53 36.4	09 22	144.1	25
6	47 06.1	09 22	145.3	47 35.2	09 22	145.2	48 04.3	09 22	145.0	49 02.5	09 22	144.6	50 58.5	09 22	143.8	52 54.1	09 23	143.0	53 23.0	09 23	142.7	06
7	46 53.2	09 22	144.1	47 22.2	09 22	143.9	47 51.2	09 22	143.7	48 49.2	09 22	143.3	50 45.0	09 23	142.5	52 40.4	09 23	141.6	53 09.2	09 23	141.4	07
8	46 39.8	09 23	142.8	47 08.8	09 23	142.7	47 37.7	09 23	142.5	48 35.6	09 23	142.1	50 31.1	09 24	141.2	52 26.2	09 24	140.3	52 54.9	09 24	140.1	08
9	46 26.0	09 24	141.6	46 54.9	09 24	141.4	47 23.8	09 24	141.2	48 21.6	09 24	140.8	50 16.8	09 24	140.0	52 11.7	09 25	139.0	52 40.3	09 25	138.8	09
30	46 11.9	09 24	140.4	46 40.7	09 24	140.2	47 09.6	09 24	140.0	48 07.2	09 25	139.6	50 02.2	09 25	138.7	51 56.8	09 25	137.7	52 25.3	09 25	137.5	30
1	45 57.3	09 25	139.1	46 26.1	09 25	138.9	46 54.9	09 25	138.7	47 52.4	09 25	138.3	49 47.2	09 26	137.4	51 41.5	09 26	136.5	52 10.0	09 26	136.2	01
2	45 42.5	09 25	137.9	46 11.2	09 26	137.7	46 39.9	09 26	137.5	47 37.3	09 26	137.1	49 31.8	09 26	136.2	51 25.8	09 27	135.2	51 54.2	09 27	134.9	02
3	45 27.2	09 26	136.7	45 55.9	09 26	136.5	46 24.6	09 26	136.3	47 31.5	09 26	135.9	49 16.1	09 27	134.9	51 09.8	09 27	133.9	51 38.1	09 27	133.7	03
4	45 11.6	09 26	135.5	45 40.3	09 27	135.3	46 08.9	09 27	135.1	47 06.0	09 27	134.6	49 00.0	09 27	133.7	50 53.4	09 28	132.7	51 21.7	09 28	132.4	04
35	44 55.7	09 27	134.3	45 24.3	09 27	134.1	45 52.8	09 27	133.9	46 49.9	09 27	133.4	48 43.6	09 28	132.6	50 36.8	09 28	131.5	51 05.0	09 28	131.2	35
6	44 39.5	09 28	133.1	45 08.0	09 28	132.9	45 36.5	09 28	132.7	46 33.4	09 28	132.2	48 28.6	09 28	131.3	50 19.8	09 29	130.2	50 47.9	09 29	130.0	06
7	44 22.9	09 28	132.0	44 51.4	09 28	131.7	45 19.8	09 28	131.5	46 16.6	09 28	131.1	48 09.8	09 29	130.1	50 02.4	09 29	129.0	50 30.5	09 29	128.8	07
8	44 06.1	09 29	130.8	44 34.5	09 29	130.6	45 02.8	09 29	130.3	45 59.5	09 29	129.9	47 52.4	09 29	128.9	49 44.8	09 30	127.8	50 12.8	09 30	127.5	08
9	43 48.9	09 29	129.6	44 17.2	09 29	129.4	44 45.6	09 29	129.2	45 42.1	09 29	128.7	47 34.8	09 30	127.7	49 26.9	09 30	126.6	49 54.9	09 30	126.3	09
40	43 31.5	09 30	128.5	43 59.7	09 30	128.3	44 28.0	09 30	128.0	45 24.4	09 30	127.5	47 16.9	09 30	126.5	49 08.8	09 31	125.4	49 36.6	09 31	125.2	40
1	43 13.7	09 30	127.3	43 42.0	09 30	127.1	44 10.2	09 30	126.9	45 06.5	09 30	126.4	46 58.7	09 31	125.4	48 50.3	09 31	124.3	49 18.1	09 31	124.0	01
2	42 55.7	09 30	126.2	43 23.9	09 31	126.0	43 52.0	09 31	125.7	44 48.2	09 31	125.2	46 40.2	09 31	124.2	48 31.6	09 32	123.1	48 59.4	09 32	122.8	02
3	42 37.5	09 31	125.1	43 05.6	09 31	124.8	43 33.7	09 31	124.6	44 29.7	09 31	124.1	46 21.5	09 32	123.1	48 12.7	09 32	122.0	48 40.4	09 32	121.7	03
4	42 18.9	09 31	124.0	42 47.0	09 31	123.7	43 15.0	09 31	123.5	44 11.0	09 32	123.0	46 02.6	09 32	121.9	47 53.5	09 32	120.8	48 21.1	09 32	120.5	04

Main table with columns for H.A., latitude (28° 00' to 35° 30'), and declination values. Includes sub-headers for Alt., Az., and Ad At.

Lat. 68°

Lat. 69°

Lat. 68°

H.A.	36° 00'		37° 00'		38° 30'		40° 00'		42° 00'		42° 30'		43° 00'		45° 00'	
	Alt.	Az.														
00	58 00.0	1.00 180.0	59 00.0	1.00 180.0	60 30.0	1.00 180.0	62 00.0	1.00 180.0	64 00.0	1.00 180.0	64 30.0	1.00 180.0	65 00.0	1.00 180.0	67 00.0	1.00 180.0
1	57 59.7	1.00 178.5	58 59.7	1.00 178.4	60 29.7	1.00 178.4	61 59.7	1.00 178.4	63 59.7	1.00 178.3	64 29.7	1.00 178.3	64 59.7	1.00 178.3	66 59.7	1.00 178.2
2	57 58.8	1.00 176.9	58 58.8	1.00 176.9	60 28.8	1.00 176.8	61 58.8	1.00 176.7	63 58.7	1.00 176.6	64 28.7	1.00 176.6	64 58.7	1.00 176.5	66 58.7	1.00 176.4
3	57 57.3	1.00 175.4	58 57.3	1.00 175.4	60 27.2	1.00 175.2	61 57.1	1.00 175.1	63 57.0	1.00 174.9	64 27.0	1.00 174.9	64 56.9	1.00 174.8	66 56.9	1.00 174.6
4	57 55.2	1.00 173.9	58 55.1	1.00 173.8	60 25.0	1.00 173.7	61 54.9	1.00 173.5	63 54.7	1.00 173.2	64 24.6	1.00 173.2	64 54.6	1.00 173.1	66 54.3	1.00 172.8
05	57 52.5	1.00 172.4	58 52.4	1.00 172.3	60 22.2	1.00 172.1	61 52.0	1.00 171.9	63 51.7	1.00 171.5	64 21.6	1.00 171.5	64 51.5	1.00 171.4	66 51.2	1.00 171.0
6	57 49.3	1.00 170.9	58 49.1	1.00 170.7	60 18.8	1.00 170.5	61 48.5	1.00 170.2	63 48.1	1.00 169.8	64 18.0	1.00 169.8	64 47.8	1.00 169.7	66 47.3	1.00 169.2
7	57 45.4	1.00 169.4	58 45.2	1.00 169.2	60 14.8	1.00 168.9	61 44.4	1.00 168.6	63 43.8	1.00 168.2	64 13.6	1.00 168.1	64 43.5	1.00 168.0	66 42.7	1.00 167.4
8	57 41.0	1.00 167.8	58 40.7	1.00 167.7	60 10.2	1.00 167.4	61 39.7	1.00 167.0	63 38.9	1.00 166.5	64 08.7	1.00 166.4	64 38.5	1.00 166.3	66 37.5	1.00 165.6
9	57 35.9	1.00 166.3	58 35.6	1.00 166.1	60 05.0	1.00 165.8	61 34.3	1.00 165.0	63 33.3	1.00 164.9	64 03.1	1.00 164.7	64 32.8	1.00 164.6	66 31.6	1.00 163.9
10	57 30.3	1.00 164.8	58 29.9	1.00 164.6	59 59.2	1.00 164.2	61 28.4	1.00 163.8	63 27.2	1.00 163.2	64 56.8	1.00 163.1	64 26.5	1.00 162.9	66 25.0	1.00 162.1
1	57 24.2	1.00 163.3	58 23.6	1.00 163.1	59 52.8	1.00 162.7	61 21.8	1.00 162.2	63 20.4	1.00 161.6	64 50.0	1.00 161.4	64 19.6	1.00 161.2	66 17.8	1.00 160.4
2	57 17.5	1.00 161.9	58 16.8	1.00 161.6	59 45.8	1.00 161.1	61 14.6	1.00 159.7	63 13.0	1.00 159.9	64 42.5	1.00 159.8	64 12.0	1.00 159.6	66 09.9	1.00 158.7
3	57 10.2	1.00 160.4	58 09.4	1.00 160.1	59 38.2	1.00 159.6	61 06.9	1.00 158.1	63 04.9	1.00 158.3	64 34.4	1.00 158.1	64 03.9	1.00 157.9	66 01.4	1.00 157.0
4	57 02.4	1.00 158.9	58 01.5	1.00 158.6	59 30.1	1.00 158.1	60 58.6	1.00 157.5	62 56.4	1.00 156.7	64 25.7	1.00 156.5	63 55.1	1.00 156.3	65 52.3	1.00 155.3
15	56 54.0	1.00 157.5	57 53.0	1.00 157.1	59 21.5	1.00 156.6	60 49.7	1.00 156.0	62 47.2	1.00 155.1	64 16.5	1.00 154.9	63 45.8	1.00 154.6	65 42.6	1.00 153.6
6	56 45.1	1.00 156.0	57 44.0	1.00 155.6	59 12.3	1.00 155.1	60 40.3	1.00 154.5	62 37.5	1.00 153.5	63 06.7	1.00 153.3	63 35.9	1.00 153.0	65 32.3	1.00 151.9
7	56 35.7	1.00 154.6	57 34.5	1.00 154.2	59 02.5	1.00 153.6	60 30.4	1.00 152.9	62 27.2	1.00 152.0	62 56.3	1.00 151.7	63 25.4	1.00 151.4	65 21.5	1.00 150.3
8	56 25.8	1.00 153.1	57 24.5	1.00 152.7	58 52.3	1.00 152.1	60 19.9	1.00 151.4	62 16.3	1.00 150.4	62 45.4	1.00 150.2	63 14.7	1.00 149.9	65 10.1	1.00 148.6
9	56 15.4	1.00 151.7	57 13.9	1.00 151.3	58 41.5	1.00 150.6	60 08.9	1.00 149.9	62 05.0	1.00 148.9	62 33.9	1.00 148.6	63 02.8	1.00 148.3	64 58.1	1.00 147.0
20	56 04.5	1.00 150.3	57 02.9	1.00 149.9	58 30.2	1.00 149.2	59 57.4	1.00 148.4	61 53.1	1.00 147.4	62 22.0	1.00 147.1	62 50.8	1.00 146.8	64 45.6	1.00 145.4
1	55 53.1	1.00 148.9	56 51.3	1.00 148.4	58 18.5	1.00 147.7	59 45.4	1.00 146.7	61 40.7	1.00 145.8	62 09.5	1.00 145.5	62 38.2	1.00 145.2	64 32.6	1.00 143.9
2	55 41.3	1.00 147.5	56 39.3	1.00 147.0	58 06.2	1.00 146.3	59 32.9	1.00 145.5	61 27.9	1.00 144.4	61 56.5	1.00 144.0	62 25.2	1.00 143.7	64 19.1	1.00 142.3
3	55 29.0	1.00 146.1	56 26.9	1.00 145.6	57 53.5	1.00 144.9	59 19.9	1.00 144.1	61 14.5	1.00 142.9	61 43.1	1.00 142.6	62 11.6	1.00 142.2	64 05.1	1.00 140.8
4	55 16.2	1.00 144.7	56 14.0	1.00 144.2	57 40.4	1.00 143.5	59 06.5	1.00 142.6	61 00.8	1.00 141.4	61 29.2	1.00 141.1	61 57.6	1.00 140.7	63 50.7	1.00 139.3
25	55 03.0	1.00 143.4	56 00.8	1.00 142.9	57 26.8	1.00 142.1	58 52.6	1.00 141.2	60 46.5	1.00 140.0	61 14.9	1.00 139.6	61 43.2	1.00 139.3	63 35.8	1.00 137.8
6	54 49.4	1.00 142.0	55 46.8	1.00 141.5	57 12.8	1.00 140.7	58 38.3	1.00 139.8	60 31.0	1.00 138.5	61 00.1	1.00 138.2	61 28.3	1.00 137.8	63 29.3	1.00 136.3
7	54 35.3	1.00 140.7	55 32.6	1.00 140.1	56 58.3	1.00 139.3	58 23.6	1.00 138.4	60 16.8	1.00 137.1	60 44.9	1.00 136.8	61 13.0	1.00 136.4	63 04.8	1.00 134.8
8	54 20.9	1.00 139.3	55 18.0	1.00 138.8	56 43.5	1.00 138.0	58 08.5	1.00 137.0	60 01.3	1.00 135.7	60 29.3	1.00 135.4	60 57.3	1.00 135.0	62 48.6	1.00 133.4
9	54 06.0	1.00 138.0	55 03.0	1.00 137.5	56 28.2	1.00 136.6	57 53.0	1.00 135.7	59 45.4	1.00 134.3	60 13.3	1.00 134.0	60 41.2	1.00 133.6	62 32.1	1.00 132.0
30	53 50.8	1.00 136.7	54 47.6	1.00 136.2	56 12.6	1.00 135.3	57 37.1	1.00 134.3	59 29.1	1.00 133.0	59 57.0	1.00 132.6	60 24.8	1.00 132.2	62 15.2	1.00 130.6
1	53 35.2	1.00 135.4	54 31.9	1.00 134.9	55 56.6	1.00 134.0	57 20.9	1.00 133.0	59 12.5	1.00 131.6	59 40.2	1.00 131.2	60 07.9	1.00 130.9	61 58.0	1.00 129.2
2	53 19.3	1.00 134.1	54 15.8	1.00 133.6	55 40.2	1.00 132.7	57 04.2	1.00 131.7	58 55.5	1.00 130.3	59 23.2	1.00 129.9	59 50.8	1.00 129.5	61 40.4	1.00 127.8
3	53 03.0	1.00 132.9	53 59.3	1.00 132.3	55 23.5	1.00 131.4	56 47.3	1.00 130.4	58 38.2	1.00 129.0	59 06.8	1.00 128.6	59 33.2	1.00 128.2	61 22.5	1.00 126.5
4	52 46.3	1.00 131.6	53 42.5	1.00 131.0	55 06.5	1.00 130.1	56 30.0	1.00 129.1	58 20.5	1.00 127.6	58 48.0	1.00 127.3	59 15.1	1.00 126.9	61 04.3	1.00 125.2
35	52 29.4	1.00 130.4	53 25.4	1.00 129.8	54 49.1	1.00 128.8	56 12.4	1.00 127.8	58 02.6	1.00 126.4	58 30.0	1.00 126.0	58 57.3	1.00 125.6	60 45.7	1.00 123.9
6	52 12.1	1.00 129.1	53 08.0	1.00 128.5	54 31.5	1.00 127.6	55 54.5	1.00 126.6	57 44.4	1.00 125.1	58 11.6	1.00 124.7	58 38.9	1.00 124.3	60 26.9	1.00 122.6
7	51 54.5	1.00 127.9	52 50.2	1.00 127.3	54 13.5	1.00 126.3	55 36.3	1.00 125.3	57 25.8	1.00 123.8	57 53.0	1.00 123.4	58 20.2	1.00 123.0	60 07.9	1.00 121.3
8	51 36.6	1.00 126.7	52 32.2	1.00 126.1	53 55.3	1.00 125.1	55 17.8	1.00 124.1	57 07.0	1.00 122.6	57 34.1	1.00 122.2	58 01.2	1.00 121.8	59 48.5	1.00 120.0
9	51 18.4	1.00 125.5	52 13.9	1.00 124.9	53 36.7	1.00 123.9	54 59.1	1.00 122.8	56 47.9	1.00 121.3	57 15.0	1.00 120.9	57 41.9	1.00 120.5	59 28.9	1.00 118.8
40	51 00.0	1.00 124.3	51 55.3	1.00 123.7	53 18.0	1.00 122.7	54 40.1	1.00 121.6	56 28.6	1.00 120.1	56 55.6	1.00 119.7	57 22.5	1.00 119.3	59 09.1	1.00 117.6
1	50 41.3	1.00 123.1	51 36.5	1.00 122.5	52 58.9	1.00 121.5	54 20.8	1.00 120.4	56 09.1	1.00 118.9	56 35.9	1.00 118.5	57 02.7	1.00 118.1	58 49.1	1.00 116.4
2	50 22.3	1.00 121.9	51 17.4	1.00 121.3	52 39.6	1.00 120.3	54 01.3	1.00 119.2	55 49.3	1.00 117.7	56 16.1	1.00 117.3	56 42.8	1.00 116.9	58 28.9	1.00 115.2
3	50 03.1	1.00 120.8	50 58.1	1.00 120.1	52 20.1	1.00 119.1	53 41.6	1.00 118.1	55 29.3	1.00 116.6	55 56.0	1.00 116.1	56 22.7	1.00 115.7	58 04.8	1.00 114.0
4	49 43.7	1.00 119.6	50 38.5	1.00 118.9	52 00.4	1.00 118.0	53 21.6	1.00 116.9	55 09.1	1.00 115.4	55 35.7	1.00 115.0	56 02.3	1.00 114.6	57 47.8	1.00 112.8
45	49 24.1	1.00 118.5	50 18.8	1.00 117.8	51 40.4	1.00 116.8	53 01.5	1.00 115.8	54 48.7	1.00 114.2	55 15.3	1.00 113.8	55 41.8	1.00 113.4	57 27.0	1.00 111.7
6	49 04.2	1.00 117.3	49 58.8	1.00 116.7	51 20.2	1.00 115.7	52 41.2	1.00 114.6	54 28.1	1.00 113.1	54 54.6	1.00 112.7	55 21.1	1.00 112.3	57 06.0	1.00 110.5
7	48 44.1	1.00 116.2	49 38.6	1.00 115.6	50 59.9	1.00 114.6	52 20.6	1.00 113.5	54 07.3	1.00 112.0	54 33.8	1.00 111.6	55 00.2	1.00 111.2	56 44.9	1.00 109.4
8	48 23.9	1.00 115.1	49 18.2	1.00 114.5	50 39.4	1.00 113.5	51 59.9	1.00 112.4	53 46.4	1.00 110.9						

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 68° to 180°.

Lat. 68°

H.A.	46° 00'			47° 00'			48° 30'			49° 30'			50° 30'			51° 30'			52° 30'			54° 00'			H.A.
	Alt.	Ad At	As.																						
00	68 00.0	1.0 01	180.0	69 00.0	1.0 01	180.0	70 30.0	1.0 01	180.0	71 30.0	1.0 01	180.0	72 30.0	1.0 01	180.0	73 30.0	1.0 01	180.0	74 30.0	1.0 01	180.0	76 00.0	1.0 01	180.0	00
1	67 59.6	1.0 02	178.1	68 59.6	1.0 02	178.1	70 29.6	1.0 02	178.0	71 29.6	1.0 02	177.9	72 29.6	1.0 02	177.9	73 29.6	1.0 02	177.8	74 29.6	1.0 02	177.7	75 59.6	1.0 02	177.6	1
2	67 58.5	1.0 03	176.3	68 58.5	1.0 03	176.2	70 28.4	1.0 03	176.0	71 28.4	1.0 03	175.9	72 28.3	1.0 03	175.8	73 28.3	1.0 04	175.8	74 28.2	1.0 04	175.4	75 58.1	1.0 04	175.1	2
3	67 56.7	1.0 04	174.4	68 56.6	1.0 04	174.3	70 26.5	1.0 04	174.1	71 26.4	1.0 04	173.9	72 26.3	1.0 04	173.7	73 26.1	1.0 04	173.4	74 26.0	1.0 04	173.2	75 55.7	1.0 04	172.7	3
4	67 54.2	1.0 05	172.6	68 54.0	1.0 05	172.4	70 23.8	1.0 05	172.1	71 23.6	1.0 05	171.8	72 23.4	1.0 05	171.6	73 23.1	1.0 05	171.3	74 22.9	1.0 07	170.9	75 52.4	09 07	170.3	4
5	67 50.9	1.0 07	170.8	68 50.7	1.0 07	170.5	70 20.3	1.0 07	170.1	71 20.0	09 07	169.8	72 19.7	09 08	169.5	73 19.3	09 08	169.1	74 18.9	09 08	168.7	75 48.2	09 09	167.9	5
6	67 47.0	09 08	168.9	68 46.6	09 08	168.6	70 16.1	09 08	168.2	71 15.6	09 09	167.8	72 15.2	09 09	167.4	73 14.7	09 09	167.0	74 14.1	09 09	166.5	75 43.9	09 10	165.6	6
7	67 42.3	09 09	167.1	68 41.9	09 09	166.8	70 11.1	09 10	166.2	71 10.5	09 10	165.8	72 09.9	09 10	165.3	73 09.2	09 10	164.8	74 08.4	09 11	164.2	75 37.0	09 12	163.2	7
8	67 37.0	09 10	165.3	68 36.4	09 10	164.9	70 05.4	09 11	164.3	71 04.6	09 11	163.8	72 03.8	09 12	163.3	73 02.9	09 12	162.7	74 01.9	09 12	162.1	75 30.1	09 13	160.9	8
9	67 30.9	09 11	163.5	68 30.2	09 11	163.1	69 58.9	09 12	162.4	70 58.0	09 12	161.8	71 57.0	09 13	161.3	72 55.8	09 13	160.6	73 54.5	09 14	159.9	75 22.3	09 14	158.6	9
10	67 24.2	09 12	161.7	68 23.3	09 13	161.2	69 51.8	09 13	160.5	70 50.6	09 13	159.8	71 49.4	09 14	159.3	72 48.0	09 14	158.6	73 46.4	09 15	157.8	75 13.7	09 16	156.4	10
1	67 16.8	09 13	159.9	68 15.7	09 14	159.4	69 43.9	09 14	158.6	70 42.6	09 14	157.9	71 41.1	09 15	157.3	72 39.4	09 15	156.5	73 37.5	09 16	155.7	75 04.3	09 17	154.2	1
2	67 08.8	09 14	158.2	68 07.5	09 15	157.6	69 35.4	09 15	156.7	70 33.8	09 15	156.1	71 32.0	09 16	155.3	72 30.1	09 17	154.5	73 27.9	09 17	153.6	75 04.2	09 18	152.0	2
3	67 00.1	09 16	156.4	67 58.6	09 16	155.8	69 26.2	09 16	154.9	70 24.3	09 17	154.2	71 22.3	09 17	153.4	72 20.0	09 18	152.5	73 17.6	09 18	151.6	74 43.2	09 19	149.9	3
4	66 50.8	09 18	154.7	67 49.1	09 17	154.1	69 16.3	09 18	153.1	70 14.2	09 18	152.3	71 11.9	09 19	151.5	72 09.3	09 19	150.6	73 06.5	09 20	149.5	74 31.6	09 21	147.8	4
15	66 40.9	09 18	153.0	67 39.0	09 18	152.3	69 05.8	09 18	151.3	70 03.4	09 19	150.5	71 00.8	09 19	149.6	71 58.0	09 20	148.6	72 54.8	09 21	147.6	74 19.3	09 22	145.7	15
6	66 30.4	09 18	151.3	67 28.2	09 19	150.6	68 54.7	09 20	149.5	69 52.0	09 20	148.7	70 49.2	09 20	147.7	71 46.0	09 21	146.7	72 42.4	09 22	145.6	74 06.3	09 23	143.7	6
7	66 19.3	09 19	149.6	67 16.9	09 20	148.9	68 43.0	09 20	147.7	69 40.1	09 21	146.9	70 36.9	09 21	145.9	71 33.3	09 22	144.9	72 29.4	09 23	143.7	73 52.7	09 24	141.8	7
8	66 07.6	09 20	148.0	67 05.0	09 21	147.2	68 30.7	09 21	146.0	69 27.5	09 22	145.1	70 24.0	09 22	144.1	71 20.1	09 23	143.1	72 15.8	09 24	141.9	73 38.5	09 25	139.8	8
9	65 55.5	09 21	146.3	66 52.6	09 22	145.6	68 17.9	09 22	144.3	69 14.4	09 23	143.4	70 10.5	09 23	142.4	71 06.3	09 24	141.3	72 01.7	09 24	140.0	73 23.7	09 26	138.0	9
20	65 42.7	09 22	144.7	66 39.6	09 23	143.9	68 04.5	09 23	142.6	69 00.7	09 24	141.7	69 56.5	09 24	140.6	70 52.0	09 25	139.5	71 47.0	09 25	138.2	73 08.4	09 26	136.1	20
1	65 29.5	09 23	143.1	66 26.2	09 24	142.3	67 50.6	09 24	141.0	68 46.5	09 24	140.0	69 42.0	09 25	138.9	70 37.1	09 26	137.8	71 31.7	09 26	136.5	72 56.6	09 27	134.3	1
2	65 15.8	09 24	141.5	66 12.2	09 24	140.7	67 36.2	09 25	139.3	68 31.8	09 25	138.3	69 27.0	09 26	137.2	70 21.8	09 26	136.1	71 16.0	09 27	134.8	72 36.3	09 28	132.6	2
3	65 01.5	09 24	140.0	65 57.7	09 25	139.1	67 21.3	09 26	137.7	68 16.6	09 26	136.7	69 11.5	09 27	135.6	70 05.9	09 27	134.4	70 59.8	09 28	133.1	72 19.5	09 29	130.9	3
4	64 46.9	09 25	138.5	65 42.7	09 26	137.6	67 06.0	09 26	136.2	68 01.0	09 27	135.1	68 55.6	09 28	134.0	69 49.7	09 28	132.8	70 43.2	09 29	131.4	72 02.3	09 29	129.2	4
25	64 31.7	09 26	136.9	65 27.4	09 27	136.1	66 50.2	09 27	134.6	67 44.9	09 28	133.5	68 39.2	09 28	132.4	69 32.9	09 29	131.2	70 26.1	09 29	129.8	71 44.6	09 30	127.5	25
6	64 16.2	09 27	135.5	65 11.6	09 27	134.6	66 34.0	09 28	133.1	67 28.4	09 28	132.0	68 22.4	09 29	130.8	69 15.8	09 29	129.6	70 08.7	09 30	128.2	71 26.6	09 31	125.9	6
7	64 00.0	09 27	134.0	64 55.3	09 28	133.1	66 17.4	09 28	131.6	67 11.5	09 29	130.5	68 05.2	09 29	129.3	68 58.3	09 30	128.0	69 50.8	09 30	126.7	71 08.2	09 31	124.4	7
8	63 43.8	09 28	132.5	64 38.7	09 28	131.6	66 00.3	09 29	130.1	66 54.2	09 29	129.0	67 47.6	09 30	127.8	68 40.4	09 30	126.5	69 32.6	09 31	125.1	70 49.5	09 32	122.8	8
9	63 27.1	09 29	131.1	64 21.7	09 29	130.2	65 43.0	09 30	128.6	66 36.6	09 30	127.5	67 29.7	09 30	126.3	68 22.2	09 31	125.0	69 14.1	09 31	123.7	70 30.5	09 32	121.3	9
30	63 10.0	09 29	129.7	64 04.4	09 30	128.7	65 25.2	09 30	127.2	66 18.6	09 31	126.1	67 11.4	09 31	124.9	68 03.6	09 31	123.6	68 55.2	09 32	122.2	70 11.1	09 33	119.9	30
1	62 52.5	09 30	128.3	63 46.7	09 30	127.3	65 07.2	09 31	125.8	66 00.2	09 31	124.7	66 52.8	09 32	123.5	67 44.7	09 32	122.2	68 36.0	09 32	120.8	69 51.5	09 33	118.5	1
2	62 34.7	09 30	126.9	63 28.7	09 31	126.0	64 48.8	09 31	124.4	65 41.6	09 32	123.3	66 33.9	09 32	122.1	67 25.6	09 32	120.8	68 16.6	09 33	119.4	69 31.6	09 34	117.1	2
3	62 16.6	09 31	125.6	63 10.3	09 31	124.6	64 30.1	09 32	123.0	65 22.7	09 32	121.9	66 14.7	09 32	120.7	67 06.1	09 33	119.4	67 56.8	09 33	118.0	69 11.5	09 34	115.7	3
4	61 58.2	09 31	124.3	62 50.7	09 32	123.3	64 11.1	09 32	121.7	65 03.4	09 32	120.6	65 55.2	09 33	119.3	66 46.4	09 33	118.0	67 36.9	09 34	116.6	68 51.1	09 34	113.4	4
35	61 39.4	09 32	122.9	62 32.7	09 32	122.0	63 51.8	09 33	120.4	64 44.0	09 33	119.2	65 35.5	09 33	118.0	66 26.4	09 34	116.7	67 16.7	09 34	115.3	68 30.5	09 35	113.0	35
6	61 20.4	09 32	121.6	62 13.5	09 32	120.7	63 32.3	09 33	119.1	64 24.2	09 33	117.9	65 15.5	09 34	116.7	66 06.2	09 34	115.4	66 56.2	09 34	114.0	68 09.8	09 35	111.7	6
7	61 01.2	09 33	120.4	61 54.1	09 33	119.4	63 12.6	09 33	117.8	64 04.2	09 34	116.6	64 55.4	09 34	115.4	65 45.8	09 34	114.1	66 35.6	09 35	112.7	67 48.8	09 35	110.5	7
8	60 41.6	09 33	119.1	61 34.4	09 33	118.1	62 52.6	09 34	116.5	63 44.0	09 34	115.4	64 35.0	09 34	114.2	65 25.2	09 35	112.9	66 14.8	09 35	111.5	67 27.7	09 36	109.3	8
9	60 21.9	09 33	117.9	61 14.4	09 34	116.9	62 32.3	09 34																	

## DECLINATION SAME NAME AS LATITUDE

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H.A.	46° 00'		47° 00'		48° 30'		49° 30'		50° 30'		51° 30'		52° 30'		54° 00'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
91	41 29.1	87 34	68.0	42 20.9	86 34	67.3	43 38.2	86 34	66.3	44 29.4	85 34	65.5	45 20.3	85 34	64.8	46 11.0	84 34	64.0	47 01.3	84 33	63.2	48 16.1	83 33	62.0	91
2	41 08.3	87 34	67.2	42 00.2	86 34	66.5	43 17.7	86 34	65.5	44 09.0	85 34	64.8	45 00.1	85 34	64.0	45 50.8	84 33	63.3	46 41.3	84 33	62.5	47 56.3	83 33	61.3	2
3	40 47.6	87 34	66.4	41 39.7	87 34	65.7	42 57.3	86 34	64.7	43 48.8	86 34	64.0	44 39.9	85 33	63.3	45 30.8	84 33	62.5	46 21.4	84 33	61.7	47 36.7	83 32	60.5	3
4	40 27.1	87 34	65.6	41 19.3	87 34	64.9	42 37.1	86 34	63.9	43 28.6	86 33	63.2	44 19.9	85 33	62.5	45 10.9	85 33	61.8	46 01.7	84 33	61.0	47 17.2	83 32	59.8	4
95	40 06.7	87 34	64.8	40 59.0	87 34	64.2	42 16.9	86 33	63.2	43 08.6	86 33	62.5	44 00.1	85 33	61.8	44 51.2	85 33	61.0	45 42.1	85 32	60.3	46 57.8	84 32	59.1	95
6	39 46.4	87 34	64.0	40 38.8	87 33	63.4	41 57.0	87 33	62.4	42 48.8	86 33	61.7	43 31.6	86 33	61.0	44 31.6	85 32	60.3	45 22.6	85 32	59.5	46 38.6	84 32	58.4	6
7	39 26.3	88 33	63.2	40 18.8	87 33	62.6	41 37.1	87 33	61.6	42 29.1	86 33	60.9	43 20.7	86 32	60.2	44 12.2	85 32	59.5	45 03.3	85 32	58.8	46 19.5	84 32	57.7	7
8	39 06.3	88 33	62.4	39 58.9	87 33	61.8	41 17.4	87 33	60.8	42 09.5	87 32	60.2	43 01.3	86 32	59.5	44 52.9	86 32	58.8	44 44.2	85 32	58.1	46 06.0	86 31	56.9	8
9	38 46.4	88 33	61.6	39 39.2	88 33	61.0	40 57.9	87 32	60.1	40 57.9	87 32	59.4	42 42.0	86 32	58.7	43 33.7	86 32	58.0	44 25.2	86 31	57.3	45 41.9	85 31	56.2	9
100	38 26.7	88 33	60.9	39 19.6	88 32	60.3	40 38.5	87 32	59.3	41 30.8	87 32	58.7	42 22.9	87 32	58.0	43 14.7	86 31	57.3	44 06.3	86 31	56.6	45 23.2	85 31	55.5	100
1	38 07.2	88 32	60.1	39 00.1	88 32	59.5	40 19.2	88 32	58.6	41 11.7	87 32	57.9	42 03.9	87 31	57.3	42 55.9	86 31	56.6	43 47.7	86 31	55.9	45 04.8	85 30	54.8	1
2	37 47.8	89 32	59.3	38 40.9	88 32	58.7	40 00.1	88 32	57.8	40 52.7	87 31	57.2	41 45.1	87 31	56.5	42 37.2	87 31	55.8	43 29.1	86 31	55.2	44 46.8	86 30	54.1	2
3	37 28.5	89 32	58.5	38 21.7	89 32	57.9	39 41.2	88 31	57.0	40 33.9	88 31	56.4	41 26.4	87 31	55.8	42 18.7	87 31	55.1	43 10.8	87 30	54.4	44 28.4	86 30	53.4	3
4	37 09.4	89 32	57.7	38 02.8	89 31	57.2	39 22.4	88 31	56.3	40 15.2	88 31	55.7	41 07.9	88 31	55.0	42 00.3	87 30	54.4	42 52.6	87 30	53.7	44 10.4	86 30	52.7	4
105	36 50.5	89 31	57.0	37 44.0	89 31	56.4	39 03.8	88 31	55.5	39 56.8	88 31	54.9	40 49.6	88 30	54.3	41 42.2	87 30	53.6	42 34.5	87 30	53.0	43 52.6	86 29	52.0	105
6	36 31.8	89 31	56.2	37 25.3	89 31	55.6	38 45.3	89 30	54.8	39 38.5	88 30	54.2	40 31.4	88 30	53.6	41 24.1	88 30	52.9	42 16.7	87 29	52.3	43 35.0	87 29	51.3	6
7	36 13.2	90 31	55.4	37 06.8	89 30	54.9	38 27.1	89 30	54.0	39 20.3	89 30	53.4	40 13.4	88 30	52.8	41 06.3	88 29	52.2	41 59.0	88 29	51.6	43 17.6	87 29	50.6	7
8	35 54.7	90 30	54.7	36 48.5	90 30	54.1	38 09.0	89 30	53.3	39 02.4	89 30	52.7	39 55.6	89 29	52.1	40 48.6	88 29	51.5	41 41.5	88 29	50.8	43 00.3	87 28	49.9	8
9	35 36.5	90 30	53.9	36 30.4	90 30	53.3	37 51.0	89 30	52.5	38 44.0	89 29	51.9	39 38.0	89 29	51.3	40 31.1	88 29	50.7	41 24.1	88 29	50.1	42 43.2	88 28	49.2	9
110	35 18.4	90 30	53.1	36 12.5	90 30	52.6	37 33.3	90 29	51.8	38 27.0	89 29	51.2	39 20.5	89 29	50.6	40 13.8	89 29	50.0	41 07.0	88 28	49.4	42 26.3	88 28	48.5	110
1	35 00.5	90 30	52.4	35 54.7	90 29	51.8	37 15.7	90 29	51.0	38 09.6	90 29	50.5	39 03.2	89 28	49.9	39 56.7	89 28	49.3	40 50.0	89 28	48.7	42 06.6	88 28	47.8	1
2	34 42.8	91 29	51.6	35 37.1	90 29	51.1	36 58.4	90 29	50.3	37 52.3	90 28	49.7	38 46.1	90 28	49.1	39 39.8	89 28	48.6	40 33.2	89 28	48.0	41 53.0	88 27	47.1	2
3	34 25.3	91 29	50.8	35 19.8	91 29	50.3	36 41.2	90 28	49.5	37 35.3	90 28	49.0	38 29.2	90 28	48.4	39 23.0	89 28	47.8	40 16.6	89 27	47.3	41 36.7	89 27	46.4	3
4	34 08.0	91 29	50.1	35 02.6	91 28	49.6	36 24.2	91 28	48.8	37 18.4	90 28	48.2	38 12.5	90 28	47.7	39 06.4	90 27	47.1	40 00.2	89 27	46.6	41 20.5	89 27	45.7	4
115	33 50.9	91 28	49.3	34 45.6	91 28	48.8	36 07.4	91 28	48.0	37 01.7	91 27	47.5	37 56.0	90 27	47.0	38 50.0	90 27	46.4	39 44.0	90 27	45.8	41 04.5	89 26	45.0	115
6	33 33.9	91 28	48.5	34 28.7	91 28	48.0	35 50.8	91 27	47.3	36 45.3	91 27	46.8	37 39.6	91 27	46.2	38 33.9	90 27	45.7	39 27.9	90 26	45.1	40 48.7	90 26	44.3	6
7	33 17.2	92 28	47.8	34 12.1	91 27	47.3	35 34.3	91 27	46.5	36 29.0	91 27	46.0	37 23.5	91 27	45.5	38 17.9	91 26	45.0	39 12.1	90 26	44.4	40 33.1	90 26	43.6	7
8	33 00.6	92 27	47.0	33 55.7	92 27	46.5	35 18.1	91 27	45.8	36 12.9	91 26	45.3	37 07.6	91 26	44.8	38 02.1	91 26	44.3	38 56.5	91 26	43.7	40 17.8	90 25	42.9	8
9	32 44.3	92 27	46.2	33 39.5	92 27	45.8	35 02.1	92 26	45.1	35 57.0	91 26	44.6	36 51.8	91 26	44.1	37 46.5	91 26	43.5	38 41.0	91 25	43.0	40 02.6	90 25	42.2	9
120	32 28.2	92 27	45.5	33 23.5	92 26	45.0	34 46.3	92 26	44.3	35 41.4	92 26	43.8	36 36.3	91 26	43.3	37 31.1	91 25	42.8	38 25.8	91 25	42.3	39 47.6	91 25	41.5	120
1	32 12.2	93 26	44.7	33 07.7	92 26	44.3	34 30.7	92 26	43.6	35 25.9	92 25	43.1	36 21.0	92 25	42.6	37 16.0	91 25	42.1	38 10.8	91 25	41.6	39 32.8	91 24	40.8	1
2	31 56.5	93 26	44.0	32 52.1	93 26	43.5	34 15.3	92 25	42.8	35 10.7	92 25	42.4	36 05.9	92 25	41.9	37 01.0	92 25	41.4	37 56.0	92 24	40.9	39 18.2	91 24	40.1	2
3	31 41.0	93 25	43.2	32 36.7	93 25	42.8	34 00.1	93 25	42.1	34 55.6	92 25	41.6	35 51.0	92 24	41.2	36 46.2	92 24	40.7	37 41.4	92 24	40.2	39 03.8	91 24	39.4	3
4	31 25.8	93 25	42.4	32 21.6	93 25	42.0	33 45.2	93 25	41.4	34 40.8	93 24	40.9	35 36.3	92 24	40.4	36 31.7	92 24	40.0	37 27.0	92 24	39.5	38 49.7	92 23	38.7	4
125	31 10.7	93 25	41.7	32 06.7	93 25	41.3	33 30.4	93 24	40.6	34 26.2	93 24	40.2	35 21.8	93 24	39.7	36 17.4	92 24	39.2	37 12.8	92 23	38.8	38 35.7	92 23	38.0	125
6	30 55.9	94 24	40.9	31 51.9	93 24	40.5	33 15.9	93 24	39.9	34 11.8	93 24	39.4	35 07.6	93 23	39.0	36 03.3	93 23	38.5	36 58.8	93 23	38.1	38 22.0	92 23	37.3	6
7	30 41.2	94 24	40.2	31 37.5	94 24	39.8	33 01.6	93 23	39.1	33 57.6	93 23	38.7	34 53.5	93 23	38.3	35 49.4	93 23	37.8	36 45.1	93 23	37.4	38 08.4	92 23	36.6	7
8	30 26.9	94 24	39.4	31 23.2	94 23	39.0	32 47.6	94 23	38.4	33 43.7	93 23	38.0	34 39.7	93 23	37.5	35 35.7	93 22	37.1	36 31.5	93 22	36.7	37 55.1	93 22	36.0	8
9	30 12.7	94 23	38.7	31 09.2	94 23	38.3	32 33.7	94 23	37.7	33 30.0	94 22	37.2	34 26.2	94 22	36.8	35 22.2	93 22	36.4	36 18.2	93 22	35.9	37 42.1	93 21	35.3	9
130	29 58.8	94 23	37.9	30 55.4	94 23	37.5	32 20.1	94 22	36.9	33 16.5	94 22	36.5	34 12.8	94 22	36.1	35 09.0	94 22	35.7	36 05.2	93 21	35.2	37 29.2	93 21	34.6	130
1	29 45.1	95 22	37.1	30 41.8	94 22	36.8	32 06.7	94 22	36.2	33 03.2	94 22	35.8	33 59.7	94 22	35.4	34 56.0	94 21	35.0	35 52.3	94 21	34.5	3			

Lat. 68°

H.A.	54° 30'		55° 00'		56° 00'		56° 30'		57° 00'		57° 30'		59° 00'		59° 30'		H.A.
	Alt.	Ad At.															
00	76 30.0	1.0 01 180.0	77 00.0	1.0 01 180.0	78 00.0	1.0 01 180.0	78 30.0	1.0 01 180.0	79 00.0	1.0 01 180.0	79 30.0	1.0 01 180.0	81 00.0	1.0 01 180.0	81 30.0	1.0 01 180.0	00
1	76 29.5	1.0 02 177.5	76 59.5	1.0 02 177.5	77 59.5	1.0 02 177.3	78 29.5	1.0 02 177.2	78 59.4	1.0 02 177.1	79 29.4	1.0 02 177.1	80 59.4	1.0 02 176.7	81 29.3	1.0 02 176.6	1
2	76 28.1	1.0 04 175.0	76 58.0	1.0 04 174.9	77 57.9	1.0 04 174.7	78 27.8	1.0 04 174.5	78 57.8	1.0 04 174.3	79 27.7	1.0 04 174.1	80 57.4	1.0 04 173.4	81 27.3	1.0 04 173.2	2
3	76 25.6	1.0 06 172.6	76 55.5	1.0 06 172.4	77 55.3	1.0 06 172.0	78 25.1	1.0 06 171.7	78 55.0	99 06 171.5	79 24.8	99 07 171.2	80 54.2	99 07 170.2	81 24.0	99 06 169.8	3
4	76 22.2	99 07 170.1	76 52.0	99 07 169.9	77 51.6	99 06 169.3	78 21.4	99 06 169.0	78 51.1	99 06 168.7	79 20.8	99 06 168.3	80 49.8	99 06 167.0	81 19.3	98 10 166.4	4
05	76 17.9	99 09 167.7	76 47.2	99 09 167.4	77 46.9	99 09 166.7	78 16.6	99 10 166.3	78 46.2	99 10 165.9	79 15.7	98 10 165.4	80 44.1	98 11 163.8	81 13.4	98 12 163.1	05
6	76 16.6	99 10 165.2	76 42.2	99 10 164.9	77 41.3	98 11 164.1	78 10.7	98 11 163.6	78 40.2	98 12 163.2	79 09.5	98 12 162.6	80 37.2	97 13 160.7	81 06.3	97 14 159.9	6
7	76 06.5	98 12 162.9	76 35.9	98 12 162.4	77 34.6	98 13 161.5	78 03.9	98 13 161.0	78 33.1	97 13 160.5	79 02.3	97 14 159.9	80 29.3	96 15 157.7	80 58.0	96 16 156.8	7
8	75 59.4	98 13 160.5	76 28.7	97 14 160.0	77 27.0	97 14 159.0	77 56.1	97 15 158.4	78 25.1	97 15 157.8	78 54.1	96 15 157.1	80 20.2	95 17 154.7	80 48.6	95 17 153.7	8
9	75 51.7	97 15 158.2	76 20.6	97 15 157.7	77 18.5	96 16 156.5	77 47.4	96 16 155.9	78 16.2	96 16 155.2	78 44.8	95 17 154.5	80 10.1	94 18 151.8	80 38.2	93 19 150.8	9
10	75 42.7	96 16 155.9	76 11.6	96 16 155.3	77 09.1	96 17 154.1	77 37.8	96 17 153.4	78 06.3	95 18 152.7	78 34.7	94 18 151.9	79 59.0	93 20 149.1	80 26.7	92 21 147.9	10
1	75 33.1	96 17 153.6	76 01.8	96 18 153.0	76 58.9	96 18 151.7	77 27.3	94 19 151.0	77 55.6	94 19 150.2	78 23.7	93 20 149.4	79 47.0	92 21 146.4	80 14.3	91 22 145.2	1
2	75 22.9	96 19 151.4	75 51.2	96 19 150.8	76 47.9	94 20 149.4	77 16.0	94 20 148.6	77 44.0	93 21 147.8	78 11.8	92 21 146.9	79 34.1	90 23 143.7	80 01.1	89 23 142.5	2
3	75 11.6	94 20 149.3	75 39.9	94 20 148.6	76 36.0	93 21 147.1	77 03.9	93 21 146.3	77 31.6	92 22 145.4	77 59.2	91 22 144.5	79 20.4	89 24 141.2	79 47.0	88 25 139.9	3
4	74 59.8	94 21 147.1	75 27.8	93 21 146.4	76 23.5	92 22 144.9	76 51.1	92 23 144.1	77 18.5	91 23 143.2	77 45.7	90 24 142.2	79 06.0	88 25 138.8	79 32.1	87 26 137.5	4
15	74 47.2	93 22 145.1	75 15.0	92 23 144.3	76 10.2	91 23 142.7	76 37.5	91 24 141.9	77 04.7	90 24 140.9	77 31.6	89 25 139.9	78 50.8	87 26 136.4	79 16.6	85 27 135.1	15
6	74 34.0	92 23 143.0	75 01.6	92 23 142.3	75 56.3	91 24 140.6	76 23.3	90 25 139.7	76 50.2	89 25 138.8	77 16.8	88 26 137.7	78 35.0	85 27 134.2	79 00.4	84 28 132.8	6
7	74 20.2	91 24 141.0	74 47.5	91 24 140.3	75 41.7	90 25 138.6	76 08.5	89 26 137.6	76 35.1	88 26 136.7	77 01.4	87 27 135.6	78 18.6	84 28 132.0	78 43.6	83 29 130.6	7
8	74 05.8	91 25 139.1	74 32.9	90 26 138.3	75 26.5	89 26 136.6	75 53.1	88 27 135.6	76 19.3	87 27 134.6	76 45.4	86 28 133.6	78 01.6	82 30 129.9	78 26.3	82 30 128.5	8
9	73 50.8	90 26 137.2	74 17.6	89 26 136.4	75 10.8	88 27 134.6	75 37.1	87 28 133.7	76 03.1	86 28 132.6	76 28.8	85 28 131.6	77 44.1	82 30 127.9	78 08.5	80 30 126.5	9
20	73 35.2	89 27 135.3	74 01.9	88 27 134.5	74 54.6	87 28 132.7	75 20.5	86 28 131.8	75 46.3	85 29 130.7	76 11.7	84 29 129.6	77 26.1	81 31 125.9	77 50.2	79 31 124.5	20
1	73 19.2	88 28 133.5	73 45.6	88 28 132.7	74 37.8	86 29 130.9	75 03.5	85 29 129.9	75 29.0	84 30 128.9	75 54.2	83 30 127.8	77 07.7	80 31 124.0	77 31.5	78 32 122.7	1
2	73 02.7	88 28 131.8	73 28.8	87 29 130.9	74 20.6	86 29 129.1	74 46.1	85 30 128.1	75 11.3	84 30 127.1	75 36.2	83 31 125.9	76 48.9	79 32 122.2	77 12.3	77 32 120.8	2
3	72 45.7	87 29 130.0	73 11.6	86 29 129.2	74 02.9	85 30 127.3	74 28.2	84 30 126.3	74 53.2	83 31 125.3	75 17.8	82 31 124.2	76 29.7	78 33 120.5	76 52.9	77 33 119.3	3
4	72 28.2	86 30 128.4	72 54.0	86 30 127.5	73 44.8	84 31 125.6	74 09.9	83 31 124.6	74 34.6	82 32 123.6	74 59.0	81 32 122.5	76 10.2	77 33 118.8	76 33.1	76 34 117.4	4
25	72 10.4	86 30 126.7	72 36.0	85 31 125.8	73 26.4	83 31 124.0	73 51.2	82 32 123.0	74 15.7	81 32 121.9	74 39.9	80 32 120.8	75 50.3	76 34 117.2	76 13.0	75 34 115.8	25
6	71 52.2	85 31 125.1	72 17.6	84 31 124.2	73 07.6	82 32 122.4	73 32.2	81 32 121.4	73 56.5	80 33 120.3	74 20.5	79 33 119.2	75 22.6	75 34 115.6	75 52.6	74 34 114.2	6
7	71 33.6	84 32 123.5	71 58.8	84 32 122.7	72 48.4	82 32 120.8	73 12.8	81 33 119.8	73 36.9	80 33 118.8	74 00.7	79 33 117.7	75 09.8	75 34 114.1	75 32.0	75 35 112.7	7
8	71 14.8	84 32 122.0	71 39.7	83 32 121.1	72 29.0	81 33 119.3	72 53.2	80 33 118.3	73 17.1	79 34 117.3	73 40.6	78 34 116.2	74 49.2	74 35 112.6	75 11.2	73 35 111.3	8
9	70 55.8	83 32 120.5	71 20.4	82 33 119.6	72 09.2	81 33 117.8	72 33.3	80 34 116.8	72 57.0	79 34 115.8	73 20.4	77 34 114.7	74 28.3	73 35 111.1	74 50.1	72 35 109.8	9
30	70 36.0	83 33 119.1	71 00.7	82 33 118.2	71 49.2	80 34 116.3	72 13.1	79 34 115.4	72 36.6	78 34 114.3	72 59.8	77 35 113.3	74 07.2	73 35 109.7	74 28.9	71 36 108.5	30
1	70 16.2	82 33 117.6	70 40.7	81 34 116.8	71 29.0	79 34 114.9	71 52.6	78 34 114.0	72 16.0	77 35 112.9	72 39.1	76 35 111.9	73 46.0	72 36 108.4	74 07.5	71 36 107.1	1
2	69 56.2	82 34 116.2	70 20.6	81 34 115.4	71 08.5	79 35 113.5	71 32.0	78 35 112.6	71 55.2	77 35 111.6	72 18.1	76 35 110.5	73 24.6	72 36 107.1	73 45.9	70 36 105.8	2
3	69 35.9	81 34 114.9	70 00.1	80 34 114.0	70 47.8	78 35 112.2	71 11.1	77 35 111.2	71 34.2	76 35 110.2	71 57.0	75 36 109.2	73 03.0	71 36 105.8	73 24.2	70 36 104.6	3
4	69 15.4	81 35 113.5	69 39.5	80 35 112.7	70 26.8	78 35 110.9	70 50.1	77 35 109.9	71 13.0	76 36 108.9	71 35.7	75 36 107.9	72 41.3	71 36 104.6	73 02.4	70 37 103.4	4
35	68 54.7	80 35 112.2	69 18.7	79 35 111.4	70 05.8	78 35 109.6	70 28.9	77 36 108.6	70 51.7	76 36 107.7	71 14.2	74 36 106.6	72 19.5	71 37 103.3	72 40.5	69 37 102.2	35
6	68 33.8	80 35 110.9	68 57.6	79 35 110.1	69 44.5	77 36 108.3	70 07.5	76 36 107.4	70 30.2	75 36 106.4	70 52.6	74 36 105.4	71 52.6	70 37 102.2	72 18.5	69 37 101.0	6
7	68 12.7	79 35 109.7	68 36.5	79 36 108.9	69 23.1	77 36 107.1	69 46.0	76 36 106.2	70 08.6	75 36 105.2	70 30.9	74 36 104.2	71 35.6	70 37 101.0	71 56.4	69 37 99.9	7
8	67 51.5	79 36 108.5	68 15.1	78 36 107.6	69 01.5	76 36 105.9	69 24.3	75 36 105.0	69 46.8	74 36 104.0	70 09.0	73 37 103.0	71 13.5	70 37 99.9	71 34.2	68 37 98.7	8
9	67 30.1	79 36 107.2	67 53.6	78 36 106.4	68 39.9	76 36 104.7	69 02.6	75 36 103.8	69 25.0	74 37 102.9	69 47.1	73 37 101.9	70 51.3	70 37 98.8	71 12.0	68 37 97.7	9
40	67 08.6	78 36 106.1	67 32.0	78 36 105.3	68 18.1	76 36 103.5	68 40.7	75 37 102.7	69 03.0	74 37 101.7	69 25.0	73 37 100.8	70 29.1	69 37 97.7	70 49.7	68 37 96.6	40
1	66 46.9	78 36 104.9	67 10.2	77 36 104.1	67 56.2	76 37 102.4	68 18.7	75 37 101.5	68 41.0	74 37 100.6	69 02.9	73 37 99.7	70 06.8	69 37 96.6	70 27.3	68 37 95.6	1
2	66 25.1	78 36 103.8	66 48.4	77 37 103.0	67 34.2	75 37 101.3	67 56.6	74 37 100.4	68 18.8	73 37 99.5	68 40.7	72 37 98.6	69 44.4	69 37 95.6	70 04.9	68 37 94.5	2
3	66 03.3	78 37 102.6	66 26.4	77 37 101.9	67 12.1	75 37 100.2	67 34.5	74 37 99.3	67 56.6	73 37 98.4	68 18.5	72 37 97.5	69 22.0	69 37 94.6	69 42.8	68 37 93.5	3
4	65 41.3	77 37 101.5	66 04.4	77 37 100.8	66 49.9	75 37 99.1	67 12.3	74 37 98.3	67 34.4	73 37 97.4	67 56.2	72 37 96.5	68 59.6	69 37 93.6	69 20.0	68 37 92.6	4
45	65 19.2	77 37 100.5	65 42.3	77 37 99.7	66 27.7	75 37 98.1	66 50.0	74 37 97.2	67 12.1	73 37 96.4	67 33.8	72 37 95.5					

Main table with columns for H.A., Alt., Az., and H.A. for various declination values (54° 30' to 59° 30').

Lat. 68°

Lat. 69°

Lat. 68°

H.A.	60° 00'		60° 30'		62° 00'		62° 30'		63° 00'		69° 00'		69° 30'		74° 30'		H.A.								
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.									
00	82 00.0	1.001	180.0	82 30.0	1.001	180.0	84 00.0	1.001	180.0	84 30.0	1.002	180.0	85 00.0	1.002	180.0	89 00.0	1.006	00.0	88 30.0	1.004	00.0	83 30.0	1.001	00.0	00
1	81 59.3	1.004	176.4	82 29.3	1.004	176.2	83 59.1	1.004	175.5	84 29.0	1.005	175.2	84 59.0	1.005	174.8	88 56.1	94 17	19.7	88 27.4	97 12	13.1	83 29.5	1.002	02.4	1
2	81 57.2	1.008	172.8	82 27.1	1.008	172.5	83 56.5	99 07	171.1	84 26.2	98 08	170.4	84 55.9	99 08	169.7	88 45.6	90 25	35.3	88 20.1	89 19	24.9	83 28.2	99 04	04.7	2
3	81 53.7	98 08	169.3	82 23.4	98 08	168.8	83 52.2	98 10	166.7	84 21.6	98 11	165.8	84 50.9	98 11	164.7	88 30.8	85 29	46.3	88 08.9	80 23	34.5	83 25.9	99 05	07.0	3
4	81 48.9	98 10	165.8	82 18.3	98 11	165.1	83 46.2	97 13	162.4	84 15.2	97 13	161.2	84 44.1	96 14	159.8	88 13.6	54 31	53.9	87 54.9	70 27	42.2	83 22.7	97 07	09.3	4
05	81 42.7	97 12	162.4	82 11.9	97 13	161.6	83 38.6	96 15	158.3	84 07.2	95 18	156.9	84 35.4	94 17	155.2	87 54.8	44 33	59.1	87 38.9	61 29	48.1	83 18.6	96 08	11.5	05
6	81 35.3	96 14	159.1	82 04.1	96 15	158.1	83 29.6	94 17	154.3	83 57.6	93 18	152.7	84 25.2	92 19	150.8	87 35.1	37 34	62.8	87 17.2	53 30	52.6	83 13.7	94 10	13.7	6
7	81 26.7	96 16	155.8	81 55.1	96 17	154.7	83 19.2	92 19	150.5	83 46.6	91 20	148.7	84 13.6	89 22	146.6	87 14.9	31 34	65.5	87 03.3	46 32	56.2	83 08.0	92 11	15.8	7
8	81 16.9	94 18	152.7	81 45.0	93 19	151.5	83 07.5	90 21	146.9	83 34.3	88 22	145.0	84 00.6	87 24	142.7	86 54.3	26 35	67.5	86 44.3	40 32	59.0	83 01.4	90 12	17.8	8
9	81 06.0	93 20	149.6	81 33.7	92 20	148.3	82 54.7	88 23	143.5	83 20.8	86 24	141.4	83 46.4	84 25	139.1	86 33.4	22 35	69.0	86 24.8	35 33	61.2	82 54.2	88 13	19.8	9
10	80 54.2	91 21	146.7	81 21.4	90 22	145.3	82 40.8	86 25	140.2	83 06.3	84 26	138.1	83 31.2	82 27	135.7	86 12.4	18 35	70.1	86 05.0	31 34	62.9	82 46.3	86 14	21.6	10
1	80 41.4	90 23	143.9	81 08.1	89 24	142.4	82 26.0	84 26	137.1	82 50.8	83 27	135.0	83 15.0	79 28	132.5	85 51.2	15 35	71.0	85 44.8	27 34	64.3	82 37.6	83 15	23.4	1
2	80 27.7	88 24	141.1	80 54.0	87 25	139.7	82 10.3	82 27	134.2	82 34.5	80 28	132.0	82 58.1	77 29	129.6	85 29.9	12 36	71.6	85 24.5	23 34	65.4	82 28.4	80 16	25.1	2
3	80 13.2	87 25	138.5	80 39.1	86 26	137.0	81 53.8	80 29	131.5	82 17.5	78 30	129.3	82 40.4	75 30	126.8	85 08.5	10 36	72.1	85 04.0	20 34	66.4	82 18.6	78 17	26.7	3
4	79 58.0	86 27	136.0	80 23.4	84 27	134.5	81 36.6	78 30	128.9	81 59.8	76 31	126.7	82 22.1	73 31	124.2	84 47.1	08 36	72.5	84 43.3	17 35	67.1	82 08.2	75 18	28.2	4
15	79 42.0	84 28	133.6	80 07.0	83 28	132.1	81 18.8	77 31	126.4	81 41.4	74 31	124.2	82 03.3	71 32	121.8	84 25.6	06 36	72.8	84 22.6	15 35	67.7	81 57.4	72 19	29.6	15
6	79 25.4	83 29	131.3	79 50.0	81 29	129.7	81 00.5	75 31	124.1	81 22.6	73 32	121.9	81 43.9	70 33	119.5	84 04.8	04 36	72.9	84 01.8	12 35	68.1	81 46.0	69 20	31.0	6
7	79 08.3	81 29	129.1	79 32.4	80 30	127.5	80 41.6	74 32	121.9	81 03.3	71 33	119.7	81 24.2	68 34	117.4	83 42.6	02 36	73.0	83 40.9	10 35	68.5	81 34.2	66 20	32.2	7
8	78 50.6	80 30	127.0	79 14.4	78 31	125.4	80 22.3	72 33	119.8	80 43.6	70 33	117.7	81 04.6	67 34	115.4	83 21.2	00 36	73.1	83 20.0	08 35	68.8	81 22.1	64 21	33.4	8
9	78 32.4	79 31	125.0	78 55.8	77 32	123.4	80 02.6	71 33	117.9	80 23.5	68 34	115.8	80 43.6	65 35	113.5	82 59.6	01 36	73.1	82 59.0	06 35	69.0	81 09.5	61 21	34.5	9
20	78 13.8	78 32	123.0	78 36.9	76 32	121.4	79 42.6	70 34	116.0	80 03.1	67 34	113.9	80 22.8	64 35	111.7	82 38.2	03 36	73.0	82 38.0	04 35	69.1	80 56.6	58 22	35.5	20
1	77 54.7	77 32	121.2	78 17.5	75 33	119.6	79 22.2	69 34	114.2	79 42.4	66 35	112.2	80 18.1	63 35	110.0	82 16.7	04 36	72.9	82 17.0	02 35	69.2	80 43.4	55 22	36.5	1
2	77 35.7	76 33	119.4	77 57.8	74 33	117.8	79 01.6	68 35	112.5	79 21.5	65 35	110.5	79 40.6	62 36	108.0	81 55.2	06 36	72.8	81 56.0	00 35	69.2	80 29.9	53 23	37.5	2
3	77 15.6	75 33	117.6	77 37.7	73 34	116.1	78 40.7	67 35	110.9	79 00.3	64 36	108.9	79 19.2	61 36	106.8	81 33.7	07 36	72.6	81 35.0	01 35	69.2	80 16.2	50 23	38.2	3
4	76 55.5	74 34	116.0	77 17.4	72 34	114.4	78 19.6	66 36	109.3	78 39.0	63 36	107.4	78 57.6	61 36	105.4	81 12.3	05 36	72.4	81 14.0	03 35	69.2	80 02.2	47 24	38.9	4
25	76 35.2	73 34	114.4	76 56.8	71 35	112.9	77 58.3	65 36	107.8	78 17.4	63 36	105.9	78 35.9	60 36	104.0	80 50.9	10 36	72.2	80 53.0	04 35	69.1	79 47.9	45 24	39.6	25
6	76 14.6	72 35	112.8	76 36.9	71 35	111.3	77 36.8	64 36	106.4	77 55.8	62 36	104.5	78 13.9	59 37	102.6	80 29.5	11 36	72.0	80 32.0	06 36	69.0	79 33.5	42 24	40.3	6
7	75 53.7	72 35	111.3	76 15.0	70 35	109.9	77 15.2	64 36	105.0	77 33.9	61 37	103.2	77 52.0	58 37	101.3	80 08.1	12 36	71.7	80 11.0	07 35	68.8	79 18.9	40 25	40.9	7
8	75 32.7	71 35	109.9	75 53.7	69 36	108.4	76 53.4	63 36	103.7	77 12.0	61 37	101.9	77 29.9	58 37	100.1	79 46.8	13 36	71.5	79 50.1	08 35	68.7	79 04.1	37 25	41.4	8
9	75 11.5	70 36	108.5	75 32.3	68 36	107.1	76 31.5	63 37	102.4	76 50.9	60 37	100.7	77 07.7	58 37	98.9	79 25.5	14 35	71.2	79 29.1	10 35	68.5	78 49.2	35 25	41.9	9
30	74 50.1	70 36	107.1	75 10.8	68 36	105.7	76 09.5	62 37	101.1	76 27.8	60 37	99.5	76 45.5	58 37	97.7	79 04.2	16 35	70.9	79 08.2	11 35	68.3	78 34.1	33 25	42.4	30
1	74 28.5	69 36	105.8	74 49.1	68 36	104.4	75 47.4	62 37	99.9	76 05.6	60 37	98.3	76 23.2	57 37	96.6	78 43.0	17 35	70.6	78 47.4	12 35	68.1	78 18.8	30 26	42.8	1
2	74 06.8	68 36	104.5	74 27.2	67 37	103.2	75 25.2	61 37	98.8	75 43.4	59 37	97.2	76 00.8	57 37	95.5	78 21.8	18 35	70.3	78 26.5	14 35	67.9	78 03.5	28 26	43.2	2
3	73 45.0	68 37	103.3	74 05.3	67 37	102.0	75 03.0	61 37	97.6	75 21.0	58 37	96.1	75 38.4	57 37	94.5	78 00.7	19 35	70.0	78 05.7	15 35	67.6	77 48.1	26 26	43.5	3
4	73 23.1	68 37	102.1	73 43.3	66 37	100.8	74 40.7	61 37	96.5	74 58.6	58 37	95.0	75 16.0	57 37	93.4	77 39.6	20 35	69.7	77 45.0	16 35	67.4	77 32.6	24 26	43.8	4
35	73 01.1	68 37	100.9	73 21.1	66 37	99.6	74 18.3	61 37	95.5	74 36.2	58 37	94.0	74 53.5	57 37	92.4	77 18.5	21 35	69.3	77 24.2	17 34	67.1	77 17.0	22 26	44.1	35
6	72 38.9	67 37	99.8	72 58.9	66 37	98.5	73 55.9	61 37	94.4	74 13.8	58 37	93.0	74 31.1	57 37	91.5	76 57.5	22 35	69.0	77 03.6	18 34	66.8	77 01.3	20 26	44.4	6
7	72 16.8	67 37	98.7	72 36.7	66 37	97.4	73 33.5	60 37	93.4	73 51.4	58 37	92.0	74 08.6	56 37	90.5	76 36.6	23 35	68.6	76 42.9	19 34	66.5	76 45.5	18 26	44.6	7
8	71 54.5	67 37	97.6	72 14.4	66 37	96.4	73 11.1	60 37	92.4	73 28.9	58 37	91.0	73 46.1	56 37	89.6	76 15.7	24 35	68.3	76 22.3	20 34	66.2	76 29.7	16 26	44.8	8
9	71 32.2	67 37	96.5	71 52.0	65 37	95.3	72 48.6	60 37	91.5	73 06.4	58 37	90.1	73 23.7	57 37	88.7	75 54.8	25 35	67.9	76 01.8	22 34	65.9	76 13.8	14 27	45.0	9
40	71 09.8	67 37	95.5	71 29.6																					

H.A.	60° 00'		60° 30'		62° 00'		62° 30'		63° 00'		69° 00'		69° 30'		74° 30'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
91	53 06.1	78 31	56.4	53 29.4	78 31	55.8	54 38.7	76 30	54.2	55 01.5	76 30	53.7	55 24.1	75 30	53.1	59 41.1	67 26	45.2	60 01.0	66 26	44.5	63 05.4	66 22	36.2	91
2	52 47.4	79 31	55.7	53 10.9	78 31	55.2	54 20.6	77 30	53.6	54 43.5	76 30	53.0	55 06.2	76 30	52.5	59 25.2	68 26	44.7	59 45.4	67 26	44.0	62 52.2	67 22	35.8	2
3	52 28.6	79 31	55.1	52 52.5	78 30	54.6	54 02.5	77 30	53.0	54 25.6	77 30	52.4	54 48.5	76 29	51.9	59 09.4	68 26	44.3	59 29.8	68 26	43.6	62 39.0	68 22	35.5	3
4	52 10.6	79 30	54.4	52 34.3	79 30	53.9	53 44.7	78 30	52.4	54 07.8	77 29	51.8	54 30.9	77 29	51.3	58 53.8	68 26	43.8	59 14.4	68 26	43.1	62 26.0	68 22	35.2	4
95	51 52.4	80 30	53.8	52 16.2	79 30	53.3	53 26.9	78 29	51.7	53 50.2	77 29	51.2	54 13.4	77 29	50.7	58 38.3	70 26	43.3	58 59.1	69 25	42.6	62 13.2	69 21	34.8	95
6	51 34.3	80 30	53.1	51 58.3	80 30	52.6	53 09.4	78 29	51.1	53 32.8	78 29	50.6	53 56.1	77 29	50.1	58 23.0	70 25	42.8	58 44.0	70 25	42.1	62 00.4	61 21	34.5	6
7	51 16.4	80 30	52.5	51 40.5	80 29	52.0	52 51.9	79 29	50.5	53 15.5	78 29	50.0	53 38.9	78 28	49.5	58 07.7	71 25	42.4	58 28.9	70 25	41.7	61 47.7	62 21	34.1	7
8	50 58.6	81 29	51.8	51 22.8	80 29	51.4	52 34.7	79 29	49.9	52 58.4	79 28	49.4	53 21.9	78 28	48.9	57 52.7	72 25	41.9	58 14.1	71 25	41.2	61 35.1	63 21	33.8	8
9	50 41.0	81 29	51.2	51 05.3	81 29	50.7	52 17.5	80 28	49.3	52 41.4	79 28	48.8	53 05.1	79 28	48.3	57 37.7	72 25	41.4	57 59.3	72 24	40.7	61 22.7	64 21	33.4	9
100	50 23.6	82 29	50.6	50 48.0	81 29	50.1	52 00.6	80 28	48.7	52 24.5	80 28	48.2	52 48.4	79 28	47.7	57 23.0	73 24	40.9	57 44.7	72 24	40.3	61 10.4	64 20	33.1	100
1	50 06.3	82 29	49.9	50 30.9	82 28	49.5	51 43.8	80 28	48.1	52 07.9	80 28	47.6	52 31.8	80 27	47.1	57 08.3	74 24	40.4	57 30.3	73 24	39.8	60 58.2	65 20	32.7	1
2	49 49.2	82 28	49.3	50 13.8	82 28	48.8	51 27.1	81 27	47.5	51 51.3	81 27	47.0	52 15.4	80 27	46.5	56 53.8	74 24	39.9	57 16.0	74 24	39.3	60 46.1	66 20	32.4	2
3	49 32.2	83 28	48.7	49 57.0	82 28	48.2	51 10.7	81 27	46.9	51 35.0	81 27	46.4	51 59.2	81 27	45.9	56 39.5	75 24	39.4	57 01.8	74 23	38.8	60 34.1	67 20	32.0	3
4	49 15.5	83 28	48.0	49 40.3	83 28	47.6	50 54.3	82 27	46.3	51 18.2	81 27	45.8	51 43.2	81 26	45.3	56 25.3	75 23	39.0	56 47.8	75 23	38.4	60 22.3	68 20	31.6	4
105	48 58.8	83 27	47.4	49 23.8	83 27	47.0	50 38.2	82 27	45.6	51 02.8	82 26	45.2	51 27.3	81 26	44.7	56 11.2	76 23	38.5	56 33.9	75 23	37.9	60 10.5	69 19	31.3	105
6	48 42.4	84 27	46.7	49 07.5	83 27	46.3	50 22.2	83 26	45.0	50 46.9	82 26	44.6	51 11.5	82 26	44.1	55 57.3	77 23	38.0	56 20.2	76 23	37.4	59 58.9	69 19	30.9	6
7	48 26.1	84 27	46.1	48 51.3	84 27	45.7	50 06.4	83 26	44.4	50 31.2	83 26	44.0	50 55.9	82 26	43.5	55 43.5	77 23	37.5	56 06.6	77 22	36.9	59 47.4	70 19	30.5	7
8	48 10.0	85 27	45.5	48 35.3	84 26	45.1	49 50.7	83 26	43.8	50 15.7	83 26	43.4	50 40.6	83 25	42.9	55 29.9	78 22	37.0	55 53.2	77 22	36.4	59 36.1	71 19	30.2	8
9	47 54.0	85 26	44.8	48 19.5	85 26	44.4	49 35.3	84 26	43.2	50 00.3	83 25	42.8	50 25.3	83 25	42.4	55 16.5	78 22	36.5	55 39.9	78 22	35.9	59 24.9	72 18	29.8	9
110	47 38.3	85 26	44.2	48 03.8	85 26	43.8	49 20.0	84 25	42.6	49 45.2	84 25	42.2	50 10.3	84 25	41.8	55 03.2	79 22	36.0	55 26.8	78 22	35.5	59 13.8	73 18	29.4	110
1	47 22.7	86 26	43.6	47 48.4	85 25	43.2	49 04.8	85 25	42.0	49 30.1	84 25	41.6	49 55.4	84 25	41.2	54 50.1	79 22	35.5	55 13.8	79 21	35.0	59 02.8	73 18	29.0	1
2	47 07.3	86 26	42.9	47 33.1	86 25	42.6	48 49.9	85 25	41.4	49 15.3	85 24	41.0	49 40.7	84 24	40.6	54 37.1	80 21	35.0	55 01.0	80 21	34.5	58 52.0	74 18	28.6	2
3	46 52.1	86 25	42.3	47 17.9	86 25	41.9	48 35.1	85 24	40.8	49 00.7	85 24	40.4	49 26.1	85 24	40.0	54 24.3	81 21	34.5	54 48.4	80 21	34.0	58 41.3	75 18	28.3	3
4	46 37.0	87 25	41.7	47 03.0	86 25	41.3	48 20.5	86 24	40.2	48 06.7	86 24	39.8	48 11.8	85 24	39.4	54 11.6	81 21	34.0	54 35.9	81 21	33.5	58 30.7	76 17	27.9	4
115	46 22.2	87 24	41.1	46 48.3	87 24	40.7	48 06.1	86 24	39.6	48 31.9	86 24	39.2	48 57.6	86 23	38.8	53 59.1	82 21	33.5	54 23.5	81 20	33.0	58 20.2	76 17	27.5	115
6	46 07.5	87 24	40.4	46 33.7	87 24	40.1	47 51.9	86 23	39.0	48 17.8	86 23	38.6	48 43.6	86 23	38.2	53 46.8	82 20	33.0	54 11.4	82 20	32.5	58 09.9	77 17	27.1	6
7	45 53.0	88 24	39.8	46 19.3	88 24	39.4	47 37.8	87 23	38.4	48 03.8	87 23	38.0	48 29.8	86 23	37.6	53 34.6	83 20	32.5	53 59.4	82 20	32.1	57 59.8	78 17	26.7	7
8	45 38.7	88 24	39.2	46 05.1	88 23	38.8	47 24.0	87 23	37.8	47 50.7	87 23	37.4	48 16.2	87 22	37.0	53 22.6	83 20	32.0	53 47.5	83 19	31.6	57 49.7	78 16	26.3	8
9	45 24.6	88 23	38.5	45 51.2	88 23	38.2	47 10.3	88 22	37.2	47 36.5	87 22	36.8	48 02.7	87 22	36.4	53 10.8	84 19	31.5	53 35.8	83 19	31.1	57 39.9	79 16	25.9	9
120	45 10.7	89 23	37.9	45 37.3	89 23	37.6	46 56.8	88 22	36.6	47 23.2	88 22	36.2	47 49.5	88 22	35.8	52 59.1	84 19	31.0	53 24.3	84 19	30.6	57 30.1	80 16	25.5	120
1	44 57.0	89 23	37.3	45 23.7	89 22	36.9	46 43.5	88 22	35.9	47 10.0	88 22	35.6	47 36.4	88 21	35.3	52 47.6	85 19	30.5	53 13.0	84 19	30.1	57 20.5	80 16	25.1	1
2	44 43.5	89 22	36.6	45 10.3	89 22	36.3	46 30.4	89 22	35.3	46 57.0	89 21	35.0	47 23.5	88 21	34.7	52 36.3	85 19	30.0	53 01.8	85 18	29.6	57 11.0	81 16	24.7	2
3	44 30.2	90 22	36.0	44 57.1	90 22	35.7	46 17.5	89 21	34.7	46 44.2	89 21	34.4	47 10.8	89 21	34.1	52 25.1	86 18	29.5	52 50.8	85 18	29.1	57 01.7	82 15	24.3	3
4	44 17.1	90 22	35.4	44 44.1	90 21	35.1	46 04.8	89 21	34.1	46 31.6	89 21	33.8	46 58.3	89 20	33.5	52 14.1	86 18	29.0	52 39.9	86 18	28.6	56 52.5	82 15	23.9	4
125	44 04.2	90 21	34.8	44 31.3	90 21	34.5	45 52.3	90 21	33.5	46 19.2	90 20	33.2	46 46.0	89 20	32.9	52 03.3	87 18	28.5	52 29.2	86 18	28.1	56 43.5	83 15	23.5	125
6	43 51.5	91 21	34.1	44 18.7	91 21	33.8	45 40.0	90 20	32.9	46 07.0	90 20	32.6	46 33.9	90 20	32.3	51 52.6	87 17	28.0	52 18.7	87 17	27.6	56 34.6	84 15	23.1	6
7	43 39.0	91 20	33.5	44 06.3	91 20	33.2	45 27.9	90 20	32.3	45 55.0	90 20	32.0	46 22.0	90 20	31.7	51 42.2	88 17	27.5	52 08.4	87 17	27.1	56 25.8	84 14	22.7	7
8	43 26.7	91 20	32.9	43 54.0	91 20	32.6	45 16.0	91 20	31.7	45 43.2	91 19	31.4	46 10.3	90 19	31.1	51 31.9	88 17	27.0	51 58.3	88 17	26.6	56 17.2	85 14	22.3	8
9	43 14.6	92 20	32.2	43 42.0	92 20	32.0	45 04.2	91 19	31.1	45 31.5	91 19	30.8	45 58.8	91 19	30.5	51 21.8	88 17	26.5	51 48.3	88 16	26.1	56 08.8	85 14	21.9	9
130	43 02.7	92 19	31.6	43 30.3	92 19	31.3	44 52.7	91 19	30.5	45 20.1	91 19	30.2	45 47.5	91 19	29.9	51 11.8	89 16	26.0	51 38.5	89 16	25.6	56 00.5	86 14	21.5	130
1	42 51.0	92 19	31.0	44 18.7	92 19	30.7	44 41.4	92 18	29.9	45 08.9	92 18	29.6	45 36.4	91 18	29.3	51 02.1	89 16	25.5	51 28.8	89 16	25.1	55 52.3	86 13	21.1	1
2	42 39.5	93 19	30.3	44 07.3	92 19	30.1	44 30.3	92 18	29.3	44 57.9	92 18	29.0	45 25.5	92 18	28.7	50 52.5	90 16	25.0	51 19.4	90 15	24.6	55 44.3	87 13	20.7	2
3	42 28.3	93 18	29.7	44 26.1	93 18	29.5	44 19.4	92 18	28.7	44 47.1	92 18	28.4	45 14.8	92 18	28.1	50 43.1	90 15	24.5	51 10.1	90 15	24.1	55 36.5	87 13	20.3	3
4	42 17.3	93 18	29.1	44 08.8	93 18	28.8	44 08.8	93 17	28.1	44 36.5	93 17	27.8	45 04.3	92 17	27.5	50 33.9	91 15	23.9	51 01.0	90 15	23.6	55 28.8	88 13	19.8	4
135	42 06.4	93 18	28.5	44 34.4	93 18	28.2	43 58.3	93 17	27.5	44 26.2	93 17	27.2	44 54.0	93 17	26.9	50 24.9	91 15	23.4	50 52.1	91 15	23.1	55 21.2	88 12	19.4	135</

# STAR IDENTIFICATION TABLE .

234

ALTITUDE

Lat.  
68°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.																					
00	26	180	30	180	34	180	38	180	42	180	46	180	50	180	54	180	58	180	62	180	66	180	00
4	26	176	30	175	34	175	38	175	42	175	46	175	50	175	54	174	58	174	62	173	66	173	4
8	26	171	30	171	34	171	38	170	42	170	46	170	50	169	54	169	58	168	62	167	66	166	8
12	25	167	29	166	33	166	37	165	41	165	45	164	49	164	53	163	57	162	61	161	65	159	12
16	25	162	29	162	33	161	37	161	41	160	45	159	49	158	53	157	57	156	61	154	65	153	16
20	25	158	29	157	32	157	36	156	40	155	44	154	48	153	52	152	56	150	60	148	64	146	20
24	24	154	28	153	32	152	36	151	40	150	44	149	48	148	51	146	55	145	59	143	63	140	24
28	23	149	27	148	31	148	35	147	39	145	43	144	47	143	51	141	54	139	58	137	62	134	28
32	22	145	26	144	30	143	34	142	38	141	42	139	46	138	50	136	53	134	57	132	61	129	32
36	22	141	25	140	29	139	33	138	37	136	41	135	45	133	48	131	52	129	56	127	60	123	36
40	21	137	24	136	28	134	32	133	36	132	40	130	44	128	47	127	51	124	55	122	58	118	40
44	19	133	23	131	27	130	31	129	35	127	39	126	42	124	46	122	50	120	53	117	57	114	44
48	18	129	22	127	26	126	30	125	34	123	37	121	41	120	45	117	48	115	52	112	56	109	48
52	17	125	21	123	25	122	29	120	32	119	36	117	40	115	43	113	47	111	51	108	54	105	52
56	16	121	20	119	23	118	27	116	31	115	35	113	38	111	42	109	46	107	49	104	53	101	56
60	15	117	18	115	22	114	26	112	30	111	33	109	37	107	41	105	44	102	48	100	51	97	60
64	13	113	17	111	21	110	24	108	28	107	32	105	35	103	39	101	43	98	46	96	50	93	64
68	12	109	16	108	19	106	23	105	27	103	30	101	34	99	38	97	41	94	45	92	48	89	68
72	10	105	14	104	18	102	22	101	25	99	29	97	33	95	36	93	40	91	43	88	47	86	72
76	09	102	13	100	16	98	20	97	24	95	27	93	31	91	35	89	38	87	42	85	45	82	76
80	07	98	11	96	15	95	19	93	22	91	26	90	30	88	33	86	37	84	40	81	44	78	80
84	06	94	10	93	13	91	17	89	21	88	24	86	28	84	32	82	35	80	39	78	42	75	84
88	04	90	08	89	12	87	16	86	19	84	23	82	27	81	30	79	34	77	37	74	41	72	88
92	03	87	07	85	10	84	14	82	18	80	21	79	25	77	29	75	32	73	36	71	39	68	92
96	01	83	05	81	09	80	13	78	16	77	20	75	24	73	27	72	31	70	34	68	38	65	96
100	00	79	04	78	07	76	11	75	15	73	19	72	22	70	26	68	29	66	33	64	37	62	100
104	01	76	02	74	06	73	10	71	13	70	17	68	21	66	24	65	28	63	32	61	35	59	104
108	02	72	01	70	05	69	08	68	12	66	16	65	19	63	23	61	27	60	30	58	34	56	108
112	04	68	01	67	03	65	07	64	11	62	14	61	18	59	22	58	26	56	29	54	33	53	112
116	06	64	02	63	02	62	06	60	09	59	13	57	17	56	21	55	24	53	28	51	32	49	116
120	07	61	03	59	01	58	04	57	08	55	12	54	16	53	19	51	23	50	27	48	31	46	120
124	08	57	04	55	01	54	03	53	07	52	11	50	14	49	18	48	22	46	26	45	30	43	124
128	10	53	06	52	02	50	02	49	06	48	10	47	13	46	17	44	21	43	25	42	29	40	128
132	11	49	07	48	03	47	01	46	05	44	09	43	12	42	16	41	20	40	24	38	28	37	132
136	12	45	08	44	04	43	00	42	04	41	08	40	11	39	15	38	19	36	23	35	27	34	136
140	13	41	09	40	05	39	01	38	03	37	07	36	10	35	14	34	18	33	22	32	26	31	140
144	14	37	10	36	06	35	02	34	02	34	06	33	10	32	14	31	17	30	21	29	25	28	144
148	15	33	11	32	07	31	03	31	01	30	05	29	09	28	13	27	17	27	21	26	25	25	148
152	15	29	11	28	08	28	04	27	00	26	04	25	08	25	12	24	16	23	20	23	24	22	152
156	16	25	12	24	08	24	04	23	00	22	04	22	08	21	12	21	16	20	20	19	23	19	156
160	17	21	13	20	09	20	05	19	01	19	03	18	07	18	11	17	15	17	19	16	23	16	160
164	17	17	13	16	09	16	05	15	01	15	03	15	07	14	11	14	15	13	19	13	23	12	164
168	18	13	14	12	10	12	06	12	02	11	02	11	06	11	10	10	14	10	18	10	22	09	168
172	18	08	14	08	10	08	06	08	02	08	02	07	06	07	10	07	14	07	18	06	22	06	172
176	18	04	14	04	10	04	06	04	02	04	02	04	06	04	10	03	14	03	18	03	22	03	176
180	18	00	14	00	10	00	06	00	02	00	02	00	06	00	10	00	14	00	18	00	22	00	180

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

10-16220

# STAR IDENTIFICATION TABLE

## ALTITUDE

235

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.																					
00	70	180	74	180	78	180	82	180	86	180	90	...	86	00	82	00	78	00	74	00	70	00	00
4	70	172	74	171	78	169	82	166	86	156	88	88	86	17	82	07	78	03	74	02	70	00	4
8	70	165	74	162	77	159	81	153	85	137	87	86	85	31	82	13	78	07	74	03	70	01	8
12	69	157	73	154	77	149	80	141	84	124	86	84	84	40	81	19	78	10	74	04	70	01	12
16	68	150	72	146	76	141	79	131	82	114	84	83	83	46	81	24	77	13	74	06	70	02	16
20	68	143	71	139	75	133	78	123	81	107	83	81	82	51	80	28	77	15	74	07	70	02	20
24	67	137	70	132	74	126	77	116	80	101	81	79	81	53	79	32	77	18	73	09	70	02	24
28	66	131	69	126	72	119	76	110	78	96	80	77	80	55	78	34	76	20	73	10	70	03	28
32	64	125	68	120	71	114	74	105	77	92	78	75	79	55	78	36	76	22	73	11	70	03	32
36	63	120	67	115	70	108	73	100	75	88	77	73	77	56	77	38	75	23	73	12	70	03	36
40	62	115	65	110	68	104	71	95	74	85	75	71	76	55	76	39	74	24	72	13	69	04	40
44	60	110	64	105	67	99	70	91	72	82	74	69	75	55	75	40	74	25	72	13	69	04	44
48	59	105	62	101	65	95	68	88	71	79	72	68	74	54	74	40	73	26	71	14	69	04	48
52	57	101	61	97	64	91	67	84	69	76	71	66	72	54	73	40	72	27	71	15	69	04	52
56	56	97	59	93	62	87	65	81	68	73	70	64	71	53	72	40	72	27	71	15	69	05	56
60	55	93	58	89	61	84	64	78	66	71	68	62	70	51	71	40	71	28	70	16	69	05	60
64	53	89	56	85	59	81	62	75	65	68	67	60	69	50	70	39	70	28	70	16	69	05	64
68	52	86	55	82	58	77	61	72	63	66	66	58	68	49	69	39	70	28	70	16	69	05	68
72	50	82	53	79	56	74	59	69	62	63	65	56	67	48	68	38	69	27	69	16	69	05	72
76	49	79	52	75	55	71	58	66	61	61	63	54	65	46	67	37	68	27	69	16	68	05	76
80	47	75	50	72	54	68	57	64	60	58	62	52	64	45	66	36	68	27	68	16	68	05	80
84	46	72	49	69	52	65	55	61	58	56	61	50	63	43	65	35	67	26	68	16	68	05	84
88	44	69	48	66	51	62	54	58	57	54	60	48	62	42	65	34	66	26	67	16	68	05	88
92	43	66	46	63	50	60	53	56	56	51	59	46	61	40	64	33	66	25	67	16	68	05	92
96	42	63	45	60	48	57	52	53	55	49	58	44	60	39	63	32	65	24	67	15	68	05	96
100	40	60	44	57	47	54	50	51	54	47	57	42	60	37	62	31	64	23	66	15	68	05	100
104	39	57	42	54	46	51	49	48	53	44	56	40	59	35	61	29	64	22	66	14	67	05	104
108	38	54	41	51	45	48	48	45	52	42	55	38	58	33	61	28	63	22	66	14	67	05	108
112	37	51	40	48	44	46	47	43	51	40	54	36	57	32	60	27	63	21	65	13	67	05	112
116	35	48	39	45	43	43	46	40	50	37	53	34	56	30	59	25	62	20	65	13	67	05	116
120	34	45	38	43	42	40	45	38	49	35	52	32	55	28	59	24	62	19	64	12	67	04	120
124	33	42	37	40	41	38	44	35	48	33	51	30	55	26	58	22	61	17	64	11	67	04	124
128	32	39	36	37	40	35	43	33	47	30	51	28	54	25	58	21	61	16	64	11	67	04	128
132	31	36	35	34	39	32	43	30	46	28	50	26	54	23	57	19	60	15	64	10	67	04	132
136	31	33	34	31	38	30	42	28	46	26	49	24	53	21	57	18	60	14	63	09	67	03	136
140	30	30	34	28	37	27	41	25	45	23	49	21	52	19	56	16	60	13	63	09	66	03	140
144	29	27	33	26	37	24	41	23	44	21	48	19	52	17	56	15	59	12	63	08	66	03	144
148	28	24	32	23	36	22	40	20	44	19	48	17	52	15	55	13	59	10	63	07	66	03	148
152	28	21	32	20	36	19	40	18	43	16	47	15	51	13	55	11	59	09	63	06	66	02	152
156	27	18	31	17	35	16	39	15	43	14	47	13	51	11	55	10	59	08	62	05	66	02	156
160	27	15	31	14	35	13	39	13	43	12	47	11	51	10	55	08	58	07	62	04	66	02	160
164	27	12	31	11	35	11	39	10	42	09	46	09	50	08	54	07	58	05	62	04	66	01	164
168	26	09	30	09	34	08	38	08	42	07	46	06	50	06	54	05	58	04	62	03	66	01	168
172	26	06	30	06	34	05	38	05	42	05	46	04	50	04	54	03	58	03	62	02	66	01	172
176	26	03	30	03	34	03	38	03	42	02	46	02	50	02	54	02	58	01	62	01	66	00	176
180	26	00	30	00	34	00	38	00	42	00	46	00	50	00	54	00	58	00	62	00	66	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat.  
68°

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

10-16320

Lat.  
69°

DECLINATION SAME NAME AS LATITUDE

Lat. 69°

H.A.	0° 00'		0° 30'		1° 00'		1° 30'		2° 00'		2° 30'		3° 00'		3° 30'		H.A.
	Alt.	Az.															
00	21 00.0	1.00 180.0	21 30.0	1.00 180.0	22 00.0	1.00 180.0	22 30.0	1.00 180.0	23 00.0	1.00 180.0	23 30.0	1.00 180.0	24 00.0	1.00 180.0	24 30.0	1.00 180.0	00
1	20 59.8	1.001 178.9	21 29.8	1.001 178.9	21 59.8	1.001 178.9	22 29.8	1.001 178.9	22 59.8	1.001 178.9	23 29.8	1.001 178.9	23 59.8	1.001 178.9	24 29.8	1.001 178.9	1
2	20 59.2	1.002 177.9	21 29.2	1.002 177.9	21 59.2	1.002 177.8	22 29.2	1.002 177.8	22 59.2	1.002 177.8	23 29.2	1.002 177.8	23 59.2	1.002 177.8	24 29.2	1.002 177.8	2
3	20 58.2	1.002 176.8	21 28.2	1.002 176.8	21 58.2	1.002 176.8	22 28.2	1.002 176.8	22 58.2	1.002 176.7	23 28.2	1.002 176.7	23 58.2	1.002 176.7	24 28.2	1.002 176.7	3
4	20 56.8	1.003 175.7	21 26.8	1.003 175.7	21 56.8	1.003 175.7	22 26.8	1.003 175.7	22 56.7	1.003 175.7	23 26.7	1.003 175.6	23 56.7	1.003 175.6	24 26.7	1.003 175.6	4
05	20 55.0	1.004 174.6	21 25.0	1.004 174.6	21 54.9	1.004 174.6	22 24.9	1.004 174.6	22 54.9	1.004 174.6	23 24.9	1.004 174.6	23 54.9	1.004 174.5	24 24.9	1.004 174.5	05
6	20 52.8	1.004 173.6	21 22.7	1.004 173.6	21 52.7	1.004 173.5	22 22.7	1.004 173.5	22 52.7	1.004 173.5	23 22.7	1.004 173.5	23 52.6	1.004 173.4	24 22.6	1.004 173.4	6
7	20 50.2	1.005 172.5	21 20.1	1.005 172.5	21 50.1	1.005 172.5	22 20.1	1.005 172.4	22 50.0	1.005 172.4	23 20.0	1.005 172.4	23 50.0	1.005 172.4	24 19.9	1.005 172.3	7
8	20 47.2	1.006 171.4	21 17.1	1.006 171.4	21 47.1	1.006 171.4	22 17.0	1.006 171.4	22 47.0	1.006 171.3	23 17.0	1.006 171.3	23 46.9	1.006 171.3	24 16.9	1.006 171.2	8
9	20 43.8	1.006 170.4	21 13.7	1.006 170.3	21 43.7	1.006 170.3	22 13.6	1.006 170.3	22 43.5	1.006 170.2	23 13.5	1.006 170.2	23 43.4	1.006 170.2	24 13.4	1.006 170.1	9
10	20 40.0	1.007 169.3	21 09.9	1.007 169.3	21 39.8	1.007 169.2	22 09.8	1.007 169.2	22 39.7	1.007 169.2	23 09.6	1.007 169.1	23 39.5	1.007 169.1	24 09.5	1.007 169.0	10
1	20 35.8	1.008 168.2	21 05.7	1.008 168.2	21 35.6	1.008 168.2	22 05.5	1.008 168.1	22 35.5	1.008 168.1	23 05.4	1.008 168.0	23 35.3	1.008 168.0	24 05.2	1.008 168.0	1
2	20 31.2	1.008 167.2	21 01.1	1.008 167.1	21 31.0	1.008 167.1	22 00.9	1.008 167.0	22 30.8	1.008 167.0	23 00.7	1.008 166.9	23 30.6	1.008 166.9	24 00.5	1.008 166.9	2
3	20 26.2	1.009 166.1	20 56.1	1.009 166.1	21 26.0	1.009 166.0	21 55.9	1.009 166.0	22 25.8	1.009 165.9	22 55.7	1.009 165.8	23 25.6	1.009 165.8	23 55.4	1.009 165.8	3
4	20 20.9	1.010 165.0	20 50.8	1.010 165.0	21 20.6	1.010 164.9	21 50.5	1.010 164.9	22 20.4	1.010 164.8	22 50.2	1.010 164.8	23 20.1	1.010 164.7	23 50.0	1.010 164.7	4
15	20 15.1	1.010 164.0	20 45.0	1.010 163.9	21 14.9	1.010 163.9	21 44.7	1.010 163.8	22 14.6	99 10 163.8	22 44.4	99 10 163.7	23 14.2	99 10 163.7	23 44.1	99 10 163.6	15
6	20 09.0	99 11 162.9	20 38.9	99 11 162.9	21 08.7	99 11 162.8	21 38.5	99 11 162.8	22 08.3	99 11 162.7	22 38.2	99 11 162.6	23 08.0	99 11 162.6	23 37.8	99 11 162.5	6
7	20 02.5	99 11 161.9	20 32.3	99 12 161.8	21 02.1	99 12 161.7	21 32.0	99 12 161.7	22 01.8	99 12 161.6	22 31.6	99 12 161.5	23 01.4	99 12 161.5	23 31.2	99 12 161.4	7
8	19 55.6	99 12 160.8	20 25.4	99 12 160.7	20 55.2	99 12 160.7	21 25.0	99 12 160.6	21 54.8	99 12 160.6	22 24.6	99 12 160.5	22 54.4	99 12 160.4	23 24.1	99 12 160.4	8
9	19 48.4	99 13 159.8	20 18.2	99 13 159.7	20 47.9	99 13 159.6	21 17.7	99 13 159.6	21 47.4	99 13 159.5	22 17.2	99 13 159.4	22 47.0	99 13 159.4	23 16.7	99 13 159.3	9
20	19 40.8	99 13 158.7	20 10.5	99 13 158.6	20 40.2	99 13 158.6	21 10.0	99 13 158.5	21 39.7	99 14 158.4	22 09.5	99 14 158.3	22 39.2	99 14 158.3	23 08.9	99 14 158.2	20
1	19 32.8	99 14 157.6	20 02.5	99 14 157.6	20 32.2	99 14 157.5	21 01.9	99 14 157.4	21 31.6	99 14 157.4	22 01.3	99 14 157.3	22 31.1	99 14 157.2	23 00.8	99 14 157.1	1
2	19 24.4	99 15 156.6	19 54.1	99 15 156.5	20 23.8	99 15 156.4	20 53.5	99 15 156.4	21 23.2	99 15 156.3	21 52.9	99 15 156.2	22 22.5	99 15 156.1	22 52.2	99 15 156.1	2
3	19 15.7	99 16 155.6	19 45.4	99 16 155.5	20 15.0	99 16 155.4	20 44.7	99 16 155.3	21 14.3	99 16 155.2	21 44.0	99 16 155.2	22 13.7	99 16 155.1	22 43.3	99 16 155.0	3
4	19 06.6	99 16 154.5	19 36.2	99 16 154.4	20 05.9	99 16 154.3	20 35.5	99 16 154.3	21 05.0	99 16 154.2	21 34.8	99 16 154.1	22 04.4	99 16 154.0	22 34.0	99 16 153.9	4
25	18 57.2	99 16 153.5	19 26.8	99 16 153.4	19 56.4	99 16 153.3	20 26.0	99 16 153.2	20 55.6	99 16 153.1	21 25.2	99 17 153.0	21 54.8	99 17 152.9	22 24.4	99 17 152.9	25
6	18 47.4	99 17 152.4	19 17.9	99 17 152.3	19 46.6	99 17 152.2	20 16.1	99 17 152.2	20 45.7	99 17 152.1	21 15.3	99 17 152.0	21 44.9	99 17 151.9	22 14.4	99 17 151.8	6
7	18 37.3	99 17 151.4	19 06.8	99 18 151.3	19 36.4	99 18 151.2	20 05.9	99 18 151.1	20 35.5	99 18 151.0	21 05.0	99 18 150.9	21 34.5	99 18 150.8	22 04.1	99 18 150.7	7
8	18 26.8	99 18 150.3	18 56.3	99 18 150.2	19 25.8	99 18 150.1	19 55.4	99 18 150.1	20 24.9	99 18 150.0	20 54.4	99 18 149.9	21 23.9	99 18 149.8	21 53.4	99 18 149.7	8
9	18 16.0	99 19 149.3	18 45.5	99 19 149.2	19 15.0	99 19 149.1	19 44.5	99 19 149.0	20 13.9	99 19 148.9	20 43.4	99 19 148.8	21 12.9	99 19 148.7	21 42.4	99 19 148.6	9
30	18 04.8	99 19 148.3	18 34.3	99 19 148.2	19 03.8	99 19 148.1	19 33.2	99 19 148.0	20 02.7	99 19 147.9	20 32.1	99 19 147.8	21 01.6	99 19 147.7	21 31.0	99 20 147.6	30
1	17 53.4	99 20 147.2	18 22.8	99 20 147.1	18 52.2	99 20 147.0	19 21.6	99 20 146.9	19 51.1	99 20 146.8	20 20.5	99 20 146.7	20 49.9	99 20 146.6	21 19.3	99 20 146.5	1
2	17 41.6	99 20 146.2	18 11.0	99 20 146.1	18 40.4	99 20 146.0	19 09.7	99 20 145.9	19 39.1	99 20 145.8	20 08.5	99 20 145.7	20 37.9	99 20 145.6	21 07.3	99 20 145.5	2
3	17 29.4	99 21 145.2	17 58.8	99 21 145.1	18 28.2	99 21 145.0	18 57.5	99 21 144.9	19 26.9	99 21 144.7	19 56.2	99 21 144.6	20 25.6	99 21 144.5	20 54.9	99 21 144.4	3
4	17 17.0	99 21 144.2	17 46.3	99 21 144.1	18 15.7	99 21 143.9	18 45.0	99 21 143.8	19 14.3	99 21 143.7	19 43.6	99 21 143.6	20 12.9	99 21 143.5	20 42.2	99 21 143.4	4
35	17 04.3	99 22 143.1	17 33.6	99 22 143.0	18 02.9	99 22 142.9	18 32.1	99 22 142.8	19 01.4	99 22 142.7	19 30.7	99 22 142.6	20 00.0	99 22 142.4	20 29.3	99 22 142.3	35
6	16 51.2	99 22 142.1	17 20.5	99 22 142.0	17 49.7	99 22 141.9	18 19.0	99 22 141.8	18 48.2	99 22 141.6	19 17.5	99 22 141.5	19 46.7	99 22 141.4	20 16.0	99 22 141.3	6
7	16 37.9	99 23 141.1	17 07.1	99 23 141.0	17 36.3	99 23 140.9	18 05.5	99 23 140.7	18 34.7	99 23 140.6	19 04.0	99 23 140.5	19 33.2	99 23 140.4	20 02.4	99 23 140.3	7
8	16 24.2	99 23 140.1	16 53.4	99 23 140.0	17 22.6	99 23 139.8	17 51.8	99 23 139.7	18 21.0	99 23 139.6	18 50.1	99 23 139.5	19 19.3	99 23 139.3	19 48.5	99 23 139.2	8
9	16 10.3	99 24 139.1	16 39.4	99 24 138.9	17 08.6	99 24 138.8	17 37.7	99 24 138.7	18 06.9	99 24 138.6	18 36.0	99 24 138.4	19 05.1	99 24 138.3	19 34.3	99 24 138.2	9
40	15 56.0	99 24 138.1	16 25.1	99 24 137.9	16 54.3	99 24 137.8	17 23.4	99 24 137.7	17 52.5	99 24 137.5	18 21.6	99 24 137.4	18 50.7	99 24 137.3	19 19.8	99 24 137.2	40
1	15 41.5	99 25 137.0	16 10.6	99 25 136.9	16 39.7	99 25 136.8	17 08.8	99 25 136.7	17 37.8	99 25 136.5	18 06.9	99 25 136.4	18 36.0	99 25 136.3	19 05.0	99 25 136.1	1
2	15 26.7	99 26 136.0	15 55.8	99 26 135.9	16 24.8	99 26 135.8	16 53.9	99 26 135.6	17 22.9	99 26 135.5	17 51.9	99 26 135.4	18 21.0	99 26 135.3	18 50.0	99 26 135.1	2
3	15 11.7	99 26 135.0	15 40.7	99 26 134.9	16 09.7	99 26 134.8	16 38.7	99 26 134.6	17 07.7	99 26 134.5	17 36.7	99 26 134.4	18 05.7	99 26 134.2	18 34.7	99 26 134.1	3
4	14 56.3	99 26 134.0	15 25.3	99 26 133.9	15 54.3	99 26 133.8	16 23.3	99 26 133.6	16 52.2	99 26 133.5	17 21.2	99 26 133.4	17 50.2	99 26 133.2	18 19.1	99 26 133.1	4
45	14 40.7	99 26 133.0	15 09.7	99 26 132.9	15 38.6	99 26 132.8	16 07.6	99 27 132.6	16 36.5	99 27 132.5	17 05.4	99 27 132.3	17 34.4	99 27			

Main data table with columns for H.A., Alt., Az., and declination values for various latitudes from 00 to 75.

Lat. 69°

Lat. 69°

Lat. 69°

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.								
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.									
00	2500.0	1.000	180.0	2530.0	1.000	180.0	2600.0	1.000	180.0	2630.0	1.000	180.0	2700.0	1.000	180.0	2730.0	1.000	180.0	2800.0	1.000	180.0	2830.0	1.000	180.0	00
1	2459.8	1.001	178.9	2529.8	1.001	178.9	2559.8	1.001	178.9	2629.8	1.001	178.9	2659.8	1.001	178.9	2729.8	1.001	178.9	2759.8	1.001	178.9	2829.8	1.001	178.9	1
2	2459.2	1.002	177.8	2529.2	1.002	177.8	2559.2	1.002	177.8	2629.2	1.002	177.8	2659.2	1.002	177.8	2729.2	1.002	177.8	2759.2	1.002	177.8	2829.2	1.002	177.8	2
3	2458.1	1.002	176.7	2528.1	1.002	176.7	2558.1	1.002	176.7	2628.1	1.002	176.7	2658.1	1.002	176.7	2728.1	1.002	176.7	2758.1	1.002	176.7	2828.1	1.002	176.7	3
4	2456.7	1.003	175.6	2526.7	1.003	175.6	2556.7	1.003	175.6	2626.7	1.003	175.6	2656.7	1.003	175.6	2726.7	1.003	175.6	2756.7	1.003	175.6	2826.7	1.003	175.6	4
05	2454.8	1.004	174.5	2524.8	1.004	174.5	2554.8	1.004	174.5	2624.8	1.004	174.5	2654.8	1.004	174.5	2724.8	1.004	174.5	2754.8	1.004	174.5	2824.8	1.004	174.5	05
6	2452.6	1.004	173.4	2522.6	1.004	173.4	2552.6	1.004	173.4	2622.6	1.004	173.4	2652.6	1.004	173.4	2722.6	1.004	173.4	2752.6	1.004	173.4	2822.6	1.004	173.4	6
7	2449.9	1.005	172.3	2519.9	1.005	172.3	2549.9	1.005	172.3	2619.9	1.005	172.3	2649.9	1.005	172.3	2719.9	1.005	172.3	2749.9	1.005	172.3	2819.9	1.005	172.3	7
8	2446.8	1.006	171.2	2516.8	1.006	171.2	2546.8	1.006	171.2	2616.8	1.006	171.2	2646.8	1.006	171.2	2716.8	1.006	171.2	2746.8	1.006	171.2	2816.8	1.006	171.2	8
9	2443.3	1.006	170.1	2513.3	1.007	170.1	2543.3	1.007	170.1	2613.3	1.007	170.1	2643.3	1.007	170.1	2713.3	1.007	170.1	2743.3	1.007	170.1	2813.3	1.007	170.1	9
10	2439.4	1.007	169.0	2509.4	1.007	169.0	2539.3	1.007	168.9	2609.2	1.007	168.9	2639.1	1.007	168.9	2709.1	1.007	168.9	2739.0	1.007	168.9	2809.0	1.007	168.9	10
1	2435.1	1.008	167.9	2505.0	1.008	167.9	2535.0	1.008	167.8	2604.9	1.008	167.8	2634.8	1.008	167.8	2704.7	1.008	167.8	2734.6	1.008	167.8	2804.5	1.008	167.8	1
2	2430.4	1.008	166.8	2500.3	1.008	166.8	2530.2	1.008	166.7	2600.1	1.008	166.7	2630.0	1.008	166.7	2700.0	1.008	166.7	2730.0	1.008	166.7	2800.0	1.008	166.7	2
3	2425.3	1.009	165.7	2495.2	1.009	165.7	2525.1	1.009	165.6	2595.0	1.009	165.6	2624.8	1.009	165.6	2694.7	1.009	165.6	2724.6	1.009	165.6	2794.5	1.009	165.6	3
4	2419.8	1.010	164.6	2489.7	1.010	164.6	2519.6	1.010	164.5	2589.5	1.010	164.5	2619.3	1.010	164.5	2689.2	1.010	164.5	2719.1	1.010	164.5	2789.0	1.010	164.5	4
15	2413.9	0910	163.6	2483.8	0910	163.6	2513.8	0911	163.4	2583.7	0911	163.4	2613.5	0911	163.4	2683.4	0911	163.4	2713.3	0911	163.4	2783.2	0911	163.4	15
6	2407.7	0911	162.5	2477.5	0911	162.5	2507.3	0911	162.3	2577.2	0911	162.3	2607.0	0911	162.3	2676.8	0911	162.3	2706.7	0911	162.3	2776.6	0911	162.3	6
7	2401.0	0912	161.4	2470.8	0912	161.4	2500.6	0912	161.3	2570.4	0912	161.3	2600.2	0912	161.3	2670.0	0912	161.3	2700.0	0912	161.3	2770.0	0912	161.3	7
8	2353.9	0912	160.3	2423.7	0912	160.2	2453.5	0912	160.2	2523.3	0912	160.1	2553.0	0912	160.0	2622.8	0912	160.0	2652.6	0912	159.9	2722.3	0912	159.8	8
9	2346.5	0913	159.2	2416.2	0913	159.1	2446.0	0913	159.1	2515.7	0913	159.0	2545.5	0913	158.9	2615.2	0913	158.9	2645.0	0913	158.8	2714.7	0913	158.7	9
20	2338.7	0914	158.1	2408.4	0914	158.1	2438.1	0914	158.0	2507.8	0914	157.9	2537.6	0914	157.8	2607.3	0914	157.8	2637.0	0914	157.7	2706.7	0914	157.6	20
1	2330.5	0914	157.1	2400.2	0914	157.0	2429.9	0914	156.9	2499.6	0914	156.8	2529.3	0914	156.7	2619.0	0914	156.7	2648.6	0914	156.6	2718.3	0914	156.5	1
2	2321.9	0915	156.0	2391.6	0915	155.9	2421.2	0915	155.8	2490.9	0915	155.7	2520.6	0915	155.6	2608.6	0915	155.6	2638.2	0915	155.5	2707.5	0915	155.4	2
3	2313.0	0916	154.9	2382.6	0916	154.8	2412.3	0916	154.7	2481.9	0916	154.6	2511.5	0916	154.5	2596.3	0916	154.5	2625.9	0916	154.4	2694.8	0916	154.3	3
4	2303.7	0916	153.8	2373.3	0916	153.7	2402.9	0916	153.6	2472.5	0916	153.5	2502.1	0916	153.4	2586.9	0916	153.4	2616.5	0916	153.3	2685.4	0916	153.2	4
25	2254.0	0917	152.8	2323.6	0917	152.7	2353.2	0917	152.6	2422.8	0917	152.5	2452.3	0917	152.4	2547.1	0917	152.4	2576.7	0917	152.3	2645.2	0917	152.2	25
6	2244.0	0917	151.7	2313.5	0917	151.6	2343.1	0917	151.5	2412.7	0917	151.4	2442.2	0917	151.3	2537.0	0917	151.3	2566.6	0917	151.2	2634.7	0917	151.1	6
7	2233.6	0918	150.6	2303.1	0918	150.5	2332.7	0918	150.4	2402.2	0918	150.3	2431.7	0918	150.2	2526.5	0918	150.2	2556.1	0918	150.1	2624.2	0918	149.9	7
8	2222.9	0918	149.6	2292.4	0918	149.5	2321.9	0918	149.4	2391.5	0918	149.3	2420.9	0918	149.2	2515.3	0918	149.2	2544.9	0918	149.1	2612.6	0918	148.9	8
9	2211.8	0919	148.5	2281.3	0919	148.4	2310.8	0919	148.3	2380.2	0919	148.2	2409.7	0919	148.1	2509.7	0919	148.1	2539.3	0919	148.0	2606.0	0919	147.8	9
30	2200.4	0920	147.5	2270.9	0920	147.3	2299.3	0920	147.2	2368.7	0920	147.1	2398.1	0920	147.0	2498.0	0920	147.0	2527.6	0920	146.9	2593.9	0920	146.7	30
1	2148.7	0920	146.4	2218.1	0920	146.3	2247.5	0920	146.2	2316.9	0920	146.1	2346.3	0920	146.0	2446.2	0920	146.0	2475.8	0920	145.9	2561.7	0920	145.6	1
2	2136.6	0921	145.3	2206.0	0921	145.2	2235.4	0921	145.1	2304.7	0921	145.0	2334.1	0921	144.9	2436.1	0921	144.9	2465.7	0921	144.8	2550.6	0921	144.6	2
3	2124.2	0921	144.3	2193.6	0921	144.2	2222.9	0921	144.1	2292.2	0921	144.0	2321.5	0921	143.9	2428.0	0921	143.9	2457.6	0921	143.8	2538.5	0921	143.5	3
4	2111.5	0922	143.3	2180.8	0922	143.1	2210.1	0922	143.0	2279.4	0922	142.9	2308.7	0922	142.8	2414.9	0922	142.8	2444.5	0922	142.7	2528.4	0922	142.4	4
35	2058.5	0923	142.2	2170.8	0923	142.1	2157.0	0923	142.0	2266.3	0923	141.9	2295.5	0923	141.7	2403.8	0923	141.7	2433.4	0923	141.6	2517.3	0923	141.4	35
6	2045.2	0923	141.2	2114.4	0923	141.0	2143.6	0923	140.9	2212.9	0923	140.8	2242.1	0923	140.7	2391.1	0923	140.7	2420.7	0923	140.6	2504.2	0923	140.3	6
7	2031.6	0923	140.1	2100.7	0923	140.0	2129.9	0923	139.9	2159.1	0923	139.8	2188.3	0923	139.6	2379.5	0923	139.6	2409.1	0923	139.5	2491.6	0923	139.2	7
8	2017.6	0924	139.1	2086.8	0924	139.0	2115.9	0924	138.8	2145.1	0924	138.7	2174.2	0924	138.6	2365.7	0924	138.6	2395.3	0924	138.5	2482.1	0924	138.2	8
9	2003.4	0924	138.1	2072.5	0924	137.9	2101.6	0924	137.8	2130.7	0924	137.7	2162.9	0924	137.5	2351.8	0924	137.5	2381.4	0924	137.4	2472.8	0924	137.1	9
40	1948.9	0925	137.0	2018.0	0925	136.9	2047.0	0925	136.8	2076.1	0925	136.7	2105.2	0925	136.6	2302.9	0925	136.6	2332.5	0925	136.5	2463.0	0925	136.1	40
1	1934.1	0925	136.0	2003.1	0925	135.9	2032.2	0925	135.8	2061.3	0925	135.7													

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	4° 00'		4° 30'		5° 00'		5° 30'		6° 00'		6° 30'		7° 00'		7° 30'		H.A.	Lat. 69°				
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.						
00	17 00.0	1.000	180.0	16 30.0	1.000	180.0	16 00.0	1.000	180.0	15 30.0	1.000	180.0	15 00.0	1.000	180.0	14 30.0	1.000	180.0	13 30.0	1.000	180.0	00
1	16 59.8	1.001	179.0	16 29.8	1.001	179.0	15 59.8	1.001	179.0	15 29.8	1.001	179.0	14 59.8	1.001	179.0	14 29.8	1.001	179.0	13 29.8	1.001	179.0	1
2	16 59.2	1.002	177.9	16 29.2	1.002	177.9	15 59.2	1.002	177.9	15 29.2	1.002	177.9	14 59.2	1.002	177.9	14 29.2	1.002	177.9	13 29.2	1.002	178.0	2
3	16 58.2	1.002	176.9	16 28.2	1.002	176.9	15 58.2	1.002	176.9	15 28.3	1.002	176.9	14 58.3	1.002	176.9	14 28.3	1.002	176.9	13 28.3	1.002	176.9	3
4	16 56.9	1.003	175.8	16 26.9	1.003	175.8	15 56.9	1.003	175.9	15 26.9	1.003	175.9	14 56.9	1.003	175.9	14 26.9	1.003	175.9	13 26.9	1.003	175.9	4
05	16 55.1	1.004	174.8	16 25.1	1.004	174.8	15 55.1	1.004	174.8	15 25.2	1.004	174.8	14 55.2	1.004	174.9	14 25.2	1.004	174.9	13 25.2	1.004	174.9	05
6	16 53.0	1.004	173.7	16 23.0	1.004	173.8	15 53.0	1.004	173.8	15 23.0	1.004	173.8	14 53.1	1.004	173.8	14 23.1	1.004	173.8	13 23.1	1.004	173.9	6
7	16 50.4	1.005	172.7	16 20.5	1.005	172.7	15 50.5	1.005	172.8	15 20.5	1.005	172.8	14 50.6	1.005	172.8	14 20.6	1.005	172.8	13 20.6	1.005	172.9	7
8	16 47.5	1.006	171.7	16 17.5	1.006	171.7	15 47.6	1.006	171.7	15 17.6	1.006	171.7	14 47.7	1.006	171.8	14 17.7	1.006	171.8	13 17.8	1.006	171.8	8
9	16 44.2	1.006	170.6	16 14.2	1.006	170.7	15 44.3	1.006	170.7	15 14.3	1.006	170.7	14 44.4	1.006	170.8	14 14.4	1.006	170.8	13 14.5	1.006	170.8	9
10	16 40.5	1.007	169.6	16 10.6	1.007	169.6	15 40.6	1.007	169.6	15 10.7	1.007	169.7	14 40.7	1.007	169.7	14 10.8	1.007	169.7	13 10.9	1.007	169.8	10
1	16 36.4	1.007	168.5	16 06.5	1.007	168.6	15 36.6	1.007	168.6	15 06.6	1.007	168.7	14 36.7	1.007	168.7	14 06.8	1.007	168.8	13 06.9	1.007	168.8	1
2	16 32.0	1.008	167.5	16 02.0	1.008	167.5	15 32.1	1.008	167.6	15 02.2	1.008	167.6	14 32.3	1.008	167.7	14 02.4	1.008	167.7	13 02.5	1.008	167.8	2
3	16 27.1	1.009	166.5	15 57.2	1.009	166.5	15 27.3	1.009	166.5	15 07.4	1.009	166.6	14 27.5	1.009	166.6	14 07.6	1.009	166.7	13 07.7	1.009	166.8	3
4	16 21.9	1.009	165.4	15 52.0	1.009	165.5	15 22.1	1.009	165.5	15 02.3	1.009	165.6	14 22.4	1.009	165.6	14 02.5	1.009	165.7	13 02.6	1.009	165.8	4
15	16 16.3	1.010	164.4	15 46.4	1.010	164.4	15 16.6	1.010	164.5	14 46.7	1.010	164.5	14 16.9	1.010	164.6	13 47.0	1.010	164.6	13 17.1	1.010	164.7	15
6	16 10.3	09 11	163.4	15 40.5	09 11	163.4	15 10.6	09 11	163.5	14 40.8	09 11	163.5	14 11.0	09 11	163.6	13 41.1	09 11	163.6	13 11.3	09 11	163.7	6
7	16 04.0	09 11	162.3	15 34.2	09 11	162.4	15 04.3	09 11	162.4	14 34.5	09 11	162.5	14 04.7	09 11	162.6	13 34.9	09 11	162.6	13 05.0	09 11	162.7	7
8	15 57.3	09 12	161.3	15 27.5	09 12	161.4	14 57.7	09 12	161.4	14 27.9	09 12	161.5	13 58.1	09 12	161.5	13 28.3	09 12	161.6	12 58.5	09 12	161.7	8
9	15 50.2	09 12	160.3	15 20.4	09 12	160.3	14 50.6	09 12	160.4	14 20.9	09 12	160.5	13 51.1	09 12	160.5	13 21.3	09 12	160.6	12 51.5	09 12	160.7	9
20	15 42.8	09 13	159.2	15 13.0	09 13	159.3	14 43.2	09 13	159.4	14 13.5	09 13	159.4	13 43.7	09 13	159.6	13 14.0	09 13	159.6	12 44.2	09 13	159.7	20
1	15 35.0	09 14	158.2	15 05.2	09 14	158.3	14 35.5	09 14	158.4	14 05.8	09 14	158.4	13 36.3	09 14	158.5	13 05.8	09 14	158.6	12 36.5	09 14	158.8	1
2	15 26.8	09 14	157.2	14 57.1	09 14	157.3	14 27.4	09 14	157.3	13 57.7	09 14	157.4	13 28.0	09 14	157.5	12 58.2	09 14	157.5	12 28.5	09 14	157.7	2
3	15 18.3	09 15	156.2	14 48.6	09 15	156.2	14 18.9	09 15	156.3	13 49.2	09 15	156.4	13 19.5	09 15	156.5	12 49.9	09 15	156.5	12 20.2	09 15	156.6	3
4	15 09.4	09 15	155.1	14 39.8	09 15	155.2	14 10.1	09 15	155.3	13 40.4	09 15	155.4	13 10.8	09 15	155.5	12 41.1	09 15	155.5	12 11.5	09 15	155.7	4
25	15 00.2	09 16	154.1	14 30.6	09 16	154.2	14 00.9	09 16	154.3	13 31.3	09 16	154.4	13 01.7	09 16	154.4	12 32.0	09 16	154.5	12 02.4	09 16	154.6	25
6	14 50.7	09 16	153.1	14 21.0	09 16	153.2	13 51.4	09 16	153.3	13 21.8	09 16	153.4	12 52.2	09 16	153.4	12 22.6	09 16	153.5	11 53.0	09 16	153.6	6
7	14 40.8	09 17	152.1	14 11.2	09 17	152.2	13 41.6	09 17	152.3	13 12.0	09 17	152.3	12 42.4	09 17	152.4	12 12.9	09 17	152.5	11 43.3	09 17	152.6	7
8	14 30.5	09 18	151.1	14 01.0	09 18	151.2	13 31.4	09 18	151.2	13 01.9	09 18	151.3	12 32.3	09 18	151.4	12 02.8	09 18	151.5	11 33.2	09 18	151.6	8
9	14 20.0	09 18	150.1	13 50.4	09 18	150.1	13 20.9	09 18	150.2	12 51.4	09 18	150.3	12 21.9	09 18	150.4	11 52.4	09 18	150.5	11 22.8	09 18	150.7	9
30	14 09.1	09 19	149.0	13 39.6	09 19	149.1	13 10.1	09 19	149.2	12 40.6	09 19	149.3	12 11.1	09 19	149.4	11 41.6	09 19	149.5	11 12.8	09 19	149.6	30
1	13 57.8	09 19	148.0	13 28.4	09 19	148.1	12 58.9	09 19	148.2	12 29.5	09 19	148.3	12 00.0	09 19	148.4	11 30.5	09 19	148.5	11 01.1	09 19	148.6	1
2	13 46.3	09 20	147.0	13 16.9	09 20	147.1	12 47.4	09 20	147.2	12 18.0	09 20	147.3	11 48.6	09 20	147.4	11 19.2	09 20	147.5	10 49.7	09 20	147.6	2
3	13 34.4	09 20	146.0	13 05.0	09 20	146.1	12 35.6	09 20	146.2	12 06.2	09 20	146.3	11 36.9	09 20	146.4	11 07.5	09 20	146.5	10 38.1	09 20	146.7	3
4	13 22.3	09 21	145.0	12 52.9	09 21	145.1	12 23.5	09 21	145.2	11 54.2	09 21	145.3	11 24.8	09 21	145.4	10 55.4	09 21	145.5	10 26.1	09 21	145.7	4
35	13 09.8	09 21	144.0	12 40.4	09 21	144.1	12 11.1	09 21	144.2	11 41.8	09 21	144.3	11 12.5	09 21	144.4	10 43.1	09 21	144.5	10 13.8	09 21	144.7	35
6	12 57.0	09 22	143.0	12 27.7	09 22	143.1	11 58.4	09 22	143.2	11 29.1	09 22	143.3	10 59.8	09 22	143.5	10 30.5	09 22	143.6	10 01.2	09 22	143.7	6
7	12 43.9	09 22	142.0	12 14.6	09 22	142.1	11 45.4	09 22	142.2	11 16.1	09 22	142.4	10 46.8	09 22	142.5	10 17.6	09 22	142.6	9 48.3	09 22	142.8	7
8	12 30.5	09 23	141.0	12 01.3	09 23	141.1	11 32.1	09 23	141.2	11 02.8	09 23	141.4	10 33.6	09 23	141.5	10 04.4	09 23	141.6	9 35.1	09 23	141.8	8
9	12 16.8	09 23	140.0	11 47.7	09 23	140.1	11 18.5	09 23	140.3	10 49.3	09 23	140.4	10 20.1	09 23	140.5	9 50.9	09 23	140.6	9 21.7	09 23	140.8	9
40	12 02.9	09 24	139.0	11 33.7	09 24	139.2	11 04.6	09 24	139.3	10 35.4	09 24	139.4	10 06.2	09 24	139.5	9 37.1	09 24	139.6	9 07.9	09 24	139.7	40
1	11 48.7	09 24	138.0	11 19.5	09 24	138.2	10 50.4	09 24	138.3	10 21.3	09 24	138.4	9 52.1	09 24	138.5	9 23.0	09 24	138.6	8 53.9	09 24	138.8	1
2	11 34.1	09 25	137.1	11 05.0	09 25	137.2	10 36.0	09 25	137.3	10 06.9	09 25	137.4	9 37.8	09 25	137.5	9 08.7	09 25	137.6	8 39.6	09 25	137.8	2
3	11 19.4	09 25	136.1	10 50.3	09 25	136.2	10 21.2	09 25	136.3	9 52.2	09 25	136.4	9 23.1	09 25	136.6	8 54.1	09 25	136.7	8 25.0	09 25	136.8	3
4	11 04.3	09 26	135.1	10 35.3	09 26	135.2	10 06.3	09 26	135.3	9 37.2	09 26	135.5	9 08.2	09 26	135.6	8 39.2	09 26	135.7	8 10.1	09 26	135.8	4
45																						

Lat. 69°

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Az.															
00	29 00.0	1.00 180.0	29 30.0	1.00 180.0	30 00.0	1.00 180.0	30 30.0	1.00 180.0	31 00.0	1.00 180.0	31 30.0	1.00 180.0	32 00.0	1.00 180.0	32 30.0	1.00 180.0	00
1	28 59.8	1.001 178.9	29 29.8	1.001 178.9	29 59.8	1.001 178.9	30 29.8	1.001 178.9	30 59.8	1.001 178.9	31 29.8	1.001 178.8	31 59.8	1.001 178.8	32 29.8	1.001 178.8	1
2	28 59.1	1.002 177.7	29 29.1	1.002 177.7	29 59.1	1.002 177.7	30 29.1	1.002 177.7	30 59.1	1.002 177.7	31 29.1	1.002 177.7	31 59.1	1.002 177.7	32 29.1	1.002 177.7	2
3	28 58.1	1.002 176.6	29 28.1	1.002 176.6	29 58.1	1.002 176.6	30 28.1	1.002 176.6	30 58.1	1.002 176.6	31 28.1	1.003 176.5	31 58.0	1.003 176.5	32 28.0	1.003 176.5	3
4	28 56.6	1.003 175.5	29 26.6	1.003 175.5	29 56.6	1.003 175.4	30 26.6	1.003 175.4	30 56.6	1.003 175.4	31 26.5	1.003 175.4	31 56.5	1.003 175.4	32 26.5	1.003 175.4	4
05	28 54.7	1.004 174.3	29 24.7	1.004 174.3	29 54.7	1.004 174.3	30 24.6	1.004 174.3	30 54.6	1.004 174.3	31 24.6	1.004 174.2	31 54.6	1.004 174.2	32 24.6	1.004 174.2	05
6	28 52.4	1.005 173.2	29 22.3	1.005 173.2	29 52.3	1.005 173.2	30 22.3	1.005 173.1	30 52.3	1.005 173.1	31 22.2	1.005 173.1	31 52.2	1.005 173.1	32 22.2	1.005 173.0	6
7	28 49.6	1.005 172.1	29 19.6	1.005 172.1	29 49.5	1.005 172.0	30 19.5	1.005 172.0	30 49.5	1.005 172.0	31 19.4	1.005 171.9	31 49.4	1.005 171.9	32 19.3	1.005 171.9	7
8	28 46.4	1.006 171.0	29 16.4	1.006 170.9	29 46.3	1.006 170.9	30 16.3	1.006 170.9	30 46.2	1.006 170.8	31 16.2	1.006 170.8	31 46.1	1.006 170.8	32 16.1	1.006 170.7	8
9	28 42.9	1.007 169.8	29 12.8	1.007 169.8	29 42.7	1.007 169.8	30 12.7	1.007 169.7	30 42.6	1.007 169.7	31 12.5	1.007 169.6	31 42.5	1.007 169.6	32 12.4	1.007 169.6	9
10	28 38.8	1.007 168.7	29 08.8	1.007 168.7	29 38.7	1.007 168.6	30 08.6	1.007 168.6	30 38.5	1.007 168.5	31 08.5	1.008 168.5	31 38.4	1.008 168.5	32 08.3	1.008 168.4	10
1	28 34.4	1.008 167.6	29 04.3	1.008 167.5	29 34.2	1.008 167.5	30 04.1	1.008 167.4	30 34.1	1.008 167.4	31 04.0	1.008 167.3	31 33.9	1.008 167.3	32 03.8	1.008 167.3	1
2	28 29.6	1.009 166.5	28 59.5	1.009 166.4	29 29.4	1.009 166.4	29 59.3	1.009 166.3	30 29.2	1.009 166.3	30 59.0	1.009 166.2	31 28.9	1.009 166.2	31 58.8	1.009 166.1	2
3	28 24.4	1.009 165.3	28 54.2	1.009 165.3	29 24.1	1.010 165.2	29 54.0	1.010 165.2	30 23.8	1.010 165.1	30 53.7	1.010 165.1	31 23.6	1.010 165.0	31 53.4	1.010 165.0	3
4	28 18.7	1.010 164.2	28 48.6	1.010 164.2	29 18.4	1.010 164.1	29 48.3	1.010 164.0	30 18.1	1.010 164.0	30 48.0	1.010 163.9	31 17.8	1.010 163.9	31 47.6	1.010 163.8	4
15	28 12.6	1.011 163.1	28 42.5	1.011 163.0	29 12.3	1.011 163.0	29 42.1	1.011 162.9	30 12.0	1.011 162.8	30 41.8	1.011 162.8	31 11.6	1.011 162.7	31 41.4	1.011 162.7	15
6	28 06.2	1.011 162.0	28 36.0	1.011 161.9	29 05.8	1.011 161.8	29 35.6	1.011 161.8	30 05.4	1.011 161.7	30 35.2	1.011 161.6	31 05.0	1.011 161.6	31 34.8	1.011 161.5	6
7	27 59.3	1.012 160.9	28 29.1	1.012 160.8	28 58.9	1.012 160.7	29 28.7	1.012 160.7	29 58.5	1.012 160.6	30 28.3	1.012 160.5	30 58.0	1.012 160.4	31 27.8	1.012 160.4	7
8	27 52.1	1.013 159.7	28 21.9	1.013 159.6	28 51.6	1.013 159.6	29 21.4	1.013 159.5	29 51.1	1.013 159.5	30 20.9	1.013 159.4	30 50.6	1.013 159.3	31 20.4	1.013 159.2	8
9	27 44.5	1.013 158.6	28 14.2	1.013 158.6	28 43.9	1.013 158.5	29 13.7	1.014 158.4	29 43.4	1.014 158.3	30 13.1	1.014 158.3	30 42.8	1.014 158.2	31 12.6	1.014 158.1	9
20	27 36.4	1.014 157.5	28 06.1	1.014 157.5	28 35.8	1.014 157.4	29 05.6	1.014 157.3	29 35.3	1.014 157.2	30 05.0	1.014 157.1	30 34.7	1.014 157.0	31 04.3	1.014 157.0	20
1	27 28.0	1.015 156.4	27 57.7	1.015 156.3	28 27.4	1.015 156.3	28 57.1	1.015 156.2	29 26.7	1.015 156.1	29 56.4	1.015 156.0	30 26.1	1.015 155.9	30 55.7	1.015 155.8	1
2	27 19.2	1.016 155.3	27 48.9	1.016 155.2	28 18.5	1.016 155.1	28 48.2	1.016 155.1	29 17.8	1.016 155.0	29 47.5	1.016 154.9	30 17.1	1.016 154.8	30 46.7	1.016 154.7	2
3	27 10.1	1.016 154.2	27 39.7	1.016 154.1	28 09.3	1.016 154.0	28 38.9	1.016 154.0	29 08.5	1.016 153.9	29 38.2	1.016 153.8	30 07.8	1.016 153.7	30 37.4	1.016 153.6	3
4	27 00.5	1.016 153.1	27 30.1	1.016 153.0	27 59.7	1.016 152.9	28 29.3	1.016 152.8	28 58.9	1.016 152.7	29 28.5	1.016 152.7	29 58.0	1.016 152.6	30 27.6	1.016 152.5	4
25	26 50.6	1.017 152.0	27 20.2	1.017 151.9	27 49.8	1.017 151.8	28 19.3	1.017 151.7	28 48.9	1.017 151.6	29 18.4	1.017 151.5	29 47.9	1.017 151.4	30 17.5	1.017 151.3	25
6	26 40.4	1.018 150.9	27 09.9	1.018 150.8	27 39.4	1.018 150.7	28 08.9	1.018 150.6	28 38.5	1.018 150.5	29 08.0	1.018 150.4	29 37.5	1.018 150.3	30 07.0	1.018 150.2	6
7	26 29.7	1.018 149.8	26 59.2	1.018 149.7	27 28.7	1.018 149.6	27 58.2	1.018 149.5	28 27.7	1.018 149.4	28 57.2	1.018 149.3	29 26.7	1.018 149.2	29 56.1	1.018 149.1	7
8	26 18.8	1.018 148.8	26 48.2	1.018 148.7	27 17.7	1.018 148.6	27 47.1	1.018 148.5	28 16.6	1.018 148.4	28 46.0	1.018 148.2	29 15.5	1.018 148.1	29 44.9	1.018 148.0	8
9	26 07.4	1.019 147.7	26 36.9	1.019 147.6	27 06.3	1.019 147.5	27 35.7	1.019 147.4	28 05.1	1.019 147.2	28 34.5	1.019 147.1	29 03.9	1.019 147.0	29 33.3	1.019 146.9	9
30	25 55.8	1.020 146.6	26 25.2	1.020 146.5	26 54.6	1.020 146.4	27 23.9	1.020 146.3	27 53.3	1.020 146.1	28 22.7	1.020 146.0	28 52.1	1.020 145.9	29 21.4	1.020 145.8	30
1	25 43.8	1.021 145.5	26 13.1	1.021 145.4	26 42.5	1.021 145.3	27 11.8	1.021 145.2	27 41.2	1.021 145.1	28 10.5	1.021 144.9	28 39.8	1.021 144.8	29 09.2	1.021 144.7	1
2	25 31.4	1.021 144.4	26 00.7	1.021 144.3	26 30.1	1.021 144.2	26 59.4	1.021 144.1	27 28.7	1.021 144.0	27 58.0	1.021 143.8	28 27.3	1.021 143.7	28 56.6	1.021 143.6	2
3	25 18.8	1.022 143.3	25 48.0	1.022 143.3	26 17.3	1.022 143.1	26 46.6	1.022 143.0	27 15.9	1.022 142.9	27 45.1	1.022 142.8	28 14.4	1.022 142.6	28 43.7	1.022 142.5	3
4	25 05.8	1.022 142.3	25 35.0	1.022 142.2	26 04.3	1.022 142.1	26 33.5	1.022 141.9	27 02.7	1.022 141.8	27 32.0	1.022 141.7	28 01.2	1.022 141.6	28 30.4	1.022 141.4	4
35	24 52.5	1.023 141.2	25 21.7	1.023 141.1	25 50.9	1.023 141.0	26 20.1	1.023 140.9	26 49.3	1.023 140.7	27 18.5	1.023 140.6	27 47.7	1.023 140.5	28 16.8	1.023 140.3	35
6	24 38.8	1.023 140.2	25 08.0	1.023 140.0	25 37.2	1.023 139.9	26 06.4	1.023 139.8	26 35.7	1.023 139.7	27 04.7	1.023 139.5	27 33.7	1.023 139.4	28 03.0	1.023 139.2	6
7	24 24.9	1.023 139.1	24 54.1	1.023 139.0	25 23.2	1.023 138.9	25 52.3	1.023 138.7	26 21.5	1.023 138.6	26 50.6	1.023 138.5	27 19.7	1.023 138.3	27 48.8	1.023 138.2	7
8	24 10.7	1.024 138.1	24 39.8	1.024 138.0	25 08.9	1.024 137.8	25 38.0	1.024 137.7	26 07.1	1.024 137.5	26 36.2	1.024 137.4	27 05.2	1.024 137.2	27 34.3	1.024 137.1	8
9	23 56.2	1.024 137.0	24 25.3	1.024 136.9	24 54.3	1.024 136.7	25 23.4	1.024 136.6	25 52.4	1.024 136.5	26 21.5	1.024 136.3	26 50.5	1.024 136.2	27 19.5	1.024 136.0	9
40	23 41.4	1.025 136.0	24 10.4	1.025 135.8	24 39.4	1.025 135.7	25 08.5	1.025 135.5	25 37.5	1.025 135.4	26 06.5	1.025 135.3	26 35.5	1.025 135.1	27 04.4	1.025 135.0	40
1	23 26.3	1.026 134.9	23 55.3	1.026 134.8	24 24.3	1.026 134.6	24 53.3	1.026 134.5	25 22.2	1.026 134.4	25 51.2	1.026 134.2	26 20.1	1.026 134.1	26 49.1	1.026 133.9	1
2	23 10.9	1.026 133.9	23 39.9	1.026 133.7	24 08.8	1.026 133.6	24 37.8	1.026 133.4	25 06.7	1.026 133.3	25 35.6	1.026 133.2	26 04.6	1.026 133.0	26 33.5	1.026 132.9	2
3	22 55.3	1.026 132.8	23 24.2	1.026 132.7	23 53.1	1.026 132.5	24 22.0	1.026 132.4	24 50.9	1.026 132.3	25 19.8	1.026 132.1	25 48.7	1.026 132.0	26 17.6	1.026 131.8	3
4	22 39.4	1.027 131.8	23 08.3	1.027 131.7	23 37.2	1.027 131.5	24 06.0	1.027 131.4	24 34.9	1.027 131.2	25 03.7	1.027 131.1	25 32.6	1.027 130.9	26 01.4	1.027 130.8	4
45	22 23.2	1.027 130.8	22 52.1	1.027 130.6	23 20.9	1.027 130.5	23 49.8	1.027 130.3	24 18.6	1.027 130.2	24 47.4	1.027 130.0	25 16.2	1.			

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	8° 00'		8° 30'		9° 00'		9° 30'		10° 00'		10° 30'		11° 00'		11° 30'		H.A.
	Alt.	Az.															
00	13 00.0	1.00 180.0	12 30.0	1.00 180.0	12 00.0	1.00 180.0	11 30.0	1.00 180.0	11 00.0	1.00 180.0	10 30.0	1.00 180.0	10 00.0	1.00 180.0	9 30.0	1.00 180.0	00
1	12 59.8	1.00 179.0	12 29.8	1.00 179.0	11 59.8	1.00 179.0	11 29.8	1.00 179.0	10 59.8	1.00 179.0	10 29.8	1.00 179.0	9 59.8	1.00 179.0	9 29.8	1.00 179.0	1
2	12 59.2	1.00 178.0	12 29.2	1.00 178.0	11 59.2	1.00 178.0	11 29.2	1.00 178.0	10 59.2	1.00 178.0	10 29.2	1.00 178.0	9 59.2	1.00 178.0	9 29.2	1.00 178.0	2
3	12 58.3	1.00 177.0	12 28.3	1.00 177.0	11 58.3	1.00 177.0	11 28.3	1.00 177.0	10 58.3	1.00 177.0	10 28.3	1.00 177.0	9 58.3	1.00 177.0	9 28.3	1.00 177.0	3
4	12 57.0	1.00 175.9	12 27.0	1.00 175.9	11 57.0	1.00 176.0	11 27.0	1.00 176.0	10 57.0	1.00 176.0	10 27.0	1.00 176.0	9 57.0	1.00 176.0	9 27.0	1.00 176.0	4
05	12 55.2	1.00 174.9	12 25.3	1.00 174.9	11 55.3	1.00 175.0	11 25.3	1.00 175.0	10 55.3	1.00 175.0	10 25.3	1.00 175.0	9 55.3	1.00 175.0	9 25.3	1.00 175.0	05
6	12 53.1	1.00 173.9	12 23.2	1.00 173.9	11 53.2	1.00 173.9	11 23.2	1.00 174.0	10 53.2	1.00 174.0	10 23.3	1.00 174.0	9 53.3	1.00 174.0	9 23.3	1.00 174.0	6
7	12 50.7	1.00 172.9	12 20.7	1.00 172.9	11 50.7	1.00 172.9	11 20.8	1.00 173.0	10 50.8	1.00 173.0	10 20.8	1.00 173.0	9 50.8	1.00 173.0	9 20.9	1.00 173.0	7
8	12 47.8	1.00 171.9	12 17.9	1.00 171.9	11 47.9	1.00 171.9	11 17.9	1.00 172.0	10 48.0	1.00 172.0	10 18.0	1.00 172.0	9 48.1	1.00 172.0	9 18.1	1.00 172.1	8
9	12 44.6	1.00 170.9	12 14.6	1.00 170.9	11 44.7	1.00 170.9	11 14.7	1.00 170.9	10 44.8	1.00 171.0	10 14.8	1.00 171.0	9 44.9	1.00 171.0	9 14.9	1.00 171.1	9
10	12 41.0	1.00 169.8	12 11.1	1.00 169.9	11 41.1	1.00 169.9	11 11.2	1.00 169.9	10 41.2	1.00 170.0	10 11.3	1.00 170.0	9 41.4	1.00 170.0	9 11.4	1.00 170.1	10
1	12 37.0	1.00 168.8	12 07.1	1.00 168.9	11 37.2	1.00 168.9	11 07.2	1.00 168.9	10 37.3	1.00 169.0	10 07.4	1.00 169.0	9 37.5	1.00 169.0	9 07.5	1.00 169.1	1
2	12 32.7	1.00 167.8	12 02.8	1.00 167.9	11 32.8	1.00 167.9	11 02.9	1.00 167.9	10 33.0	1.00 168.0	10 03.1	1.00 168.0	9 33.2	1.00 168.1	9 03.3	1.00 168.1	2
3	12 27.9	1.00 166.8	11 58.0	1.00 166.9	11 28.1	1.00 166.9	10 58.2	1.00 166.9	10 28.3	1.00 167.0	9 58.5	1.00 167.0	9 28.6	1.00 167.1	8 58.7	1.00 167.1	3
4	12 22.9	1.00 165.8	11 53.0	1.00 165.8	11 23.1	1.00 165.9	10 53.2	1.00 165.9	10 23.3	1.00 166.0	9 53.4	1.00 166.0	9 23.6	1.00 166.1	8 53.7	1.00 166.1	4
15	12 17.4	1.00 164.8	11 47.5	1.00 164.8	11 17.7	1.00 164.9	10 47.8	1.00 164.9	10 17.9	1.00 165.0	9 48.1	1.00 165.0	9 18.2	1.00 165.1	8 48.3	1.00 165.1	15
6	12 11.6	99 10 163.8	11 41.7	99 10 163.8	11 11.9	99 10 163.9	10 42.0	99 10 163.9	10 12.2	99 10 164.0	9 42.3	99 10 164.0	9 12.5	99 10 164.1	8 42.6	99 10 164.1	6
7	12 05.4	99 11 162.8	11 35.6	99 11 162.8	11 05.7	99 11 162.9	10 35.9	99 11 162.9	10 06.1	99 11 163.0	9 36.2	99 11 163.0	9 06.4	99 11 163.1	8 36.6	99 11 163.2	7
8	11 58.8	99 12 161.8	11 29.0	99 11 161.8	10 59.2	99 11 161.9	10 29.4	99 11 161.9	9 59.6	99 11 162.0	9 29.8	99 11 162.1	9 00.0	99 11 162.1	8 30.2	99 11 162.2	8
9	11 51.9	99 12 160.8	11 22.1	99 12 160.8	10 52.4	99 12 160.9	10 22.6	99 12 160.9	9 52.8	99 12 161.0	9 23.0	99 12 161.1	8 53.2	99 12 161.1	8 23.4	99 12 161.2	9
20	11 44.7	99 13 159.8	11 14.9	99 13 159.8	10 45.1	99 13 159.9	10 15.4	99 13 160.0	9 45.6	99 13 160.0	9 15.8	99 13 160.1	8 46.1	99 13 160.1	8 16.3	99 13 160.2	20
1	11 37.1	99 13 158.8	11 07.3	99 13 158.8	10 37.6	99 13 158.9	10 07.8	99 13 159.0	9 38.1	99 13 159.0	9 08.3	99 13 159.1	8 38.6	99 13 159.2	8 08.9	99 13 159.2	1
2	11 29.1	99 14 157.8	10 59.4	99 14 157.8	10 29.7	99 14 157.9	9 59.9	99 14 158.0	9 30.2	99 14 158.0	9 00.5	99 14 158.1	8 30.8	99 14 158.2	8 01.1	99 14 158.2	2
3	11 20.8	99 14 156.8	10 51.1	99 14 156.8	10 21.1	99 14 156.9	9 51.7	99 14 157.0	9 22.0	99 14 157.0	8 52.3	99 14 157.1	8 22.6	99 14 157.2	7 52.9	99 14 157.3	3
4	11 12.1	99 15 155.8	10 42.5	99 15 155.8	10 12.8	99 15 155.9	9 43.1	99 15 156.0	9 13.4	99 15 156.1	8 43.8	99 15 156.1	8 14.1	99 15 156.2	7 44.4	99 15 156.3	4
25	11 03.1	99 16 154.8	10 33.5	99 16 154.8	10 03.8	99 16 154.9	9 34.2	99 16 155.0	9 04.6	99 16 155.1	8 34.9	99 16 155.2	8 05.3	99 16 155.2	7 35.6	99 16 155.3	25
6	10 53.8	99 16 153.8	10 24.2	99 16 153.8	9 54.6	99 16 153.9	9 24.9	99 16 154.0	8 55.3	99 16 154.1	8 25.7	99 16 154.2	7 56.1	99 16 154.2	7 26.5	99 16 154.3	6
7	10 44.1	99 17 152.8	10 14.5	99 17 152.9	9 44.9	99 17 152.9	9 15.4	99 17 153.0	8 45.8	99 17 153.1	8 16.2	99 17 153.2	7 46.6	99 17 153.3	7 17.0	99 17 153.4	7
8	10 34.1	99 17 151.8	10 04.6	99 17 151.9	9 35.0	99 17 151.9	9 05.4	99 17 152.0	8 35.9	99 17 152.1	8 06.3	99 17 152.2	7 36.7	99 17 152.3	7 07.2	99 17 152.4	8
9	10 23.8	98 18 150.8	9 54.2	98 18 150.9	9 24.7	98 18 151.0	8 55.2	98 18 151.1	8 25.7	98 18 151.1	7 56.1	98 18 151.2	7 26.6	98 17 151.3	6 57.0	98 17 151.4	9
30	10 13.1	98 18 149.8	9 43.6	98 18 149.9	9 14.1	98 18 150.0	8 44.6	98 18 150.1	8 15.1	98 18 150.2	7 45.6	98 18 150.3	7 16.1	98 18 150.3	6 46.6	98 18 150.4	30
1	10 02.1	98 19 148.8	9 32.7	98 19 148.9	9 03.2	98 19 149.0	8 33.7	98 19 149.1	8 04.3	98 19 149.2	7 34.8	98 19 149.3	7 05.3	98 19 149.4	6 35.8	98 19 149.5	1
2	9 50.8	98 19 147.8	9 21.4	98 19 147.9	8 52.0	98 19 148.0	8 22.5	98 19 148.1	7 53.1	98 19 148.2	7 23.6	98 19 148.3	6 54.2	98 19 148.4	6 24.8	98 19 148.5	2
3	9 39.2	98 20 146.8	9 09.8	98 20 146.9	8 40.4	98 20 147.0	8 11.0	98 20 147.1	7 41.6	98 20 147.2	7 12.2	98 20 147.3	6 42.8	98 20 147.4	6 13.4	98 20 147.5	3
4	9 27.3	98 20 145.8	8 57.9	98 20 146.0	8 28.6	98 20 146.1	7 59.2	98 20 146.2	7 29.8	98 20 146.3	7 00.4	98 20 146.4	6 31.0	98 20 146.5	6 01.7	98 20 146.6	4
35	9 15.1	98 21 144.9	8 45.8	98 21 145.0	8 16.4	98 21 145.1	7 47.1	98 21 145.2	7 17.7	98 21 145.3	6 48.4	98 21 145.4	6 19.0	98 21 145.5	5 49.7	98 21 145.6	35
6	9 02.6	98 21 143.9	8 33.3	98 21 144.0	8 04.0	98 21 144.1	7 34.6	98 21 144.2	7 05.3	98 21 144.3	6 36.0	98 21 144.4	6 06.7	98 21 144.5	5 37.4	98 21 144.6	6
7	8 49.8	98 22 142.9	8 20.5	98 22 143.0	7 51.2	98 22 143.1	7 21.9	98 22 143.2	6 52.6	98 22 143.3	6 23.4	98 22 143.5	5 54.1	98 22 143.6	5 24.8	98 22 143.7	7
8	8 36.6	97 22 141.9	8 07.4	97 22 142.0	7 38.2	97 22 142.2	7 08.9	97 22 142.3	6 39.7	97 22 142.4	6 10.4	97 22 142.5	5 41.2	97 22 142.6	5 11.9	97 22 142.7	8
9	8 23.2	97 23 141.0	7 54.0	97 23 141.1	7 24.8	97 23 141.2	6 55.6	97 23 141.3	6 26.4	97 23 141.4	5 57.2	97 23 141.5	5 27.9	97 23 141.6			9
40	8 09.6	97 23 140.0	7 40.4	97 23 140.1	7 11.2	97 23 140.2	6 42.0	97 23 140.3	6 12.8	97 23 140.4	5 43.6	97 23 140.6	5 14.5	97 23 140.7			40
1	7 55.6	97 24 139.0	7 26.4	97 24 139.1	6 57.3	97 24 139.2	6 28.2	97 24 139.4	5 59.0	97 24 139.5	5 29.9	97 24 139.6	5 00.7	97 24 139.7			1
2	7 41.3	97 24 138.0	7 12.2	97 24 138.2	6 43.1	97 24 138.3	6 14.0	97 24 138.4	5 44.9	97 24 138.5	5 15.8	97 24 138.6					2
3	7 26.8	97 25 137.1	6 57.8	97 25 137.2	6 28.7	97 25 137.3	5 59.6	97 25 137.4	5 30.5	97 25 137.6	5 01.4	97 25 137.7					3
4	7 12.1	97 25 136.1	6 43.0	97 25 136.2	6 14.0	97 25 136.4	5 44.9	97 25 136.5	5 15.9	97 25 136.6							4
45	6 57.0	97 26 135.1	6 28.0	97 26 135.3	5 59.0	97 26 135.4	5 30.0	97 26 135.5	5 01.0	97 26 135.6							45
6	6 41.7	97 26 134.2	6 12.8	97 26 134.4	5 43.8	97 26 134.4	5 14.8	97 26 134.6									6
7	6 26.2	96 26 133.2	5 57.2	96 26 133.3	5 28.3	96 26 133.5											7
8	6 10.4	96 27 132.3	5 41.5	96 27 132.4	5 12.6	96 26 132.5											8
9	5 54.3	96 27 131.3	5 25.5	96 27 131.4													

Lat. 69°

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.		
	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At	Alt.	Ad At			
00	33 00.0	1.00	180.0	33 30.0	1.00	180.0	34 00.0	1.00	180.0	34 30.0	1.00	180.0	35 00.0	1.00	180.0	35 30.0	1.00	180.0	00
1	32 59.8	1.00	178.8	33 29.8	1.00	178.8	33 59.8	1.00	178.8	34 29.8	1.00	178.8	34 59.8	1.00	178.8	35 29.8	1.00	178.8	1
2	32 59.1	1.00	177.7	33 29.1	1.00	177.7	33 59.1	1.00	177.6	34 29.1	1.00	177.6	34 59.1	1.00	177.6	35 29.1	1.00	177.6	2
3	32 58.0	1.00	176.5	33 28.0	1.00	176.5	33 58.0	1.00	176.5	34 28.0	1.00	176.5	34 58.0	1.00	176.4	35 28.0	1.00	176.4	3
4	32 56.5	1.00	175.3	33 26.5	1.00	175.3	33 56.5	1.00	175.3	34 26.5	1.00	175.3	34 56.4	1.00	175.2	35 26.4	1.00	175.2	4
05	32 54.5	1.00	174.2	33 24.5	1.00	174.1	33 54.5	1.00	174.1	34 24.5	1.00	174.1	34 54.5	1.00	174.1	35 24.4	1.00	174.0	05
6	32 52.1	1.00	173.0	33 22.1	1.00	173.0	33 52.1	1.00	173.0	34 22.0	1.00	172.9	34 52.0	1.00	172.9	35 22.0	1.00	172.9	6
7	32 49.3	1.00	171.8	33 19.3	1.00	171.8	33 49.3	1.00	171.8	34 19.2	1.00	171.8	34 49.1	1.00	171.7	35 19.1	1.00	171.7	7
8	32 46.0	1.00	170.7	33 16.0	1.00	170.6	33 45.9	1.00	170.6	34 15.9	1.00	170.6	34 45.8	1.00	170.5	35 15.8	1.00	170.5	8
9	32 42.3	1.00	169.5	33 12.3	1.00	169.5	33 42.2	1.00	169.4	34 12.1	1.00	169.4	34 42.1	1.00	169.3	35 12.0	1.00	169.3	9
10	32 38.2	1.00	168.4	33 08.1	1.00	168.3	33 38.0	1.00	168.3	34 08.0	1.00	168.2	34 37.9	1.00	168.1	35 07.8	1.00	168.1	10
1	32 33.7	1.00	167.2	33 03.6	1.00	167.2	33 33.5	1.00	167.1	34 03.4	1.00	167.0	34 33.3	1.00	167.0	35 03.2	1.00	166.9	1
2	32 28.7	1.00	166.0	32 58.6	1.00	166.0	33 28.5	1.00	165.9	33 58.3	1.00	165.9	34 28.2	1.00	165.8	35 28.0	1.00	165.7	2
3	32 23.3	1.00	164.9	32 53.2	1.00	164.8	33 23.0	1.00	164.8	33 52.9	1.00	164.7	34 22.7	1.00	164.7	35 22.4	1.00	164.5	3
4	32 17.5	1.00	163.7	32 47.3	1.00	163.7	33 17.2	1.00	163.6	33 47.0	1.00	163.6	34 16.8	1.00	163.5	35 16.5	1.00	163.4	4
15	32 11.3	1.00	162.6	32 41.1	1.00	162.5	33 10.9	1.00	162.5	33 40.7	1.00	162.4	34 10.5	1.00	162.3	35 10.1	1.00	162.2	15
6	32 04.6	1.00	161.4	32 34.4	1.00	161.4	33 04.2	1.00	161.3	33 34.0	1.00	161.2	34 03.8	1.00	161.1	35 03.4	1.00	161.0	6
7	31 57.6	1.00	160.3	32 27.9	1.00	160.2	32 57.1	1.00	160.1	33 26.9	1.00	160.0	33 56.6	1.00	159.9	34 26.4	1.00	159.8	7
8	31 50.1	1.00	159.2	32 19.9	1.00	159.1	32 49.6	1.00	159.0	33 19.4	1.00	158.9	33 49.1	1.00	158.8	34 18.8	1.00	158.7	8
9	31 42.3	1.00	158.0	32 12.0	1.00	157.9	32 41.7	1.00	157.8	33 11.4	1.00	157.7	33 41.1	1.00	157.6	34 10.8	1.00	157.5	9
20	31 34.0	1.00	156.9	32 03.7	1.00	156.8	32 33.4	1.00	156.7	33 03.1	1.00	156.6	33 32.8	1.00	156.5	34 02.4	1.00	156.4	20
1	31 25.4	1.00	155.7	31 55.1	1.00	155.7	32 24.7	1.00	155.6	32 54.4	1.00	155.5	33 24.0	1.00	155.4	33 53.6	1.00	155.3	1
2	31 16.4	1.00	154.6	31 46.0	1.00	154.5	32 15.6	1.00	154.4	32 45.2	1.00	154.3	33 14.8	1.00	154.2	33 44.5	1.00	154.1	2
3	31 07.0	1.00	153.5	31 36.6	1.00	153.4	32 06.1	1.00	153.3	32 35.7	1.00	153.2	33 05.3	1.00	153.1	33 34.9	1.00	153.0	3
4	30 57.2	1.00	152.4	31 26.7	1.00	152.3	31 56.3	1.00	152.2	32 25.8	1.00	152.1	32 55.4	1.00	152.0	33 24.9	1.00	151.9	4
25	30 47.0	1.00	151.2	31 16.5	1.00	151.1	31 46.1	1.00	151.0	32 15.6	1.00	150.9	32 45.1	1.00	150.8	33 14.6	1.00	150.7	25
6	30 36.5	1.00	150.1	31 06.0	1.00	150.0	31 35.5	1.00	149.9	32 04.9	1.00	149.8	32 34.3	1.00	149.7	33 03.9	1.00	149.6	6
7	30 25.6	1.00	149.0	30 55.0	1.00	148.9	31 24.5	1.00	148.8	31 53.9	1.00	148.7	32 23.4	1.00	148.6	32 52.8	1.00	148.5	7
8	30 14.3	1.00	147.9	30 43.8	1.00	147.8	31 13.2	1.00	147.7	31 42.6	1.00	147.5	32 12.0	1.00	147.4	32 41.4	1.00	147.3	8
9	30 02.7	1.00	146.8	30 32.1	1.00	146.7	31 01.5	1.00	146.6	31 30.9	1.00	146.5	32 00.8	1.00	146.4	32 29.6	1.00	146.3	9
30	29 50.8	1.00	145.7	30 20.2	1.00	145.6	30 49.5	1.00	145.5	31 18.8	1.00	145.4	31 48.2	1.00	145.3	32 17.5	1.00	145.2	30
1	29 38.5	1.00	144.6	30 07.8	1.00	144.5	30 37.1	1.00	144.4	31 06.4	1.00	144.3	31 35.7	1.00	144.2	32 05.0	1.00	144.1	1
2	29 25.9	1.00	143.5	29 55.1	1.00	143.4	30 24.4	1.00	143.2	30 53.7	1.00	143.1	31 22.9	1.00	143.0	31 52.2	1.00	142.9	2
3	29 12.9	1.00	142.4	29 42.1	1.00	142.3	30 11.4	1.00	142.1	30 40.6	1.00	142.0	31 09.8	1.00	141.9	31 39.0	1.00	141.7	3
4	28 59.6	1.00	141.3	29 28.8	1.00	141.2	29 58.0	1.00	141.0	30 27.2	1.00	140.9	30 56.4	1.00	140.8	31 25.5	1.00	140.6	4
35	28 46.0	1.00	140.2	29 15.2	1.00	140.1	29 44.3	1.00	139.9	30 13.5	1.00	139.8	30 42.6	1.00	139.7	31 11.7	1.00	139.5	35
6	28 32.1	1.00	139.1	29 01.2	1.00	139.0	29 30.3	1.00	138.8	29 59.4	1.00	138.7	30 28.5	1.00	138.6	30 57.6	1.00	138.4	6
7	28 17.9	1.00	138.0	28 46.9	1.00	137.9	29 16.0	1.00	137.8	29 45.1	1.00	137.7	30 14.1	1.00	137.5	30 43.2	1.00	137.3	7
8	28 03.3	1.00	137.0	28 32.4	1.00	136.8	29 01.4	1.00	136.7	29 30.4	1.00	136.5	29 59.5	1.00	136.4	30 28.5	1.00	136.2	8
9	27 48.5	1.00	135.9	28 17.5	1.00	135.8	28 46.5	1.00	135.6	29 15.5	1.00	135.5	29 44.5	1.00	135.3	30 13.4	1.00	135.1	9
40	27 33.4	1.00	134.8	28 02.4	1.00	134.7	28 31.3	1.00	134.5	29 00.3	1.00	134.4	29 29.2	1.00	134.2	30 02.1	1.00	134.1	40
1	27 18.0	1.00	133.8	27 47.0	1.00	133.6	28 15.9	1.00	133.5	28 44.8	1.00	133.3	29 13.7	1.00	133.2	29 42.6	1.00	133.0	1
2	27 02.4	1.00	132.7	27 31.2	1.00	132.6	28 00.1	1.00	132.4	28 29.0	1.00	132.2	28 57.8	1.00	132.1	29 26.7	1.00	131.9	2
3	26 46.4	1.00	131.7	27 15.3	1.00	131.5	27 44.1	1.00	131.3	28 12.9	1.00	131.2	28 41.8	1.00	131.0	29 10.6	1.00	130.9	3
4	26 30.2	1.00	130.6	26 59.0	1.00	130.4	27 27.8	1.00	130.3	27 56.6	1.00	130.1	28 25.4	1.00	129.9	28 54.2	1.00	129.8	4
45	26 13.8	1.00	129.6	26 42.5	1.00	129.4	27 11.3	1.00	129.2	27 40.1	1.00	129.0	28 08.8	1.00	128.8	28 37.5	1.00	128.6	45
6	25 57.1	1.00	128.5	26 25.8	1.00	128.3	26 54.5	1.00	128.2	27 23.2	1.00	128.0	27 51.9	1.00	127.7	28 20.6	1.00	127.5	6
7	25 40.1	1.00	127.5	26 08.8	1.00	127.3	26 37.5	1.00	127.1	27 06.2	1.00	127.0	27 34.9	1.00	126.8	28 03.5	1.00	126.6	7
8	25 22.9	1.00	126.4	25 51.6	1.00	126.3	26 20.3	1.00	126.1	26 48.9	1.00	125.9	27 17.5	1.00	125.8	27 46.1	1.00	125.6	8
9	25 05.5	1.00	125.4	25 34.2	1.00	125.2	26 02.8	1.00	125.1	26 31.4	1.00	124.9	27 00.0	1.00	124.7	27 25.0	1.00	124.6	9
50	24 47.9	1.00	124.4	25 16.5	1.00	124.2	25 45.1	1.00	124.0	26 13.6	1.00	123.9	26 42.2	1.00	123.7	27 10.7	1.00	123.5	50
1	24 30.0	1.00	123.3	24 58.6	1.00	123.2	25 27.1	1.00	123.0	25 55.7	1.00	122.8	26 24.2	1.00	122.7	26 52.7	1.00	122.5	1
2	24 12.0	1.00	122.3	24 40.5	1.00	122.2	25 09.0	1.00	122.0	25 37.5	1.00	121.8	26 06.0	1.00	121.6	26 34.4	1.00	121.5	2
3	23 53.7	1.00	121.3	24 22.2	1.00	121.1	24 50.7	1.00	120.8	25 19.1	1.00	120.8	25 47.6	1.00	120.6	26 16.0	1.00	120.4	3
4	23 35.2	1.00	120.3	24 03.7	1.00	120.1	24 32.1	1.00	119.9	25 00.6	1.00	119.8	25 29.0	1.00	119.6	25 57.4	1.00	119.4	4
55	23 16.6	1.00	119.3	23 45.0	1.00	119.1	24 13.4	1.00	118.9	24 41.8	1.00	118.8	25 10.2	1.00	118.6	25 38.5	1.00	118.4	55
6	22 57.7	1.00	118.3	23 26.1	1.00	118.1	23 54.5	1.00	117.9	24 22.9	1.00	117.7	24 51.2	1.00	117.6	25 19.5	1.00	117.4	6
7	22 38.7	1.00	117.3	23 07.1	1.00	117.1	23 35.4	1.00	116.9	24 03.7	1.00	116.7	24 32.1	1.00	116.6	25 00.4	1.00	116.4	7
8	22 19.5	1.00	116.3	22 47.8	1.00	116.1	23 16.1	1.00	115.9	23 44.4	1.00	115.7	24 12.7	1.00					

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.
	Alt.	Az.															
00	900.0	180.0	830.0	180.0	800.0	180.0	730.0	180.0	700.0	180.0	630.0	180.0	600.0	180.0	530.0	180.0	00
1	859.8	179.0	829.8	179.0	759.8	179.0	729.8	179.0	659.8	179.0	629.8	179.0	559.8	179.0	529.8	179.0	1
2	859.3	178.0	829.3	178.0	759.3	178.0	729.3	178.0	659.3	178.0	629.3	178.0	559.3	178.0	529.3	178.0	2
3	858.3	177.0	828.3	177.0	758.3	177.0	728.3	177.0	658.3	177.0	628.3	177.0	558.3	177.0	528.3	177.0	3
4	857.0	176.0	827.0	176.0	757.0	176.0	727.0	176.0	657.0	176.0	627.0	176.0	557.0	176.0	527.0	176.0	4
05	855.4	175.0	825.4	175.0	755.4	175.0	725.4	175.0	655.4	175.0	625.4	175.0	555.4	175.0	525.4	175.0	05
6	853.3	174.1	823.3	174.1	753.3	174.1	723.3	174.1	653.3	174.1	623.3	174.1	553.3	174.1	523.3	174.1	6
7	850.9	173.1	820.9	173.1	751.0	173.1	721.0	173.1	651.0	173.1	621.0	173.1	551.0	173.1	521.0	173.1	7
8	848.1	172.1	818.2	172.1	748.2	172.1	718.2	172.1	648.3	172.1	618.3	172.1	548.4	172.1	518.4	172.1	8
9	845.0	171.1	815.0	171.1	745.1	171.1	715.1	171.1	645.2	171.1	615.2	171.1	545.3	171.1	515.3	171.1	9
10	841.5	170.1	811.5	170.1	741.6	170.1	711.7	170.1	641.7	170.1	611.8	170.1	541.8	170.1	511.9	170.1	10
1	837.6	169.1	807.7	169.1	737.7	169.1	707.8	169.1	637.9	169.1	608.0	169.1	538.0	169.1	508.1	169.1	1
2	833.4	168.1	803.4	168.1	733.5	168.1	703.6	168.1	633.7	168.1	603.8	168.1	533.9	168.1	503.9	168.1	2
3	828.8	167.1	798.9	167.1	729.0	167.1	699.1	167.1	629.2	167.1	599.3	167.1	529.3	167.1	499.4	167.1	3
4	823.8	166.2	793.9	166.2	724.0	166.2	694.1	166.2	624.2	166.2	594.3	166.2	524.3	166.2	494.4	166.2	4
15	818.5	165.2	788.6	165.2	718.7	165.2	688.8	165.2	618.9	165.2	589.0	165.2	519.1	165.2	489.2	165.2	15
6	812.8	164.2	782.9	164.2	713.1	164.2	683.2	164.2	613.3	164.2	583.4	164.2	513.5	164.2	483.6	164.2	6
7	806.8	163.2	776.9	163.2	707.1	163.2	677.2	163.2	607.3	163.2	577.4	163.2	507.5	163.2	477.6	163.2	7
8	800.4	162.2	770.6	162.2	700.7	162.2	670.8	162.2	600.9	162.2	571.0	162.2	501.1	162.2	471.2	162.2	8
9	793.6	161.2	763.8	161.2	693.9	161.2	664.0	161.2	594.1	161.2	564.2	161.2	494.3	161.2	464.4	161.2	9
20	746.5	160.3	716.8	160.3	647.0	160.3	617.2	160.3	547.5	160.3	517.7	160.3					20
1	739.1	159.3	709.4	159.3	639.6	159.3	609.9	159.3	540.1	159.3	510.4	159.3					1
2	731.3	158.3	701.6	158.3	631.9	158.3	602.2	158.3	532.4	158.3	502.7	158.3					2
3	723.2	157.3	693.5	157.3	623.8	157.3	594.1	157.3	524.4	157.3							3
4	714.8	156.4	685.1	156.4	615.4	156.4	585.7	156.4	516.1	156.4							4
25	706.0	155.4	676.3	155.4	606.7	155.4	577.0	155.4	507.4	155.4							25
6	696.8	154.4	667.2	154.4	597.6	154.4	567.9	154.4	498.3	154.4							6
7	687.4	153.4	658.0	153.4	588.4	153.4	558.7	153.4	489.0	153.4							7
8	677.6	152.5	648.8	152.5	578.5	152.5	548.8	152.5	479.1	152.5							8
9	667.5	151.5	639.6	151.5	568.6	151.5	538.9	151.5	469.2	151.5							9
30	617.1	150.5	547.6	150.5	518.1	150.5											30
1	606.4	149.6	536.9	149.6	507.4	149.6											1
2	595.3	148.6	525.9	148.6													2
3	583.9	147.6	514.5	147.6													3
4	572.3	146.7	502.9	146.7													4
35	520.3	145.7															35
6	508.0	144.7															6

Lat. 69°

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00'		12° 30'		13° 00'		13° 30'		14° 00'		14° 30'		15° 00'		15° 30'		H.A.
	Alt.	Az.															
91	1050.1	84.7	1118.0	84.5	1146.0	84.3	1213.9	84.2	1241.8	84.0	1309.7	83.8	1337.6	83.6	1405.5	83.4	91
2	1028.7	83.8	1096.7	83.6	1124.6	83.4	1192.5	83.2	1260.4	83.0	1328.3	82.9	1356.2	82.7	1424.1	82.5	2
3	1007.4	82.9	1075.3	82.7	1103.2	82.5	1171.1	82.3	1238.2	82.1	1306.1	81.9	1344.0	81.7	1401.9	81.6	3
4	946.0	81.9	1014.0	81.8	1041.9	81.6	1109.9	81.4	1177.8	81.2	1245.8	81.0	1313.7	80.8	1381.6	80.6	4
95	924.8	81.0	992.7	80.8	1020.7	80.6	1088.7	80.5	1156.6	80.3	1224.5	80.1	1292.4	79.9	1360.3	79.7	95
6	903.6	80.1	971.5	79.9	949.4	79.7	1017.3	79.5	1085.2	79.4	1153.1	79.2	1221.0	79.0	1288.9	78.8	6
7	882.4	79.2	950.3	79.0	928.2	78.8	996.1	78.6	1064.0	78.4	1131.9	78.2	1200.0	78.1	1267.9	77.9	7
8	861.2	78.2	929.1	78.1	907.0	77.9	974.9	77.7	1042.8	77.5	1110.7	77.3	1178.6	77.1	1246.5	77.0	8
9	840.0	77.3	907.9	77.1	885.8	77.0	953.7	76.8	1021.6	76.6	1089.5	76.4	1157.4	76.2	1225.3	76.0	9
100	739.4	76.4	807.3	76.2	835.2	76.0	903.1	75.9	971.0	75.7	1038.9	75.5	1106.8	75.3	1174.7	75.1	100
1	718.2	75.5	786.2	75.3	814.1	75.1	882.0	74.9	949.9	74.8	1017.8	74.6	1085.7	74.4	1153.6	74.2	1
2	697.0	74.6	765.0	74.4	792.9	74.2	860.8	74.0	928.7	73.8	996.6	73.6	1064.5	73.4	1132.4	73.2	2
3	675.8	73.6	743.8	73.5	771.7	73.3	839.6	73.1	907.5	72.9	975.4	72.7	1043.3	72.5	1111.2	72.3	3
4	654.6	72.7	722.6	72.5	750.5	72.4	818.4	72.2	886.3	72.0	954.2	71.8	1022.1	71.6	1089.9	71.4	4
105	556.0	71.8	624.0	71.6	652.0	71.4	720.0	71.3	788.0	71.1	856.0	70.9	924.0	70.7	992.0	70.6	105
6	535.6	70.9	603.6	70.7	631.6	70.5	700.0	70.3	758.0	70.2	826.0	70.0	894.0	69.8	962.0	69.6	6
7	515.4	69.9	583.4	69.8	611.4	69.6	679.8	69.4	738.2	69.3	806.6	69.1	874.4	68.9	942.2	68.7	7
8			563.0	68.8	591.0	68.7	659.4	68.5	727.8	68.3	796.2	68.2	864.0	68.0	931.8	67.8	8
9			542.6	67.9	570.6	67.8	639.0	67.6	707.4	67.4	775.8	67.2	843.6	67.1	911.4	66.9	9
110					511.8	66.8	540.2	66.7	608.6	66.5	677.0	66.3	745.4	66.2	813.8	66.0	110
1							520.4	65.7	548.8	65.6	616.2	65.4	684.6	65.2	752.4	65.1	1
2							500.0	64.8	529.2	64.7	597.6	64.5	665.4	64.3	733.2	64.2	2
3									509.8	63.7	538.0	63.6	604.2	63.4	672.0	63.2	3
4											518.9	62.7	593.0	62.5	667.0	62.3	4
115													528.2	61.6	556.6	61.4	115
6													509.4	60.7	537.8	60.5	6
7															519.2	59.6	7
8															500.7	58.7	8

Lat. 69°

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
00	37 00.0	1.00 180.0	37 30.0	1.00 180.0	38 00.0	1.00 180.0	38 30.0	1.00 180.0	39 00.0	1.00 180.0	39 30.0	1.00 180.0	40 00.0	1.00 180.0	40 30.0	1.00 180.0	00
1	36 59.0	1.001 178.8	37 29.1	1.001 178.8	37 59.1	1.001 178.8	38 29.1	1.001 178.8	38 59.1	1.001 178.8	39 29.1	1.001 178.8	39 59.1	1.001 178.8	40 29.1	1.001 178.8	1
2	36 58.1	1.002 177.6	37 28.2	1.002 177.6	37 58.2	1.002 177.6	38 28.2	1.002 177.6	38 58.2	1.002 177.6	39 28.2	1.002 177.6	39 58.2	1.002 177.6	40 28.2	1.002 177.6	2
3	36 57.2	1.003 176.4	37 27.3	1.003 176.4	37 57.3	1.003 176.4	38 27.3	1.003 176.4	38 57.3	1.003 176.4	39 27.3	1.003 176.4	39 57.3	1.003 176.4	40 27.3	1.003 176.4	3
4	36 56.4	1.004 175.2	37 26.4	1.004 175.2	37 56.4	1.004 175.2	38 26.4	1.004 175.2	38 56.4	1.004 175.2	39 26.4	1.004 175.2	39 56.4	1.004 175.2	40 26.4	1.004 175.2	4
05	36 54.4	1.004 174.0	37 24.4	1.004 174.0	37 54.4	1.004 174.0	38 24.4	1.004 174.0	38 54.4	1.004 174.0	39 24.4	1.004 174.0	39 54.4	1.004 174.0	40 24.4	1.004 174.0	05
6	36 51.9	1.005 172.8	37 21.9	1.005 172.8	37 51.8	1.005 172.8	38 21.8	1.005 172.8	38 51.7	1.005 172.8	39 21.7	1.005 172.8	39 51.7	1.005 172.8	40 21.7	1.005 172.8	6
7	36 49.0	1.006 171.6	37 18.9	1.006 171.6	37 48.9	1.006 171.6	38 18.8	1.006 171.6	38 48.8	1.006 171.6	39 18.7	1.006 171.6	39 48.7	1.006 171.6	40 18.7	1.006 171.6	7
8	36 45.6	1.006 170.4	37 15.5	1.006 170.4	37 45.5	1.006 170.4	38 15.4	1.006 170.4	38 45.4	1.006 170.4	39 15.3	1.006 170.4	39 45.3	1.006 170.4	40 15.3	1.006 170.4	8
9	36 41.8	1.007 169.2	37 11.7	1.007 169.2	37 41.6	1.007 169.2	38 11.6	1.007 169.2	38 41.5	1.007 169.2	39 11.4	1.007 169.2	39 41.3	1.007 169.2	40 11.3	1.007 169.2	9
10	36 37.8	1.008 168.0	37 07.4	1.008 167.9	37 37.3	1.008 167.9	38 07.3	1.008 167.9	38 37.2	1.008 167.9	39 07.1	1.008 167.9	39 37.0	1.008 167.9	40 06.9	1.008 167.9	10
1	36 32.8	1.009 166.8	37 02.4	1.009 166.7	37 32.6	1.009 166.7	38 02.5	1.009 166.7	38 32.4	1.009 166.7	39 02.3	1.009 166.7	39 32.2	1.009 166.7	40 02.1	1.009 166.7	1
2	36 27.7	1.009 165.6	36 57.6	1.009 165.6	37 27.4	1.009 165.6	37 57.3	1.009 165.6	38 27.2	1.009 165.6	38 57.0	1.009 165.6	39 26.9	1.009 165.6	39 56.8	1.009 165.6	2
3	36 22.2	99 10 164.4	36 52.0	99 10 164.4	37 21.8	99 10 164.3	37 51.7	99 10 164.3	38 21.5	99 10 164.2	38 51.4	99 10 164.1	39 21.2	99 10 164.0	39 51.0	99 10 164.0	3
4	36 16.2	99 11 163.2	36 46.0	99 11 163.2	37 15.8	99 11 163.1	37 45.6	99 11 163.0	38 15.4	99 11 162.9	38 45.3	99 11 162.9	39 15.1	99 11 162.8	39 44.9	99 11 162.8	4
15	36 09.7	99 11 162.1	36 39.5	99 11 162.0	37 09.3	99 11 161.9	37 39.1	99 11 161.8	38 08.9	99 11 161.8	38 38.7	99 11 161.7	39 08.5	99 11 161.6	39 38.3	99 11 161.5	15
6	36 02.9	99 12 160.9	36 32.7	99 12 160.8	37 02.5	99 12 160.7	37 32.2	99 12 160.6	38 02.0	99 12 160.6	38 31.8	99 12 160.5	39 01.5	99 12 160.4	39 31.3	99 12 160.3	6
7	35 55.7	99 13 159.7	36 25.4	99 13 159.6	36 55.1	99 13 159.5	37 24.9	99 13 159.4	37 54.6	99 13 159.4	38 24.4	99 13 159.3	38 54.1	99 13 159.2	39 23.8	99 13 159.1	7
8	35 48.0	99 13 158.5	36 17.7	99 14 158.4	36 47.4	99 14 158.3	37 17.1	99 14 158.3	37 46.8	99 14 158.2	38 16.5	99 14 158.1	38 46.2	99 14 158.0	39 15.9	99 14 157.9	8
9	35 39.9	99 14 157.3	36 09.6	99 14 157.3	36 39.3	99 14 157.2	37 09.0	99 14 157.1	37 38.6	99 14 157.0	38 08.3	99 14 156.9	38 38.0	99 14 156.8	39 07.6	99 14 156.7	9
20	35 31.4	99 15 156.2	36 01.1	99 15 156.1	36 30.7	99 15 156.0	37 00.4	99 15 155.9	37 30.0	99 15 155.8	37 59.7	99 15 155.7	38 29.3	99 15 155.6	38 58.9	99 15 155.5	20
1	35 22.5	99 15 155.0	35 52.2	99 16 154.9	36 21.8	99 16 154.8	36 51.4	99 16 154.7	37 21.0	99 16 154.6	37 50.6	99 16 154.5	38 20.2	99 16 154.4	38 49.8	99 16 154.3	1
2	35 13.3	99 16 153.8	35 42.8	99 16 153.7	36 12.4	99 16 153.6	36 42.0	99 16 153.5	37 11.6	99 16 153.4	37 41.2	99 16 153.3	38 10.7	99 16 153.2	38 40.3	99 16 153.1	2
3	35 03.6	99 17 152.7	35 33.1	99 17 152.6	36 02.7	99 17 152.5	36 32.2	99 17 152.4	37 01.8	99 17 152.3	37 31.3	99 17 152.1	38 00.8	99 17 152.0	38 30.3	99 17 151.9	3
4	34 53.5	99 17 151.5	35 23.0	99 17 151.4	35 52.6	99 18 151.3	36 22.1	99 18 151.2	36 51.6	99 18 151.1	37 21.1	99 18 151.0	37 50.6	99 18 150.9	38 20.0	99 18 150.7	4
25	34 43.1	98 18 150.4	35 12.6	98 18 150.3	35 42.0	98 18 150.2	36 11.5	98 18 150.0	36 41.0	98 18 149.9	37 10.4	98 18 149.8	37 39.9	98 18 149.7	38 09.3	98 18 149.6	25
6	34 32.3	98 19 149.2	35 01.7	98 19 149.1	35 31.2	98 19 149.0	36 00.6	98 19 148.9	36 30.0	98 19 148.8	36 59.4	98 19 148.6	37 28.8	98 19 148.5	37 58.2	98 19 148.4	6
7	34 21.1	98 19 148.1	34 50.5	98 19 148.0	35 19.9	98 19 147.8	35 49.3	98 19 147.7	36 18.7	98 19 147.6	36 48.1	98 20 147.5	37 17.8	98 20 147.2	37 46.8	98 20 147.2	7
8	34 09.5	98 20 146.9	34 38.9	98 20 146.8	35 08.3	98 20 146.7	35 37.6	98 20 146.6	36 07.0	98 20 146.4	36 36.3	98 20 146.3	37 05.6	98 20 146.2	37 35.0	98 20 146.1	8
9	33 57.6	98 20 145.8	34 27.0	98 20 145.7	34 56.3	98 21 145.6	35 25.6	98 21 145.4	35 54.9	98 21 145.3	36 24.2	98 21 145.2	36 53.5	98 21 145.0	37 22.8	98 21 144.9	9
30	33 45.4	98 21 144.7	34 14.7	98 21 144.6	34 44.0	98 21 144.4	35 13.2	98 21 144.3	35 42.5	98 21 144.2	36 11.0	98 21 144.0	36 41.0	98 21 143.9	37 10.2	98 21 143.7	30
1	33 32.8	98 22 143.6	34 02.0	98 22 143.4	34 31.3	98 22 143.3	35 00.5	98 22 143.2	35 29.7	98 22 143.0	35 58.9	98 22 142.9	36 28.1	98 22 142.7	36 57.3	98 22 142.6	1
2	33 19.8	98 22 142.4	33 49.0	98 22 142.3	34 18.3	98 22 142.2	34 47.4	98 22 142.0	35 16.6	98 22 141.9	35 45.8	98 22 141.7	36 15.0	98 22 141.6	36 44.1	98 22 141.4	2
3	33 06.6	97 23 141.3	33 35.7	97 23 141.2	34 04.9	97 23 141.0	34 34.0	97 23 140.9	35 03.2	97 23 140.7	35 32.3	97 23 140.6	36 01.4	97 23 140.5	36 30.5	97 23 140.3	3
4	32 53.0	97 23 140.2	33 22.1	97 23 140.1	33 51.2	97 23 139.9	34 20.3	97 23 139.8	34 49.4	97 23 139.6	35 18.5	97 24 139.5	35 47.6	97 24 139.3	36 16.6	97 24 139.2	4
35	32 39.0	97 24 139.1	33 08.1	97 24 138.9	33 37.2	97 24 138.8	34 06.3	97 24 138.7	34 35.3	97 24 138.5	35 04.4	97 24 138.3	35 33.4	97 24 138.2	36 02.4	97 24 138.0	35
6	32 24.8	97 24 138.0	32 53.3	97 24 137.8	33 22.9	97 24 137.7	33 51.9	97 24 137.5	34 20.9	97 24 137.4	34 49.9	97 25 137.2	35 18.9	97 25 137.1	35 47.9	97 25 136.9	6
7	32 10.3	97 25 136.9	32 39.3	97 25 136.7	33 08.3	97 25 136.6	33 37.2	97 25 136.4	34 06.2	97 25 136.3	34 35.2	97 25 136.1	35 04.1	97 25 136.0	35 33.0	97 25 135.8	7
8	31 55.4	97 25 135.8	32 24.4	97 26 135.6	32 53.3	97 26 135.5	33 22.3	97 26 135.3	33 51.2	97 26 135.2	34 20.1	97 26 135.0	34 49.0	97 26 134.8	35 17.9	97 26 134.7	8
9	31 40.3	97 26 134.7	32 09.2	97 26 134.5	32 38.1	97 26 134.4	33 07.0	97 26 134.2	33 35.9	97 26 134.1	34 04.8	97 26 133.9	34 33.6	97 26 133.7	35 02.5	97 26 133.6	9
40	31 24.9	97 26 133.6	31 53.7	97 26 133.5	32 22.6	97 26 133.3	32 51.5	97 26 133.1	33 20.3	97 26 133.0	33 49.1	97 27 132.8	34 17.9	97 27 132.6	34 46.7	97 27 132.5	40
1	31 09.1	97 27 132.5	31 38.0	97 27 132.4	32 06.8	97 27 132.2	32 35.6	97 27 132.0	33 04.4	97 27 131.9	33 33.2	97 27 131.7	34 02.0	97 27 131.5	34 30.7	97 27 131.4	1
2	30 53.2	97 27 131.5	31 22.0	97 27 131.3	31 50.7	97 27 131.1	32 19.5	97 27 130.9	32 48.3	97 27 130.8	33 17.0	97 27 130.6	33 45.8	97 28 130.4	34 14.5	97 28 130.3	2
3	30 36.9	97 28 130.4	31 05.0	97 28 130.2	31 34.4	97 28 130.0	32 03.2	97 28 129.9	32 31.9	97 28 129.7	33 00.6	97 28 129.5	33 29.3	97 28 129.4	33 57.9	97 28 129.2	3
4	30 20.4	97 28 129.3	30 49.1	97 28 129.1	31 17.8	97 28 128.9	31 46.5	97 28 128.8	32 15.2	97 28 128.6	32 43.9	97 28 128.5	33 12.5	97 28 128.3	33 41.1	97 28 128.1	4
45	30 03.6	97 28 128.2	30 32.3	97 28 128.0	31 01.0	97 28 127.9	31 29.6	97 28 127.7	31 58.3	97 29 127.6	32 26.9	97 29 127.4	32 55.5				

Lat.  
69°

H.A.	16° 00'		16° 30'		17° 00'		17° 30'		18° 00'		18° 30'		19° 00'		19° 30'		H.A.
	Alt.	Az.															
91	14 33.3	83.2	15 01.2	83.0	15 29.0	82.8	15 56.9	82.6	16 24.7	82.4	16 52.5	82.2	17 20.4	82.0	17 48.2	81.8	91
2	14 12.0	82.3	14 39.9	82.1	15 07.7	81.9	15 35.6	81.7	16 03.4	81.5	16 31.3	81.3	16 59.1	81.1	17 26.9	80.9	2
3	13 50.7	81.4	14 18.6	81.2	14 46.5	81.0	15 14.3	80.8	15 42.2	80.6	16 10.0	80.4	16 37.9	80.2	17 05.7	80.0	3
4	13 29.5	80.4	13 57.4	80.3	14 25.3	80.1	14 53.1	79.9	15 21.0	79.7	15 48.9	79.5	16 16.7	79.3	16 44.6	79.1	4
95	13 08.3	79.5	13 36.2	79.3	14 04.1	79.2	14 32.0	79.0	14 59.9	78.8	15 27.8	78.6	15 55.6	78.4	16 23.5	78.2	95
6	12 47.2	78.6	13 15.1	78.4	13 43.0	78.2	14 10.9	78.0	14 38.8	77.9	15 06.7	77.7	15 34.6	77.5	16 02.5	77.3	6
7	12 26.2	77.7	12 54.1	77.5	13 22.0	77.3	13 49.9	77.1	14 17.8	76.9	14 45.7	76.8	15 13.6	76.6	15 41.5	76.4	7
8	12 05.2	76.8	12 33.1	76.6	13 01.1	76.4	13 29.0	76.2	13 56.9	76.0	14 24.9	75.8	14 52.8	75.7	15 20.7	75.5	8
9	11 44.3	75.9	12 12.3	75.7	12 40.2	75.5	13 08.2	75.3	13 36.1	75.1	14 04.1	74.9	14 32.0	74.7	14 59.9	74.6	9
100	11 23.5	74.9	11 51.5	74.8	12 19.4	74.6	12 47.4	74.4	13 15.4	74.2	13 43.3	74.0	14 11.3	73.8	14 39.2	73.6	100
1	11 02.8	74.0	11 30.8	73.8	11 58.8	73.7	12 26.8	73.5	12 54.7	73.3	13 22.7	73.1	13 50.7	72.9	14 18.6	72.7	1
2	10 42.1	73.1	11 10.2	72.9	11 38.2	72.8	12 06.2	72.6	12 34.2	72.4	13 02.2	72.2	13 30.2	72.0	13 58.2	71.8	2
3	10 21.6	72.2	10 49.7	72.0	11 17.7	71.8	11 45.7	71.7	12 13.8	71.5	12 41.8	71.3	13 09.8	71.1	13 37.8	70.9	3
4	10 01.2	71.3	10 29.3	71.1	10 57.3	70.9	11 25.4	70.8	11 53.4	70.6	12 21.5	70.4	12 49.5	70.2	13 17.5	70.0	4
105	9 40.9	70.4	10 09.0	70.2	10 37.1	70.0	11 05.1	69.8	11 33.2	69.7	12 01.3	69.5	12 29.3	69.3	12 57.4	69.1	105
6	9 20.7	69.5	9 48.8	69.3	10 16.9	69.1	10 45.0	68.9	11 13.1	68.8	11 41.2	68.6	12 09.3	68.4	12 37.3	68.2	6
7	9 00.6	68.6	9 28.8	68.4	9 56.9	68.2	10 25.0	68.0	10 53.1	67.8	11 21.2	67.7	11 49.3	67.5	12 17.4	67.3	7
8	8 40.7	67.6	9 08.8	67.5	9 37.0	67.3	10 05.1	67.1	10 33.3	66.9	11 01.4	66.8	11 29.5	66.6	11 57.7	66.4	8
9	8 20.8	66.7	8 49.0	66.6	9 17.2	66.4	9 45.4	66.2	10 13.6	66.0	10 41.7	65.9	11 09.9	65.7	11 38.0	65.5	9
110	8 01.2	65.8	8 29.4	65.6	8 57.6	65.5	9 25.8	65.3	9 54.0	65.1	10 22.2	64.9	10 50.4	64.8	11 18.5	64.6	110
1	7 41.6	64.9	8 09.9	64.7	8 38.1	64.6	9 06.3	64.4	9 34.5	64.2	10 02.8	64.0	10 31.0	63.9	10 59.2	63.7	1
2	7 22.2	64.0	7 50.5	63.8	8 18.7	63.6	8 47.0	63.5	9 15.3	63.3	9 43.5	63.1	10 11.7	63.0	10 40.0	62.8	2
3	7 03.0	63.1	7 31.3	62.9	7 59.6	62.7	8 27.8	62.6	8 56.1	62.4	9 24.4	62.2	9 52.7	62.1	10 20.9	61.9	3
4	6 43.9	62.2	7 12.2	62.0	7 40.5	61.8	8 08.8	61.7	8 37.1	61.5	9 05.5	61.3	9 33.8	61.2	10 02.0	61.0	4
115	6 25.0	61.2	6 53.3	61.1	7 21.6	60.9	7 50.0	60.8	8 18.3	60.6	8 46.7	60.4	9 15.0	60.3	9 43.3	60.1	115
6	6 06.2	60.3	6 34.6	60.2	7 02.9	60.0	7 31.3	59.8	7 59.7	59.7	8 28.1	59.5	8 56.4	59.3	9 24.8	59.2	6
7	5 47.6	59.4	6 16.0	59.3	6 44.4	59.1	7 12.8	58.9	7 41.2	58.8	8 09.6	58.6	8 38.0	58.4	9 06.4	58.3	7
8	5 29.2	58.5	5 57.6	58.3	6 26.0	58.2	6 54.5	58.0	7 22.9	57.9	7 51.3	57.7	8 19.8	57.5	8 48.2	57.4	8
9	5 10.9	57.6	5 39.4	57.4	6 07.9	57.3	6 36.3	57.1	7 04.8	57.0	7 33.3	56.8	8 01.7	56.6	8 30.2	56.5	9
120			5 21.4	56.5	5 49.9	56.4	6 18.4	56.2	6 46.9	56.0	7 15.4	55.9	7 43.9	55.7	8 12.3	55.6	120
1			5 03.5	55.6	5 32.1	55.4	6 00.6	55.3	6 29.1	55.1	6 57.7	55.0	7 26.2	54.8	7 54.7	54.7	1
2					5 14.5	55.4	5 43.0	55.4	6 11.6	55.2	6 40.2	55.1	7 08.7	54.9	7 37.3	54.8	2
3							5 25.6	55.5	5 54.2	55.3	6 22.8	55.2	6 51.4	55.0	7 20.0	54.9	3
4							5 08.5	55.5	5 37.1	55.4	6 05.7	55.2	6 34.4	55.1	7 03.0	54.9	4
125									5 20.2	51.5	5 48.8	51.3	6 17.5	51.2	6 46.2	51.0	125
6									5 03.5	50.6	5 32.2	50.4	6 00.9	50.3	6 29.6	50.1	6
7											5 15.7	49.5	5 44.4	49.4	6 13.2	49.2	7
8													5 28.2	48.5	5 57.0	48.3	8
9													5 12.2	47.5	5 41.0	47.4	9
130															5 25.3	46.5	130
1															5 09.9	45.6	1

Lat. 69°

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.		
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.			
00	41 00.0	1.000	180.0	41 30.0	1.000	180.0	42 00.0	1.000	180.0	42 30.0	1.000	180.0	43 00.0	1.000	180.0	43 30.0	1.000	180.0	00
1	40 59.8	1.001	178.8	41 29.8	1.001	178.7	41 59.8	1.001	178.7	42 29.8	1.001	178.7	42 59.8	1.001	178.7	43 29.8	1.001	178.7	1
2	40 59.1	1.002	177.5	41 29.1	1.002	177.5	41 59.1	1.002	177.5	42 29.1	1.002	177.5	42 59.1	1.002	177.5	43 29.1	1.002	177.5	2
3	40 57.9	1.003	176.3	41 27.9	1.003	176.2	41 57.9	1.003	176.2	42 27.9	1.003	176.2	42 57.9	1.003	176.2	43 27.9	1.003	176.2	3
4	40 56.3	1.004	175.0	41 26.2	1.004	175.0	41 56.2	1.004	175.0	42 26.2	1.004	175.0	42 56.2	1.004	174.9	43 26.2	1.004	174.9	4
05	40 54.2	1.004	173.8	41 24.1	1.004	173.8	41 54.1	1.004	173.7	42 24.1	1.004	173.7	42 54.1	1.004	173.7	43 24.1	1.004	173.6	05
6	40 51.6	1.005	172.5	41 21.6	1.005	172.5	41 51.5	1.005	172.5	42 21.5	1.005	172.4	42 51.5	1.005	172.4	43 21.5	1.005	172.3	6
7	40 48.6	1.006	171.3	41 18.5	1.006	171.3	41 48.5	1.006	171.2	42 18.4	1.006	171.2	42 48.4	1.006	171.1	43 18.3	1.006	171.1	7
8	40 45.1	1.007	170.1	41 15.0	1.007	170.0	41 45.0	1.007	170.0	42 14.9	1.007	169.9	42 44.8	1.007	169.8	43 14.7	1.007	169.8	8
9	40 41.2	1.007	168.8	41 11.1	1.007	168.8	41 41.0	1.007	168.7	42 10.9	1.007	168.7	42 40.8	1.007	168.6	43 10.7	1.007	168.6	9
10	40 36.8	1.008	167.6	41 06.7	1.008	167.5	41 36.6	1.008	167.5	42 06.5	1.008	167.4	42 36.3	1.008	167.4	43 06.2	1.008	167.3	10
1	40 31.9	1.009	166.4	41 01.8	1.009	166.3	41 31.7	1.009	166.2	42 01.5	1.009	166.2	42 31.4	1.009	166.1	43 01.3	1.009	166.0	1
2	40 26.6	1.010	165.1	40 56.5	1.010	165.1	41 26.3	1.010	165.0	41 56.2	1.010	164.9	42 26.0	1.010	164.8	42 55.9	1.010	164.7	2
3	40 20.9	1.010	163.9	40 50.7	1.010	163.8	41 20.5	1.010	163.7	41 50.4	1.010	163.6	42 20.2	1.010	163.5	42 50.0	1.010	163.4	3
4	40 14.7	1.011	162.7	40 44.5	1.011	162.6	41 14.3	1.011	162.5	41 44.1	1.011	162.4	42 13.9	1.011	162.3	42 43.7	1.011	162.2	4
15	40 08.1	1.012	161.5	40 37.8	1.012	161.4	41 07.6	1.012	161.3	41 37.4	1.012	161.2	42 07.2	1.012	161.1	42 36.9	1.012	161.0	15
6	40 01.0	1.012	160.2	40 30.8	1.012	160.1	41 00.5	1.012	160.1	41 30.2	1.012	160.0	42 00.0	1.012	159.9	42 29.7	1.012	159.8	6
7	39 53.5	1.013	159.0	40 23.2	1.013	158.9	40 53.0	1.013	158.8	41 22.7	1.013	158.7	41 52.4	1.013	158.6	42 22.1	1.013	158.5	7
8	39 45.6	1.014	157.8	40 15.3	1.014	157.7	40 45.0	1.014	157.6	41 14.7	1.014	157.5	41 44.3	1.014	157.4	42 14.0	1.014	157.3	8
9	39 37.3	1.015	156.6	40 06.9	1.015	156.5	40 36.6	1.015	156.4	41 06.2	1.015	156.3	41 35.9	1.015	156.2	42 05.5	1.015	156.1	9
20	39 28.5	1.016	155.4	39 58.2	1.016	155.3	40 27.8	1.016	155.2	40 57.4	1.016	155.1	41 27.0	1.016	155.0	41 56.6	1.016	154.9	20
1	39 19.4	1.016	154.2	39 49.0	1.016	154.1	40 18.5	1.016	154.0	40 48.1	1.016	153.9	41 17.7	1.016	153.8	41 47.2	1.016	153.7	1
2	39 09.8	1.017	153.0	39 39.4	1.017	152.9	40 08.9	1.017	152.8	40 38.4	1.017	152.7	41 08.0	1.017	152.6	41 37.5	1.017	152.5	2
3	38 59.9	1.017	151.8	39 29.4	1.017	151.7	39 58.9	1.017	151.6	40 28.4	1.017	151.5	40 57.8	1.017	151.4	41 27.3	1.017	151.3	3
4	38 49.5	1.018	150.6	39 19.0	1.018	150.5	39 48.4	1.018	150.4	40 17.9	1.018	150.3	40 47.3	1.018	150.2	41 16.8	1.018	150.1	4
25	38 38.8	1.018	149.4	39 08.2	1.018	149.3	39 37.6	1.018	149.2	40 07.0	1.018	149.1	40 36.4	1.018	149.0	41 05.8	1.018	148.8	25
6	38 27.6	1.019	148.3	38 57.0	1.019	148.2	39 26.4	1.019	148.1	39 55.8	1.019	148.0	40 25.1	1.019	147.9	40 54.5	1.019	147.8	6
7	38 16.1	1.020	147.1	38 45.5	1.020	147.0	39 14.8	1.020	146.8	39 44.1	1.020	146.7	40 13.5	1.020	146.6	40 42.8	1.020	146.5	7
8	38 04.3	1.020	145.8	38 33.6	1.020	145.8	39 02.9	1.020	145.6	39 32.2	1.020	145.5	40 01.4	1.020	145.4	40 30.7	1.020	145.3	8
9	37 52.0	1.021	144.6	38 21.3	1.021	144.5	38 50.6	1.021	144.4	39 19.8	1.021	144.3	39 49.0	1.021	144.2	40 18.2	1.021	144.1	9
30	37 39.5	1.022	143.6	38 08.7	1.022	143.5	38 37.9	1.022	143.3	39 07.1	1.022	143.2	39 36.3	1.022	143.0	40 05.4	1.022	142.9	30
1	37 26.5	1.022	142.4	37 55.7	1.022	142.3	38 24.9	1.022	142.1	38 54.0	1.022	142.0	39 23.1	1.022	141.8	39 52.3	1.022	141.7	1
2	37 13.2	1.023	141.3	37 42.4	1.023	141.1	38 11.5	1.023	141.0	38 40.6	1.023	140.8	39 09.7	1.023	140.7	39 38.8	1.023	140.5	2
3	36 59.6	1.023	140.2	37 28.7	1.023	140.0	37 57.8	1.023	139.8	38 26.9	1.023	139.7	38 55.9	1.023	139.5	39 24.9	1.023	139.4	3
4	36 45.7	1.024	139.0	37 14.7	1.024	138.9	37 43.8	1.024	138.7	38 12.8	1.024	138.5	38 41.8	1.024	138.4	39 10.8	1.024	138.2	4
35	36 31.4	1.024	137.9	37 00.4	1.024	137.7	37 29.4	1.024	137.6	37 58.3	1.024	137.4	38 27.3	1.024	137.2	38 56.3	1.024	137.1	35
6	36 16.9	1.025	136.8	36 45.8	1.025	136.6	37 14.7	1.025	136.4	37 43.7	1.025	136.3	38 12.6	1.025	136.1	38 41.5	1.025	135.9	6
7	36 02.0	1.025	135.6	36 30.9	1.025	135.5	36 59.8	1.025	135.3	37 28.6	1.025	135.1	37 57.5	1.025	135.0	38 26.4	1.025	134.8	7
8	35 46.8	1.026	134.5	36 15.6	1.026	134.3	36 44.5	1.026	134.2	37 13.3	1.026	134.0	37 42.1	1.026	133.8	38 10.9	1.026	133.6	8
9	35 31.3	1.026	133.4	36 00.1	1.026	133.2	36 28.9	1.026	133.1	36 57.7	1.026	132.9	37 26.5	1.026	132.7	37 55.2	1.026	132.5	9
40	35 15.5	1.027	132.3	35 44.3	1.027	132.1	36 13.1	1.027	131.9	36 41.8	1.027	131.8	37 10.5	1.027	131.6	37 39.3	1.027	131.4	40
1	34 59.5	1.027	131.2	35 28.2	1.027	131.0	35 56.9	1.027	130.8	36 25.6	1.027	130.6	36 54.3	1.027	130.5	37 23.1	1.027	130.3	1
2	34 43.2	1.028	130.1	35 11.9	1.028	129.9	35 40.5	1.028	129.7	36 09.2	1.028	129.6	36 37.8	1.028	129.4	37 05.5	1.028	129.2	2
3	34 26.6	1.028	129.0	34 55.2	1.028	128.8	35 23.9	1.028	128.6	35 52.5	1.028	128.5	36 21.1	1.028	128.3	36 49.7	1.028	128.1	3
4	34 09.8	1.029	127.9	34 38.4	1.029	127.7	35 07.0	1.029	127.5	35 35.5	1.029	127.4	36 04.1	1.029	127.2	36 32.6	1.029	127.0	4
45	33 52.7	1.029	126.8	34 21.2	1.029	126.7	34 49.8	1.029	126.5	35 18.3	1.029	126.3	35 46.8	1.029	126.1	36 15.3	1.029	125.9	45
6	33 35.3	1.030	125.8	34 03.9	1.030	125.6	34 32.4	1.030	125.4	35 00.9	1.030	125.2	35 29.3	1.030	125.0	35 57.8	1.030	124.8	6
7	33 17.8	1.030	124.7	33 46.3	1.030	124.5	34 14.7	1.030	124.3	34 43.2	1.030	124.1	35 11.6	1.030	123.9	35 40.0	1.030	123.7	7
8	33 00.0	1.031	123.6	33 28.4	1.031	123.4	33 56.9	1.031	123.2	34 25.3	1.031	123.0	34 53.6	1.031	122.8	35 22.0	1.031	122.6	8
9	32 42.0	1.031	122.6	33 10.4	1.031	122.4	33 38.8	1.031	122.2	34 07.1	1.031	122.0	34 35.5	1.031	121.8	35 03.8	1.031	121.6	9
50	32 23.8	1.032	121.5	32 52.1	1.032	121.3	33 20.5	1.032	121.1	33 48.8	1.032	120.9	34 17.1	1.032	120.7	34 45.4	1.032	120.5	50
1	32 05.3	1.032	120.5	32 33.6	1.032	120.3	33 01.9	1.032	120.1	33 30.2	1.032	119.9	33 5						

H.A.	20° 00'		20° 30'		21° 00'		21° 30'		22° 00'		22° 30'		23° 00'		23° 30'		H.A.	Lat. 69°
	Alt.	Az.																
91	18 16.0	81.7	18 43.7	81.5	19 11.5	81.3	19 39.2	81.1	20 07.0	80.8	20 34.7	80.6	21 02.4	80.4	21 30.1	80.2	91	
2	17 54.7	80.7	18 22.5	80.5	18 50.3	80.3	19 18.0	80.1	19 45.8	79.9	20 13.5	79.7	20 41.2	79.5	21 08.9	79.3	2	
3	17 33.5	79.8	18 01.3	79.6	18 29.1	79.4	18 56.9	79.2	19 24.6	79.0	19 52.4	78.8	20 20.1	78.6	20 47.8	78.4	3	
4	17 12.4	78.9	17 40.2	78.7	18 08.0	78.5	18 35.8	78.3	19 03.6	78.1	19 31.3	77.9	19 59.1	77.7	20 26.8	77.5	4	
95	16 51.3	78.0	17 19.1	77.8	17 47.0	77.6	18 14.8	77.4	18 42.6	77.2	19 10.3	77.0	19 38.1	76.8	20 05.9	76.6	95	
6	16 30.3	77.1	16 58.2	76.9	17 26.0	76.7	17 53.8	76.5	18 21.6	76.3	18 49.4	76.1	19 17.2	75.9	19 45.0	75.7	6	
7	16 09.4	76.2	16 37.3	76.0	17 05.1	75.8	17 32.9	75.6	18 00.8	75.4	18 28.6	75.2	18 56.4	75.0	19 24.2	74.8	7	
8	15 48.6	75.3	16 16.4	75.1	16 44.3	74.9	17 12.2	74.7	17 40.0	74.5	18 07.8	74.3	18 35.7	74.1	19 03.5	73.9	8	
9	15 27.8	74.4	15 55.7	74.2	16 23.6	74.0	16 51.5	73.8	17 19.3	73.6	17 47.2	73.4	18 15.0	73.2	18 42.9	73.0	9	
100	15 07.1	73.5	15 35.1	73.3	16 03.0	73.1	16 30.9	72.9	16 58.8	72.7	17 26.6	72.5	17 54.5	72.3	18 22.4	72.1	100	
1	14 46.6	72.5	15 14.5	72.4	15 42.5	72.2	16 10.4	72.0	16 38.3	71.8	17 06.2	71.6	17 34.1	71.4	18 01.9	71.2	1	
2	14 26.1	71.6	14 54.1	71.5	15 22.0	71.3	15 50.0	71.1	16 17.9	70.9	16 45.8	70.7	17 13.8	70.5	17 41.6	70.3	2	
3	14 05.8	70.7	14 33.8	70.6	15 01.7	70.4	15 29.7	70.2	15 57.7	70.0	16 25.6	69.8	16 53.5	69.6	17 21.5	69.4	3	
4	13 45.5	69.8	14 13.5	69.7	14 41.5	69.5	15 09.5	69.3	15 37.5	69.1	16 05.5	68.9	16 33.5	68.7	17 01.4	68.5	4	
105	13 25.4	68.9	13 53.4	68.8	14 21.5	68.6	14 49.5	68.4	15 17.5	68.2	15 45.5	68.0	16 13.5	67.8	16 41.4	67.6	105	
6	13 05.4	68.0	13 33.5	67.8	14 01.5	67.7	14 29.5	67.5	14 57.6	67.3	15 25.6	67.1	15 53.6	66.9	16 21.6	66.7	6	
7	12 45.5	67.1	13 13.6	66.9	13 41.7	66.8	14 09.7	66.6	14 37.8	66.4	15 05.9	66.2	15 33.9	66.0	16 01.9	65.9	7	
8	12 25.8	66.2	12 53.9	66.0	13 22.0	65.9	13 50.1	65.7	14 18.2	65.5	14 46.3	65.3	15 14.3	65.1	15 42.4	65.0	8	
9	12 06.2	65.3	12 34.3	65.1	13 02.4	65.0	13 30.6	64.8	13 58.7	64.6	14 26.8	64.4	14 54.9	64.3	15 23.0	64.1	9	
110	11 46.7	64.4	12 14.9	64.2	12 43.0	64.1	13 11.2	63.9	13 39.3	63.7	14 07.5	63.5	14 35.6	63.4	15 03.7	63.2	110	
1	11 27.4	63.5	11 55.6	63.3	12 23.8	63.2	12 51.9	63.0	13 20.1	62.8	13 48.3	62.6	14 16.4	62.5	14 44.6	62.3	1	
2	11 08.2	62.6	11 36.4	62.4	12 04.7	62.3	12 32.9	62.1	13 01.1	61.9	13 29.3	61.8	13 57.5	61.6	14 25.6	61.4	2	
3	10 49.2	61.7	11 17.4	61.5	11 45.7	61.4	12 13.9	61.2	12 42.2	61.0	13 10.4	60.9	13 38.6	60.7	14 06.8	60.5	3	
4	10 30.3	60.8	11 08.6	60.6	11 26.9	60.5	11 55.2	60.3	12 23.5	60.1	12 51.7	60.0	13 20.0	59.8	13 48.2	59.6	4	
115	10 11.6	59.9	10 40.0	59.8	11 08.3	59.6	11 36.6	59.4	12 04.9	59.2	12 33.2	59.1	13 01.5	58.9	13 29.7	58.7	115	
6	9 53.1	59.0	10 21.5	58.9	10 49.8	58.7	11 18.2	58.5	11 46.5	58.3	12 14.8	58.2	12 43.1	58.0	13 11.5	57.8	6	
7	9 34.8	58.1	10 03.2	58.0	10 31.5	57.8	10 59.9	57.6	11 28.3	57.5	11 56.6	57.3	12 25.0	57.1	12 53.3	57.0	7	
8	9 16.6	57.2	9 45.0	57.1	10 13.4	56.9	10 41.8	56.7	11 10.2	56.6	11 38.6	56.4	12 07.0	56.2	12 35.4	56.1	8	
9	8 58.6	56.3	9 27.1	56.2	9 55.5	56.0	10 24.0	55.8	10 52.4	55.7	11 20.8	55.5	11 49.3	55.3	12 17.7	55.2	9	
120	8 40.8	55.4	9 09.3	55.3	9 37.8	55.1	10 06.3	54.9	10 34.7	54.8	11 03.2	54.6	11 31.7	54.4	12 00.1	54.3	120	
1	8 23.2	54.5	8 51.7	54.3	9 20.3	54.2	9 48.8	54.0	10 17.3	53.9	10 45.8	53.7	11 14.3	53.6	11 42.7	53.4	1	
2	8 05.8	53.6	8 34.4	53.4	9 02.9	53.3	9 31.5	53.1	10 00.0	53.0	10 28.5	52.8	10 57.1	52.7	11 25.6	52.5	2	
3	7 48.6	52.7	8 17.2	52.5	8 45.8	52.4	9 14.4	52.2	9 42.9	52.1	10 11.5	51.9	10 40.1	51.8	11 08.6	51.6	3	
4	7 31.6	51.8	8 00.2	51.6	8 28.9	51.5	8 57.5	51.3	9 26.1	51.2	9 54.7	51.0	10 23.3	50.9	10 51.9	50.7	4	
125	7 14.8	50.9	7 43.5	50.7	8 12.1	50.6	8 40.8	50.4	9 09.4	50.3	9 38.1	50.1	10 06.7	50.0	10 35.3	49.8	125	
6	6 58.2	50.0	7 26.9	49.8	7 55.6	49.7	8 24.3	49.5	8 53.0	49.4	9 21.7	49.2	9 50.3	49.1	10 19.0	48.9	6	
7	6 41.9	49.1	7 10.6	48.9	7 39.3	48.8	8 08.1	48.6	8 36.8	48.5	9 05.5	48.4	9 34.2	48.2	10 02.9	48.1	7	
8	6 25.8	48.2	6 54.5	48.0	7 23.3	47.9	7 52.0	47.7	8 20.8	47.6	8 49.5	47.5	9 18.3	47.3	9 47.0	47.2	8	
9	6 09.8	47.3	6 38.6	47.1	7 07.4	47.0	7 36.2	46.8	8 05.0	46.7	8 33.8	46.6	9 02.6	46.4	9 31.4	46.3	9	
130	5 54.2	46.4	6 23.0	46.2	6 51.8	46.1	7 20.7	45.9	7 49.5	45.8	8 18.3	45.7	8 47.1	45.5	9 16.0	45.4	130	
1	5 38.7	45.5	6 07.6	45.3	6 36.5	45.2	7 05.3	45.0	7 34.2	44.9	8 03.1	44.8	8 31.9	44.6	9 00.8	44.5	1	
2	5 23.5	44.5	5 52.4	44.4	6 21.3	44.3	6 50.2	44.1	7 19.1	44.0	7 48.0	43.9	8 16.9	43.7	8 45.8	43.6	2	
3	5 08.6	43.6	5 37.5	43.5	6 06.4	43.4	6 35.4	43.2	7 04.3	43.1	7 33.3	43.0	8 02.2	42.8	8 31.1	42.7	3	
4			5 22.8	42.6	5 51.8	42.5	6 20.8	42.3	6 49.7	42.2	7 18.7	42.1	7 47.7	41.9	8 16.7	41.8	4	
135			5 08.4	41.7	5 37.4	41.6	6 06.4	41.4	6 35.4	41.3	7 04.4	41.2	7 33.4	41.0	8 02.4	40.9	135	
6			5 23.3	40.6	5 52.3	40.5	6 21.4	40.4	6 50.4	40.3	7 19.5	40.2	7 48.5	40.1	8 17.5	40.0	6	
7			5 09.4	39.7	5 38.5	39.6	6 07.6	39.5	6 36.6	39.4	7 05.7	39.2	7 34.8	39.1	8 03.8	39.0	7	
8					5 24.9	38.7	5 54.0	38.6	6 23.1	38.5	6 52.2	38.3	7 21.4	38.2	7 50.5	38.1	8	
9					5 11.6	37.8	5 40.7	37.7	6 09.9	37.6	6 39.0	37.4	7 08.2	37.3	7 37.3	37.2	9	
140									5 27.7	36.8	5 56.9	36.7	6 26.1	36.5	6 55.3	36.4	140	
1									5 15.0	35.9	5 44.2	35.8	6 13.4	35.6	6 42.7	35.5	1	
2									5 02.5	35.0	5 31.8	34.9	6 01.0	34.7	6 30.3	34.6	2	
3											5 19.6	33.9	5 48.9	33.8	6 18.2	33.7	3	
4											5 07.8	33.0	5 37.1	32.9	6 06.4	32.8	4	
145													5 25.6	32.0	5 54.9	31.9	145	
6													5 14.3	31.1	5 43.7	31.0	6	
7													5 03.3	30.2	5 32.7	30.1	7	
8															5 22.1	29.2	8	
9															5 11.8	28.3	9	
150															5 01.7	27.4	150	

Lat. 69°

H.A.	24° 00'		24° 30'		25° 00'		25° 30'		26° 00'		26° 30'		27° 00'		27° 30'		H.A.
	Alt.	Az.															
00	45 00.0	1.00 180.0	45 30.0	1.00 180.0	46 00.0	1.00 180.0	46 30.0	1.00 180.0	47 00.0	1.00 180.0	47 30.0	1.00 180.0	48 00.0	1.00 180.0	48 30.0	1.00 180.0	00
1	44 59.8	1.001 178.7	45 29.8	1.001 178.7	45 59.8	1.001 178.7	46 29.8	1.001 178.7	46 59.8	1.001 178.7	47 29.8	1.001 178.7	47 59.8	1.001 178.7	48 29.8	1.001 178.7	1
2	44 59.0	1.002 177.4	45 29.0	1.002 177.4	45 59.0	1.002 177.4	46 29.0	1.002 177.4	46 59.0	1.002 177.4	47 29.0	1.002 177.4	47 59.0	1.002 177.4	48 29.0	1.002 177.4	2
3	44 57.8	1.003 176.1	45 27.8	1.003 176.1	45 57.8	1.003 176.1	46 27.8	1.003 176.1	46 57.8	1.003 176.0	47 27.8	1.003 176.0	47 57.8	1.003 176.0	48 27.8	1.003 176.0	3
4	44 56.1	1.004 174.8	45 26.1	1.004 174.8	45 56.1	1.004 174.8	46 26.1	1.004 174.8	46 56.0	1.004 174.7	47 26.0	1.004 174.7	47 56.0	1.004 174.7	48 26.0	1.004 174.6	4
05	44 53.9	1.004 173.5	45 23.9	1.004 173.5	45 53.9	1.004 173.5	46 23.9	1.004 173.5	46 53.8	1.004 173.4	47 23.8	1.004 173.4	47 53.8	1.004 173.3	48 23.8	1.004 173.3	05
6	44 51.3	1.006 172.3	45 21.2	1.006 172.2	45 51.2	1.006 172.2	46 21.2	1.006 172.1	46 51.1	1.006 172.1	47 21.1	1.006 172.1	47 51.0	1.006 172.0	48 21.0	1.006 172.0	6
7	44 48.2	1.006 171.0	45 18.1	1.006 170.9	45 48.0	1.006 170.9	46 18.0	1.006 170.8	46 47.9	1.006 170.8	47 17.9	1.006 170.7	47 47.8	1.006 170.7	48 17.7	1.006 170.6	7
8	44 44.5	1.007 169.7	45 14.4	1.007 169.6	45 44.4	1.007 169.6	46 14.3	1.007 169.5	46 44.2	1.007 169.5	47 14.2	1.007 169.4	47 44.1	1.007 169.4	48 14.0	1.007 169.3	8
9	44 40.5	1.008 168.4	45 10.4	1.008 168.4	45 40.3	1.008 168.3	46 10.2	1.008 168.2	46 40.1	1.008 168.2	47 10.0	1.008 168.1	47 39.9	1.008 168.1	48 09.8	1.008 168.0	9
10	44 35.9	1.008 167.1	45 05.8	1.008 167.1	45 35.7	1.008 167.0	46 05.6	1.008 166.9	46 35.4	1.008 166.9	47 05.3	1.008 166.8	47 35.2	1.008 166.7	48 05.0	1.008 166.6	10
1	44 30.9	1.009 165.8	45 00.7	1.009 165.8	45 30.6	1.009 165.7	46 00.5	1.009 165.6	46 30.3	1.009 165.6	47 00.2	1.009 165.5	47 30.0	1.009 165.4	47 59.8	1.009 165.3	1
2	44 25.4	1.010 164.6	44 55.2	1.010 164.5	45 25.1	1.010 164.4	45 54.9	1.010 164.4	46 24.7	1.010 164.3	46 54.5	1.010 164.2	47 24.4	1.010 164.1	47 54.2	1.010 164.0	2
3	44 19.4	1.011 163.3	44 49.3	1.011 163.2	45 19.1	1.011 163.1	45 48.9	1.011 163.1	46 18.7	1.011 163.0	46 48.4	1.011 162.9	47 18.2	1.011 162.8	47 48.0	1.011 162.7	3
4	44 13.0	1.012 162.0	44 42.8	1.012 162.0	45 12.6	1.012 161.9	45 42.4	1.012 161.8	46 12.1	1.012 161.7	46 41.9	1.012 161.6	47 11.6	1.012 161.5	47 41.4	1.012 161.4	4
15	44 06.2	1.012 160.8	44 35.9	1.012 160.7	45 05.7	1.012 160.6	45 35.4	1.012 160.5	46 05.1	1.012 160.4	46 34.9	1.012 160.3	47 04.6	1.012 160.2	47 34.3	1.012 160.1	15
6	43 58.9	1.013 159.5	44 28.6	1.013 159.4	44 58.3	1.013 159.3	45 28.0	1.013 159.2	45 57.7	1.013 159.1	46 27.4	1.013 159.0	46 57.1	1.013 158.9	47 26.8	1.013 158.8	6
7	43 51.1	1.014 158.3	44 20.8	1.014 158.2	44 50.5	1.014 158.1	45 20.2	1.014 158.0	45 49.8	1.014 157.8	46 19.5	1.014 157.7	46 49.1	1.014 157.6	47 18.8	1.014 157.5	7
8	43 43.0	1.014 157.0	44 12.6	1.014 156.9	44 42.2	1.014 156.8	45 11.9	1.014 156.7	45 41.5	1.014 156.6	46 11.1	1.014 156.5	46 40.7	1.014 156.4	47 10.3	1.014 156.3	8
9	43 34.3	1.015 155.8	44 03.9	1.015 155.7	44 33.5	1.015 155.5	45 03.1	1.015 155.4	45 32.7	1.015 155.3	46 02.3	1.015 155.2	46 31.9	1.015 155.1	47 01.4	1.015 155.0	9
20	43 25.3	1.016 154.5	43 54.9	1.016 154.4	44 24.4	1.016 154.3	44 54.0	1.016 154.2	45 23.9	1.016 154.0	45 53.1	1.016 153.9	46 22.6	1.016 153.8	46 52.1	1.016 153.7	20
1	43 15.8	1.016 153.3	43 45.4	1.016 153.2	44 14.9	1.016 153.0	44 44.4	1.016 152.9	45 13.9	1.016 152.8	45 43.4	1.016 152.7	46 12.9	1.016 152.5	46 42.3	1.016 152.4	1
2	43 06.0	1.017 152.1	43 35.5	1.017 151.9	44 04.9	1.017 151.8	44 34.4	1.017 151.7	45 03.9	1.017 151.5	45 33.3	1.017 151.4	46 02.7	1.017 151.3	46 32.2	1.017 151.1	2
3	42 55.7	1.018 150.8	43 25.1	1.018 150.7	43 54.6	1.018 150.6	44 24.0	1.018 150.4	44 53.4	1.018 150.3	45 22.8	1.018 150.1	45 52.2	1.018 150.0	46 21.6	1.018 149.9	3
4	42 45.0	1.018 149.6	43 14.4	1.018 149.5	43 43.8	1.018 149.3	44 13.2	1.018 149.2	44 42.5	1.018 149.0	45 11.9	1.018 148.9	45 41.2	1.018 148.7	46 10.6	1.018 148.6	4
25	42 33.9	1.019 148.4	43 03.3	1.019 148.2	43 32.6	1.019 148.1	44 02.0	1.019 148.0	44 31.3	1.019 147.8	45 00.6	1.019 147.7	45 29.9	1.019 147.5	45 59.2	1.019 147.3	25
6	42 22.5	1.020 147.2	42 51.8	1.020 147.0	43 21.1	1.020 146.9	43 50.4	1.020 146.7	44 19.6	1.020 146.6	44 48.9	1.020 146.4	45 18.1	1.020 146.3	45 47.4	1.020 146.1	6
7	42 10.6	1.020 146.0	42 39.9	1.020 145.8	43 09.1	1.020 145.7	43 38.4	1.020 145.5	44 07.6	1.020 145.4	44 36.8	1.020 145.2	45 06.0	1.020 145.0	45 35.2	1.020 144.9	7
8	41 58.4	1.021 144.8	42 27.6	1.021 144.6	42 56.8	1.021 144.5	43 26.0	1.021 144.3	43 55.2	1.021 144.1	44 24.4	1.021 144.0	44 53.5	1.021 143.8	45 22.6	1.021 143.6	8
9	41 45.8	1.022 143.6	42 15.0	1.022 143.4	42 44.1	1.022 143.3	43 13.3	1.022 143.1	43 42.4	1.022 142.9	44 11.5	1.022 142.8	44 40.6	1.022 142.6	45 09.7	1.022 142.4	9
30	41 32.9	1.022 142.4	42 02.0	1.022 142.2	42 31.1	1.022 142.1	43 00.2	1.022 141.9	43 29.3	1.022 141.7	43 58.3	1.022 141.6	44 27.4	1.022 141.4	44 56.4	1.022 141.2	30
1	41 19.6	1.023 141.2	41 48.6	1.023 141.0	41 77.7	1.023 140.9	42 46.7	1.023 140.7	43 15.8	1.023 140.5	43 44.8	1.023 140.4	44 13.8	1.023 140.2	44 42.8	1.023 140.0	1
2	41 05.9	1.023 140.0	41 35.0	1.023 139.9	41 04.0	1.023 139.7	42 33.0	1.023 139.5	43 01.9	1.023 139.3	43 30.9	1.023 139.2	43 59.8	1.023 139.0	44 28.8	1.023 138.8	2
3	40 51.9	1.024 138.9	41 20.9	1.024 138.7	41 49.9	1.024 138.5	42 18.8	1.024 138.3	42 47.8	1.024 138.2	43 16.7	1.024 138.0	43 45.6	1.024 137.8	44 14.4	1.024 137.6	3
4	40 37.6	1.024 137.7	41 06.6	1.024 137.5	41 35.5	1.024 137.3	42 04.4	1.024 137.2	42 33.3	1.024 137.0	43 02.1	1.024 136.8	43 31.0	1.024 136.6	43 59.8	1.024 136.4	4
35	40 23.0	1.025 136.5	40 51.9	1.025 136.4	41 20.8	1.025 136.2	41 49.6	1.025 136.0	42 18.4	1.025 135.8	42 47.2	1.025 135.6	43 16.0	1.025 135.4	43 44.8	1.025 135.2	35
6	40 08.1	1.026 135.4	40 36.9	1.026 135.2	41 05.7	1.026 135.0	41 34.5	1.026 134.8	42 03.3	1.026 134.6	42 32.0	1.026 134.4	43 00.8	1.026 134.3	43 29.8	1.026 134.1	6
7	39 52.8	1.026 134.2	40 21.6	1.026 134.1	40 50.4	1.026 133.9	41 19.1	1.026 133.7	41 47.8	1.026 133.5	42 16.5	1.026 133.3	42 45.2	1.026 133.1	43 13.9	1.026 132.9	7
8	39 37.3	1.026 133.1	40 06.0	1.026 132.9	40 34.7	1.026 132.7	41 03.4	1.026 132.5	41 32.1	1.026 132.3	42 00.7	1.026 132.1	42 29.4	1.026 131.9	42 58.0	1.026 131.7	8
9	39 21.4	1.027 132.0	39 50.1	1.027 131.8	40 18.8	1.027 131.6	40 47.4	1.027 131.4	41 16.0	1.027 131.2	41 44.6	1.027 131.0	42 13.2	1.027 130.8	42 41.8	1.027 130.6	9
40	39 05.3	1.027 130.8	39 33.9	1.027 130.6	40 02.5	1.027 130.5	40 31.1	1.027 130.3	40 59.7	1.027 130.1	41 28.3	1.027 129.8	41 56.8	1.027 129.6	42 25.3	1.027 129.4	40
1	38 48.9	1.028 129.7	39 17.5	1.028 129.5	39 46.0	1.028 129.3	40 14.6	1.028 129.1	40 43.1	1.028 128.9	41 11.6	1.028 128.7	41 40.1	1.028 128.5	42 08.6	1.028 128.3	1
2	38 32.2	1.028 128.6	39 00.7	1.028 128.4	39 29.3	1.028 128.2	39 57.8	1.028 128.0	40 26.3	1.028 127.8	40 54.7	1.028 127.6	41 23.2	1.028 127.4	41 51.6	1.028 127.2	2
3	38 15.3	1.029 127.5	38 43.8	1.029 127.3	39 12.3	1.029 127.1	39 40.7	1.029 126.9	40 09.3	1.029 126.7	40 37.6	1.029 126.5	41 05.9	1.029 126.3	41 34.3	1.029 126.0	3
4	37 58.1	1.029 126.4	38 26.5	1.029 126.2	38 55.0	1.029 126.0	39 23.4	1.029 125.8	39 51.8	1.029 125.6	40 20.1	1.029 125.4	40 48.5	1.029 125.2	41 16.8	1.029 124.9	4
45	37 40.7	1.030 125.3	38 09.1	1.030 125.1	38 37.5	1.030 124.9	39 05.8	1.030 124.7	39 34.2	1.030 124.5	40 02.5	1.030 124.3	40 30.8				

Main table with columns for H.A., Alt., Az., and declination values for various latitude ranges from 91 to 180.

Lat. 69°

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00'			28° 30'			29° 00'			30° 00'			32° 00'			34° 00'			34° 30'			35° 30'			H.A.
	Alt.	Ad At.	Az.																						
00	49 00.0	1.00	180.0	49 30.0	1.00	180.0	50 00.0	1.00	180.0	51 00.0	1.00	180.0	53 00.0	1.00	180.0	55 00.0	1.00	180.0	55 30.0	1.00	180.0	56 30.0	1.00	180.0	00
1	48 59.7	1.01	178.7	49 29.7	1.01	178.7	49 59.7	1.01	178.7	50 59.7	1.01	178.7	52 59.7	1.01	178.7	54 59.7	1.01	178.7	55 29.7	1.01	178.7	56 29.7	1.01	178.7	1
2	48 59.0	1.02	177.3	49 29.0	1.02	177.3	49 59.0	1.02	177.3	50 59.0	1.02	177.3	52 59.0	1.02	177.3	54 59.0	1.02	177.3	55 29.0	1.02	177.3	56 29.0	1.02	177.3	2
3	48 57.7	1.03	176.0	49 27.7	1.03	176.0	49 57.7	1.03	176.0	50 57.7	1.03	176.0	52 57.7	1.03	176.0	54 57.7	1.03	176.0	55 27.7	1.03	176.0	56 27.7	1.03	176.0	3
4	48 56.0	1.04	174.6	49 25.9	1.04	174.6	49 55.9	1.04	174.6	50 55.9	1.04	174.6	52 55.9	1.04	174.6	54 55.7	1.04	174.2	55 25.6	1.04	174.2	56 25.6	1.04	174.2	4
05	48 53.7	1.05	173.3	49 23.7	1.05	173.2	49 53.6	1.05	173.2	50 53.6	1.05	173.2	52 53.4	1.05	172.8	54 53.2	1.05	172.7	55 23.2	1.05	172.7	56 23.1	1.05	172.6	05
6	48 50.9	1.06	171.9	49 20.9	1.06	171.9	49 50.8	1.06	171.8	50 50.7	1.06	171.8	52 50.5	1.06	171.6	54 50.3	1.06	171.3	55 20.2	1.06	171.3	56 20.1	1.06	171.2	6
7	48 47.7	1.06	170.6	49 17.6	1.06	170.5	49 47.5	1.06	170.5	50 47.4	1.06	170.4	52 47.1	1.07	170.2	54 46.8	1.07	169.9	55 16.7	1.07	169.8	56 16.5	1.07	169.7	7
8	48 43.9	1.07	169.3	49 13.8	1.07	169.2	49 43.7	1.07	169.1	50 43.6	1.07	169.0	52 43.2	1.07	168.8	54 42.7	1.08	168.5	55 12.6	1.08	168.4	56 12.4	1.08	168.2	8
9	48 39.7	1.08	167.9	49 09.5	1.08	167.9	49 39.4	1.08	167.8	50 39.2	1.08	167.7	52 38.7	1.08	167.4	54 38.2	1.08	167.1	55 08.0	1.09	167.0	56 07.7	1.09	166.8	9
10	48 34.9	1.09	166.6	49 04.8	1.09	166.5	49 34.6	1.09	166.5	50 34.4	1.09	166.3	52 33.8	1.09	166.0	54 33.1	1.09	165.6	55 02.9	1.09	165.5	56 02.6	1.09	165.3	10
1	48 29.7	1.09	165.3	48 59.5	1.09	165.2	49 29.4	1.09	165.1	50 29.0	1.09	164.9	52 28.3	1.09	164.6	54 27.5	1.09	164.2	55 57.3	1.09	164.1	56 56.9	1.09	163.9	1
2	48 24.0	1.09	163.9	48 53.8	1.09	163.8	49 23.6	1.09	163.8	50 23.2	1.09	163.6	52 22.3	1.09	163.2	54 21.4	1.09	162.8	55 51.1	1.09	162.7	56 50.6	1.09	162.5	2
3	48 17.8	1.09	162.6	48 47.6	1.09	162.5	49 17.4	1.09	162.4	50 16.9	1.09	162.3	52 15.9	1.09	161.8	54 14.8	1.09	161.4	55 44.5	1.09	161.3	56 43.9	1.09	161.0	3
4	48 11.1	1.09	161.3	48 40.9	1.09	161.2	49 10.6	1.09	161.1	50 10.1	1.09	160.9	52 08.9	1.09	160.5	54 07.7	1.09	160.0	55 37.3	1.09	159.9	56 36.6	1.09	159.6	4
15	48 04.0	1.09	160.0	48 33.7	1.09	159.9	49 03.4	1.09	159.8	50 02.8	1.09	159.6	52 01.5	1.09	159.1	54 00.1	1.09	158.6	55 29.7	1.09	158.5	56 28.9	1.09	158.2	15
6	47 56.4	1.09	158.7	48 26.1	1.09	158.6	48 55.8	1.09	158.5	49 55.1	1.09	158.2	51 53.6	1.09	157.7	54 52.0	1.09	157.2	55 21.5	1.09	157.1	56 20.7	1.09	156.8	6
7	47 48.4	1.09	157.4	48 18.0	1.09	157.3	48 47.7	1.09	157.2	49 46.9	1.09	156.9	51 45.2	1.09	156.4	54 43.4	1.09	155.8	55 12.9	1.09	155.7	56 11.9	1.09	155.4	7
8	47 39.9	1.09	156.1	48 09.5	1.09	156.0	48 39.1	1.09	155.9	49 38.2	1.09	155.6	51 36.4	1.09	155.0	54 34.4	1.09	154.4	55 04.8	1.09	154.3	56 02.7	1.09	154.0	8
9	47 31.0	1.09	154.8	48 00.5	1.09	154.7	48 30.1	1.09	154.6	49 29.1	1.09	154.3	51 27.1	1.09	153.7	54 24.9	1.09	153.1	55 53.3	1.09	152.9	56 51.3	1.09	152.6	9
20	47 21.6	1.08	153.5	47 51.1	1.08	153.4	48 20.6	1.08	153.3	49 19.6	1.08	153.0	51 17.3	1.08	152.4	54 14.9	1.08	151.7	55 44.2	1.08	151.5	56 42.9	1.08	151.2	20
1	47 11.8	1.08	152.2	47 41.3	1.08	152.1	48 10.7	1.08	152.0	49 09.6	1.08	151.7	51 07.1	1.08	151.0	54 03.5	1.08	150.4	55 33.8	1.08	150.2	56 32.3	1.08	149.8	1
2	47 01.6	1.08	151.0	47 31.0	1.08	150.8	48 00.4	1.08	150.7	49 00.1	1.08	150.4	50 56.5	1.08	149.7	54 53.6	1.08	149.0	55 22.9	1.08	148.8	56 21.3	1.08	148.4	2
3	46 51.0	1.08	149.7	47 20.3	1.08	149.6	47 49.7	1.08	149.4	48 48.3	1.08	149.1	50 45.5	1.08	148.4	54 42.3	1.08	147.7	55 11.5	1.08	147.5	56 09.8	1.08	147.1	3
4	46 39.9	1.08	148.4	47 09.2	1.08	148.3	47 38.5	1.08	148.1	48 37.1	1.08	147.8	50 34.0	1.08	147.1	54 30.6	1.08	146.4	55 59.8	1.08	146.2	56 57.5	1.08	145.7	4
25	46 28.4	1.08	147.2	46 57.7	1.08	147.0	47 27.0	1.08	146.9	48 25.4	1.08	146.5	50 22.1	1.08	145.8	54 18.5	1.08	145.0	55 47.6	1.08	144.8	56 45.3	1.08	144.4	25
6	46 16.6	1.08	145.9	46 45.8	1.08	145.8	47 15.0	1.08	145.6	48 13.3	1.08	145.3	50 09.8	1.08	144.5	54 06.0	1.08	143.7	55 35.0	1.08	143.5	56 32.9	1.08	143.1	6
7	46 04.4	1.08	144.7	46 33.5	1.08	144.5	47 02.7	1.08	144.4	48 00.9	1.08	144.0	49 57.1	1.08	143.2	54 53.1	1.08	142.4	55 22.0	1.08	142.2	56 19.8	1.08	141.8	7
8	45 51.8	1.07	143.5	46 20.9	1.07	143.3	46 49.9	1.07	143.1	47 48.1	1.07	142.8	49 44.1	1.07	142.0	54 39.8	1.07	141.1	55 08.6	1.07	140.9	56 05.3	1.07	140.5	8
9	45 38.8	1.07	142.2	46 07.8	1.07	142.1	46 36.9	1.07	141.9	47 34.9	1.07	141.5	49 30.7	1.07	140.7	54 26.1	1.07	139.9	55 54.9	1.07	139.6	56 52.4	1.07	139.2	9
30	45 25.4	1.07	141.0	45 54.4	1.07	140.8	46 23.4	1.07	140.7	47 21.3	1.07	140.3	49 16.9	1.07	139.5	54 12.1	1.07	138.6	55 40.8	1.07	138.4	56 38.2	1.07	137.9	30
1	45 11.7	1.07	139.8	45 40.7	1.07	139.6	46 09.6	1.07	139.4	47 07.4	1.07	139.0	49 02.7	1.07	138.2	54 57.7	1.07	137.3	55 26.3	1.07	137.1	56 23.6	1.07	136.6	1
2	44 57.7	1.07	138.6	45 26.6	1.07	138.4	45 55.4	1.07	138.2	46 53.1	1.07	137.8	48 48.2	1.07	137.0	54 42.9	1.07	136.1	55 11.5	1.07	135.8	56 08.6	1.07	135.3	2
3	44 43.3	1.07	137.4	45 12.1	1.07	137.2	45 40.9	1.07	137.0	46 38.5	1.07	136.6	48 33.4	1.07	135.7	54 27.8	1.07	134.8	55 50.4	1.07	134.6	56 51.3	1.07	134.1	3
4	44 28.6	1.07	136.2	44 57.4	1.07	136.0	45 26.1	1.07	135.8	46 23.6	1.07	135.4	48 18.2	1.07	134.5	54 12.4	1.07	133.6	55 40.9	1.07	133.3	56 37.7	1.07	132.8	4
35	44 13.5	1.07	135.0	44 42.3	1.07	134.8	45 11.0	1.07	134.6	46 08.3	1.07	134.2	48 02.7	1.07	133.3	54 56.7	1.07	132.4	55 25.1	1.07	132.1	56 21.9	1.07	131.6	35
6	43 58.2	1.07	133.9	44 26.9	1.07	133.6	44 55.5	1.07	133.4	45 52.8	1.07	133.0	47 46.9	1.07	132.1	54 40.6	1.07	131.1	55 09.0	1.07	130.9	56 05.6	1.07	130.4	6
7	43 42.5	1.07	132.7	44 11.1	1.07	132.5	44 39.8	1.07	132.3	45 36.9	1.07	131.8	47 30.8	1.07	130.9	54 24.3	1.07	129.9	55 52.6	1.07	129.7	56 49.0	1.07	129.2	7
8	43 26.6	1.07	131.5	43 55.2	1.07	131.3	44 23.7	1.07	131.1	45 20.7	1.07	130.7	47 14.4	1.07	129.7	54 07.7	1.07	128.7	55 35.9	1.07	128.5	56 32.2	1.07	127.9	8
9	43 10.3	1.07	130.4	43 38.9	1.07	130.2	44 07.3	1.07	129.9	45 04.3	1.07	129.5	46 57.8	1.07	128.6	54 50.8	1.07	127.6	55 18.9	1.07	127.3	56 15.1	1.07	126.7	9
40	42 53.8	1.07	129.2	43 22.3	1.07	129.0	43 50.7	1.07	128.8	44 47.5	1.07	128.3	46 40.8	1.07	127.4	54 33.6	1.								

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 91 to 180.

Lat. 69°

H.A.	36° 00'		37° 00'		38° 30'		40° 00'		42° 00'		42° 30'		43° 00'		45° 00'		H.A.					
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.						
00	57 00.0	1.000	180.0	58 00.0	1.000	180.0	59 30.0	1.000	180.0	61 00.0	1.000	180.0	63 00.0	1.001	180.0	64 00.0	1.001	180.0	66 00.0	1.001	180.0	00
1	56 59.7	1.001	178.5	57 59.7	1.001	178.5	59 29.7	1.001	178.5	60 59.7	1.001	178.4	62 59.7	1.002	178.4	63 29.7	1.002	178.3	65 59.7	1.002	178.3	1
2	56 58.9	1.002	177.0	57 58.9	1.002	177.0	59 28.8	1.002	176.9	60 58.8	1.002	176.8	62 58.8	1.003	176.7	63 28.8	1.003	176.7	65 58.7	1.003	176.6	2
3	56 57.5	1.003	175.5	57 57.5	1.003	175.5	59 27.4	1.003	175.4	60 57.3	1.003	175.3	62 57.2	1.004	175.1	63 27.2	1.004	175.0	65 57.1	1.004	174.8	3
4	56 55.5	1.004	174.1	57 55.5	1.004	174.0	59 25.4	1.004	173.8	60 55.3	1.004	173.7	62 55.1	1.005	173.5	63 25.0	1.005	173.4	65 54.8	1.005	173.1	4
5	56 53.0	1.005	172.6	57 52.9	1.005	172.5	59 22.8	1.005	172.3	60 52.6	1.005	172.1	62 52.3	1.006	171.8	63 22.3	1.006	171.7	65 51.9	1.006	171.3	05
6	56 50.0	1.006	171.1	57 49.9	1.006	171.0	59 19.4	1.006	170.8	60 49.4	1.006	170.5	62 49.0	1.007	170.2	63 18.9	1.007	170.1	65 48.3	1.007	169.6	6
7	56 46.4	1.007	169.6	57 46.2	1.007	169.5	59 15.9	1.007	169.2	60 45.5	1.007	168.9	62 45.0	1.008	168.6	63 14.9	1.008	168.5	65 44.1	1.008	167.9	7
8	56 42.3	1.008	168.2	57 42.0	1.008	168.0	59 11.6	1.008	167.7	60 41.1	1.008	167.4	62 40.5	1.009	167.0	63 10.3	1.009	166.9	65 39.3	1.009	166.2	8
9	56 37.6	1.009	166.7	57 37.3	1.009	166.5	59 06.7	1.009	166.2	60 36.2	1.009	165.9	62 35.3	1.010	165.4	63 05.1	1.010	165.2	65 33.9	1.010	164.5	9
10	56 32.4	1.010	165.2	57 32.0	1.010	165.0	59 01.3	1.010	164.7	60 30.7	1.010	164.3	62 29.6	1.011	163.8	62 59.4	1.011	163.6	65 27.8	1.011	162.8	10
1	56 26.6	1.011	163.8	57 26.2	1.011	163.6	58 55.4	1.011	163.2	60 24.6	1.011	162.8	62 23.3	1.012	162.2	62 53.0	1.012	162.0	65 21.1	1.012	161.1	1
2	56 20.4	1.012	162.3	57 19.8	1.012	162.1	58 48.9	1.012	161.7	60 17.9	1.012	161.2	62 16.5	1.013	160.6	62 46.1	1.013	160.4	65 13.9	1.013	159.5	2
3	56 13.6	1.013	160.9	57 12.9	1.013	160.6	58 41.9	1.013	160.2	60 10.7	1.013	159.7	62 09.1	1.014	159.0	62 38.6	1.014	158.8	65 06.1	1.014	157.8	3
4	56 06.3	1.014	159.5	57 05.5	1.014	159.2	58 34.3	1.014	158.7	60 03.0	1.014	158.2	62 01.1	1.015	157.5	62 30.6	1.015	157.3	65 00.0	1.015	156.2	4
15	55 58.5	1.015	158.0	56 57.6	1.015	157.7	58 26.3	1.015	157.2	59 54.8	1.015	156.7	61 52.6	1.016	156.0	62 22.0	1.016	155.7	64 51.4	1.016	155.5	15
6	55 50.2	1.016	156.6	56 49.2	1.016	156.3	58 17.7	1.016	155.8	59 46.0	1.016	155.2	61 43.5	1.017	154.4	62 12.9	1.017	154.2	64 39.2	1.017	152.9	6
7	55 41.4	1.017	155.2	56 40.3	1.017	154.9	58 08.6	1.017	154.3	59 36.8	1.017	153.7	61 34.0	1.018	152.8	62 03.2	1.018	152.6	64 29.1	1.018	151.3	7
8	55 32.2	1.018	153.8	56 31.0	1.018	153.4	57 59.1	1.018	152.9	59 27.0	1.018	152.2	61 23.9	1.019	151.3	61 53.1	1.019	151.1	64 18.5	1.019	149.7	8
9	55 22.4	1.019	152.4	56 21.1	1.019	152.0	57 49.0	1.019	151.4	59 16.7	1.019	150.8	61 13.4	1.020	149.8	61 42.4	1.020	149.6	64 07.4	1.020	148.2	9
20	55 12.2	1.020	151.0	56 10.8	1.020	150.6	57 38.5	1.020	150.0	59 06.0	1.020	149.3	61 02.3	1.021	148.3	61 31.3	1.021	148.1	63 55.8	1.021	146.6	20
1	55 01.6	1.021	149.6	56 00.0	1.021	149.2	57 27.5	1.021	148.6	58 54.8	1.021	147.9	60 50.8	1.022	146.9	61 19.7	1.022	146.6	63 48.6	1.022	145.1	1
2	54 50.5	1.022	148.2	55 48.8	1.022	147.8	57 16.1	1.022	147.2	58 43.1	1.022	146.4	60 38.8	1.023	145.4	61 07.6	1.023	145.1	63 31.2	1.023	143.6	2
3	54 38.9	1.023	146.9	55 37.1	1.023	146.5	57 04.2	1.023	145.8	58 31.0	1.023	144.9	60 26.4	1.024	143.9	60 55.1	1.024	143.7	63 12.8	1.024	142.0	3
4	54 27.0	1.024	145.5	55 25.0	1.024	145.1	56 51.9	1.024	144.4	58 18.5	1.024	143.6	60 13.5	1.025	142.5	60 42.2	1.025	142.2	63 04.8	1.025	140.6	4
25	54 14.6	1.025	144.2	55 12.5	1.025	143.7	56 39.2	1.025	143.0	58 05.5	1.025	142.2	60 00.0	1.026	141.1	60 28.8	1.026	140.8	62 50.9	1.026	139.1	25
6	54 01.8	1.026	142.9	54 59.6	1.026	142.4	56 26.0	1.026	141.6	57 52.2	1.026	140.8	59 46.5	1.027	139.7	60 15.0	1.027	139.4	62 36.6	1.027	137.6	6
7	53 48.6	1.027	141.5	54 46.3	1.027	141.1	56 12.5	1.027	140.3	57 38.4	1.027	139.5	59 32.4	1.028	138.3	60 00.8	1.028	138.0	62 21.9	1.028	135.6	7
8	53 35.1	1.028	140.2	54 32.6	1.028	139.7	55 58.5	1.028	138.9	57 24.2	1.028	138.1	59 17.9	1.029	136.9	59 46.2	1.029	136.6	62 06.9	1.029	133.8	8
9	53 21.1	1.029	138.9	54 18.5	1.029	138.4	55 44.2	1.029	137.6	57 09.7	1.029	136.8	59 03.0	1.030	135.5	59 31.2	1.030	135.2	61 51.4	1.030	133.4	9
30	53 06.8	1.030	137.6	54 04.0	1.030	137.1	55 29.6	1.030	136.3	56 54.8	1.030	135.4	58 47.8	1.031	134.2	59 15.2	1.031	133.8	61 35.6	1.031	132.0	30
1	52 52.2	1.031	136.3	53 49.2	1.031	135.8	55 15.4	1.031	135.0	56 39.5	1.031	134.1	58 32.2	1.032	132.8	59 00.2	1.032	132.5	61 19.5	1.032	130.6	1
2	52 37.1	1.032	135.1	53 34.1	1.032	134.6	54 59.2	1.032	133.7	56 23.9	1.032	132.8	58 16.2	1.033	131.5	58 44.2	1.033	131.2	61 03.0	1.033	129.3	2
3	52 21.8	1.033	133.8	53 18.6	1.033	133.3	54 43.5	1.033	132.4	56 08.0	1.033	131.5	58 00.0	1.034	129.9	58 27.8	1.034	129.5	60 46.2	1.034	127.9	3
4	52 06.1	1.034	132.6	53 02.8	1.034	132.0	54 27.4	1.034	131.2	55 51.7	1.034	130.2	57 43.4	1.035	128.9	58 11.2	1.035	128.2	60 29.1	1.035	126.6	4
35	51 50.1	1.035	131.3	52 46.6	1.035	130.8	54 11.1	1.035	129.9	55 35.1	1.035	129.0	57 26.5	1.036	127.6	57 54.2	1.036	127.3	60 11.7	1.036	125.3	35
6	51 33.8	1.036	130.0	52 30.2	1.036	129.5	53 54.4	1.036	128.7	55 18.3	1.036	127.7	57 09.3	1.037	126.4	57 36.9	1.037	126.0	59 54.0	1.037	123.0	6
7	51 17.2	1.037	128.8	52 13.5	1.037	128.3	53 37.5	1.037	127.4	55 01.1	1.037	126.5	56 51.9	1.038	125.1	57 19.4	1.038	124.7	59 36.0	1.038	121.8	7
8	51 00.3	1.038	127.7	51 56.5	1.038	127.1	53 20.3	1.038	126.2	54 43.7	1.038	125.2	56 34.1	1.039	123.9	57 01.6	1.039	123.5	59 17.8	1.039	119.5	8
9	50 43.2	1.039	126.5	51 39.2	1.039	125.9	53 02.8	1.039	125.0	54 26.0	1.039	124.0	56 16.2	1.040	122.6	56 43.5	1.040	122.3	58 59.4	1.040	117.3	9
40	50 25.8	1.040	125.3	51 21.6	1.040	124.7	52 45.1	1.040	123.8	54 08.1	1.040	122.8	55 57.9	1.041	121.4	56 25.2	1.041	121.0	58 40.7	1.041	115.0	40
1	50 08.1	1.041	124.1	51 03.8	1.041	123.5	52 27.1	1.041	122.6	53 49.9	1.041	121.6	55 39.5	1.042	120.2	56 06.7	1.042	119.8	58 21.8	1.042	112.7	1
2	49 50.2	1.042	122.9	50 45.8	1.042	122.3	52 08.8	1.042	121.4	53 31.4	1.042	120.4	55 20.8	1.043	118.9	55 47.9	1.043	118.6	58 02.7	1.043	110.6	2
3	49 32.0	1.043	121.8	50 27.5	1.043	121.2	51 50.4	1.043	120.2	53 12.8	1.043	119.3	55 01.9	1.044	117.5	55 25.0	1.044	117.1	57 43.3	1.044	103.4	3
4	49 13.6	1.044	120.6	50 09.0	1.044	120.0	51 31.7	1.044	119.0	52 53.9	1.044	118.1	54 42.7	1.045	116.7	55 09.8	1.045	116.3	57 23.8	1.		

Main table with columns for H.A., Alt., Az., and declination values for various latitudes from 91 to 180.

Lat. 69°

Lat. 69°

H.A.	46° 00'		47° 00'		48° 30'		49° 30'		50° 30'		51° 30'		52° 30'		54° 00'		H.A.
	Alt.	Az.															
00	67 00.0	1.001 180.0	68 00.0	1.001 180.0	69 30.0	1.001 180.0	70 30.0	1.001 180.0	71 30.0	1.001 180.0	72 30.0	1.001 180.0	73 30.0	1.001 180.0	75 00.0	1.001 180.0	00
1	66 59.7	1.002 178.2	67 59.7	1.002 178.2	69 29.6	1.002 178.1	70 29.6	1.002 178.1	71 29.6	1.002 178.0	72 29.6	1.002 177.9	73 29.6	1.002 177.9	74 59.6	1.002 177.7	1
2	66 58.7	1.003 176.4	67 58.6	1.003 176.4	69 28.6	1.003 176.2	70 28.5	1.003 176.1	71 28.5	1.003 176.0	72 28.4	1.003 175.9	73 28.4	1.003 175.7	74 58.3	1.004 175.5	2
3	66 57.0	1.004 174.7	67 56.9	1.004 174.5	69 26.8	1.004 174.3	70 26.7	1.004 174.2	71 26.5	1.004 174.0	72 26.5	1.005 173.8	73 26.4	1.005 173.6	74 56.2	1.005 173.6	3
4	66 54.7	1.005 172.9	67 54.5	1.005 172.7	69 24.3	1.005 172.4	70 24.2	1.005 172.2	71 24.0	1.005 172.0	72 23.8	1.005 171.7	73 23.6	1.005 171.5	74 53.2	1.005 171.0	4
05	66 51.7	1.006 171.1	67 51.5	1.006 170.9	69 21.2	1.006 170.6	70 20.9	1.007 170.3	71 20.6	1.007 170.0	72 20.3	09 07 169.7	73 20.0	09 07 169.3	74 49.4	09 08 168.7	05
6	66 48.0	09 07 169.4	67 47.8	09 07 169.1	69 17.3	09 08 168.7	70 16.9	09 08 168.4	71 16.6	09 08 168.0	72 16.1	09 08 167.7	73 15.6	09 08 167.2	74 44.8	09 08 166.5	6
7	66 43.8	09 08 167.6	67 43.4	09 08 167.3	69 12.7	09 09 166.8	70 12.3	09 09 166.5	71 11.7	09 09 166.1	72 11.2	09 09 165.8	73 10.5	09 10 165.1	74 39.4	09 10 164.3	7
8	66 38.3	09 09 165.9	67 38.3	09 09 165.6	69 07.5	09 10 165.0	70 06.9	09 10 164.6	71 06.2	09 10 164.1	72 05.5	09 11 163.6	73 04.6	09 11 163.1	74 33.2	09 12 162.1	8
9	66 33.3	09 10 164.2	67 32.7	09 11 163.8	69 01.6	09 11 163.2	70 00.8	09 11 162.7	71 00.0	09 12 162.0	72 00.0	09 12 161.6	73 00.0	09 12 161.0	74 26.2	09 13 160.0	9
10	66 27.1	09 11 162.4	67 26.3	09 12 162.0	68 55.1	09 12 161.3	69 54.1	09 12 160.8	70 53.1	09 13 160.3	71 51.9	09 13 159.7	72 50.6	09 13 159.0	74 18.4	09 14 157.8	10
1	66 20.3	09 12 160.7	67 19.4	09 13 160.3	68 47.9	09 13 159.5	69 46.7	09 13 159.0	70 45.5	09 14 158.4	71 44.1	09 14 157.7	72 42.6	09 15 157.0	74 10.0	09 15 155.7	1
2	66 12.9	09 13 159.0	67 11.8	09 14 158.5	68 40.0	09 14 157.7	69 38.7	09 14 157.2	70 37.2	09 15 156.5	71 35.6	09 15 155.8	72 33.8	09 16 155.0	74 00.8	09 16 153.7	2
3	66 04.9	09 14 157.3	67 03.7	09 15 156.8	68 31.6	09 15 156.0	69 30.0	09 15 155.3	70 28.4	09 16 154.7	71 26.5	09 16 153.9	72 24.4	09 17 153.1	73 50.9	09 18 151.6	3
4	65 56.3	09 15 155.7	66 54.9	09 16 155.1	68 22.5	09 16 154.2	69 20.8	09 17 153.5	70 18.8	09 17 152.8	71 16.7	09 17 152.0	72 14.4	09 18 151.1	73 40.3	09 19 149.6	4
15	65 47.2	09 16 154.0	66 45.6	09 17 153.4	68 12.9	09 17 152.5	69 10.9	09 17 151.8	70 08.7	09 18 151.0	71 06.3	09 18 150.2	72 03.7	09 19 149.2	73 29.1	09 20 147.6	15
6	65 37.5	09 17 152.4	66 35.7	09 17 151.8	68 02.7	09 18 150.8	69 00.4	09 18 150.0	69 58.0	09 19 149.2	70 55.3	09 19 148.3	71 52.4	09 20 147.4	73 17.3	09 21 145.7	6
7	65 27.2	09 18 150.7	66 25.2	09 18 150.1	67 51.9	09 19 149.1	68 49.4	09 19 148.3	69 46.7	09 20 147.4	70 43.7	09 20 146.5	71 40.5	09 21 145.5	73 04.9	09 22 143.8	7
8	65 16.5	09 19 149.1	66 14.2	09 19 148.5	67 40.6	09 20 147.4	68 37.8	09 20 146.6	69 34.9	09 21 145.7	70 31.6	09 21 144.8	71 28.0	09 22 143.7	72 51.9	09 23 141.9	8
9	65 05.2	09 20 147.5	66 02.7	09 20 146.8	67 28.7	09 21 145.7	68 25.7	09 21 144.9	69 22.5	09 22 144.0	70 18.9	09 22 143.0	71 15.0	09 23 141.9	72 38.4	09 23 140.1	9
20	64 53.4	09 20 146.0	65 50.7	09 21 145.2	67 16.3	09 21 144.1	68 13.1	09 22 143.2	69 09.6	09 22 142.3	70 05.7	09 23 141.3	71 01.5	09 23 140.2	72 24.4	09 24 138.3	20
1	64 41.1	09 21 144.4	65 38.2	09 22 143.7	67 03.5	09 22 142.5	68 00.0	09 23 141.6	68 56.2	09 23 140.6	69 52.1	09 24 139.6	70 47.5	09 24 138.5	72 09.8	09 25 136.6	1
2	64 28.3	09 22 142.9	65 25.2	09 22 142.1	66 50.1	09 23 140.9	67 46.4	09 23 140.0	68 42.3	09 24 139.0	69 37.9	09 24 137.9	70 33.0	09 25 136.8	71 54.8	09 26 134.8	2
3	64 15.1	09 23 141.3	65 11.8	09 23 140.6	66 36.4	09 24 139.3	67 32.3	09 24 138.4	68 28.0	09 25 137.4	69 23.2	09 25 136.3	70 18.1	09 26 135.1	71 39.3	09 26 133.1	3
4	64 01.4	09 24 139.8	64 57.9	09 24 139.0	66 22.1	09 24 137.8	67 17.8	09 25 136.8	68 13.2	09 25 135.8	69 08.2	09 26 134.7	70 02.7	09 26 133.5	71 23.4	09 27 131.5	4
25	63 47.4	09 24 138.3	64 43.6	09 25 137.5	66 07.4	09 25 136.2	67 02.9	09 26 135.2	67 58.7	09 26 134.2	68 52.7	09 26 133.1	69 46.9	09 27 131.9	71 07.1	09 28 129.9	25
6	63 32.9	09 25 136.9	64 28.9	09 25 136.1	65 52.4	09 26 134.7	66 47.6	09 26 133.7	67 42.4	09 27 132.7	68 36.8	09 27 131.6	69 30.7	09 28 130.3	70 50.4	09 28 128.3	6
7	63 18.0	09 26 135.4	64 13.8	09 26 134.6	65 36.9	09 26 133.2	66 31.8	09 27 132.2	67 26.4	09 27 131.2	68 20.5	09 28 129.8	69 14.1	09 28 128.8	70 33.4	09 29 126.7	7
8	63 02.7	09 26 134.0	64 03.3	09 26 133.1	65 21.0	09 27 131.8	66 15.7	09 27 130.8	67 10.0	09 28 129.7	68 03.9	09 28 128.5	68 97.2	09 29 127.3	70 16.0	09 30 125.2	8
9	62 47.1	09 27 132.6	63 42.4	09 27 131.7	65 04.8	09 28 130.3	65 59.3	09 28 129.3	66 53.3	09 28 128.2	67 46.9	09 29 127.1	68 39.9	09 29 125.8	69 58.2	09 30 123.7	9
30	62 31.1	09 27 131.2	63 26.2	09 28 130.3	64 48.3	09 28 128.9	65 42.5	09 29 127.9	66 36.3	09 29 126.8	67 29.5	09 29 125.6	68 22.3	09 30 124.3	69 40.2	09 31 122.2	30
1	62 14.7	09 28 129.8	63 09.6	09 28 128.9	64 31.4	09 29 127.5	65 25.3	09 29 126.5	66 18.9	09 30 125.4	67 11.9	09 30 124.2	68 04.4	09 30 122.9	69 21.8	09 31 120.8	1
2	61 58.0	09 28 128.4	62 52.7	09 29 127.6	64 14.1	09 29 126.1	65 07.9	09 30 125.1	66 01.2	09 30 124.0	66 54.0	09 30 122.8	67 46.2	09 31 121.5	69 03.2	09 31 119.4	2
3	61 41.0	09 29 127.1	62 35.5	09 29 126.2	63 56.6	09 30 124.8	64 50.2	09 30 123.7	65 43.2	09 31 122.6	66 35.8	09 31 121.4	67 27.7	09 31 120.1	68 44.4	09 32 118.0	3
4	61 23.7	09 29 125.8	62 18.0	09 30 124.9	63 38.8	09 30 123.4	64 32.1	09 30 122.4	65 25.0	09 31 121.2	66 17.3	09 31 120.0	67 09.0	09 32 118.8	68 25.3	09 32 116.7	4
35	61 06.1	09 30 124.5	62 00.3	09 30 123.6	63 20.7	09 31 122.1	64 13.8	09 31 121.0	65 06.5	09 31 119.9	65 58.5	09 32 118.7	66 50.0	09 32 117.4	68 06.0	09 33 115.3	35
6	60 48.3	09 30 123.2	61 42.2	09 31 122.3	63 02.4	09 31 120.8	63 55.3	09 31 119.7	64 47.7	09 32 118.6	65 39.6	09 32 117.4	66 30.8	09 32 116.1	67 46.4	09 33 114.0	6
7	60 30.1	09 31 121.9	61 23.9	09 31 121.0	62 43.8	09 31 119.5	63 36.5	09 32 118.4	64 28.7	09 32 117.3	65 20.4	09 32 116.1	66 11.4	09 33 114.8	67 26.7	09 33 112.7	7
8	60 11.8	09 31 120.6	61 05.3	09 31 119.7	62 25.0	09 32 118.2	63 17.5	09 32 117.2	64 09.5	09 32 116.0	65 00.8	09 33 114.9	65 51.8	09 33 113.6	67 06.8	09 34 111.5	8
9	59 53.1	09 31 119.4	60 46.6	09 32 118.5	62 05.9	09 32 117.0	62 58.2	09 32 115.9	63 50.1	09 33 114.8	64 41.3	09 33 113.6	65 32.0	09 33 112.3	66 46.7	09 34 110.3	9
40	59 34.3	09 32 118.2	60 27.5	09 32 117.2	61 46.6	09 32 115.8	62 38.8	09 33 114.7	63 30.5	09 33 113.6	64 21.5	09 33 112.4	65 12.0	09 34 111.1	66 26.4	09 34 109.0	40
1	59 15.2	09 32 116.9	60 08.3	09 32 116.0	61 27.2	09 33 114.5	62 19.2	09 33 113.5	63 10.7	09 33 112.4	64 01.6	09 34 111.2	64 51.9	09 34 109.9	66 06.0	09 34 107.9	1
2	58 56.0	09 32 115.7	59 48.9	09 33 114.8	61 07.5	09 33 113.3	61 59.4	09 33 112.3	62 50.7	09 34 111.2	63 41.4	09 34 110.0	64 31.6	09 34 108.7	65 45.5	09 34 106.7	2
3	58 36.5	09 33 114.6	59 29.3	09 33 113.6	60 47.7	09 33 112.2	61 39.4	09 34 111.1	62 30.6	09 34 110.0	63 21.2	09 34 108.8	64 11.2	09 34 107.6	65 24.8	09 35 105.5	3
4	58 16.9	09 33 113.4	59 09.5	09 33 112.5	60 27.7	09 34 111.0	61 19.2	09 34 109.9	62 10.3	09 34 108.8	63 00.7	09 34 107.7	63 50.6	09 34 106.4	65 04.1	09 35 104.4	4
45	57 57.0	09 33 112.2	58 49.6	09 34 111.3	60 07.5	09 34 109.8	60 59.0	09 34 108.8	61 49.9	09 34 107.7	62 40.2	09 34 106.5	63				

Table with columns for H.A., Az., and values for various declinations (46° 00' to 54° 00'). Includes a 'Lat. 69°' label on the right side.

Lat. 60°

H.A.	54° 30'		55° 00'		56° 00'		56° 30'		57° 00'		57° 30'		59° 00'		59° 30'		H.A.		
	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.	Alt.	Ad At.			
00	75 30.0	1.001	180.0	76 00.0	1.001	180.0	77 00.0	1.001	180.0	77 30.0	1.001	180.0	78 00.0	1.001	180.0	80 00.0	1.001	180.0	00
1	75 29.6	1.002	177.7	75 59.6	1.002	177.6	76 59.5	1.002	177.5	77 29.5	1.002	177.4	77 59.5	1.002	177.4	79 59.4	1.003	177.0	01
2	75 28.3	1.004	175.4	75 58.2	1.004	175.3	76 58.1	1.004	175.0	77 28.1	1.004	174.9	77 58.0	1.004	174.8	79 58.0	1.005	174.1	02
3	75 26.1	1.005	173.1	75 56.0	1.005	172.9	76 55.8	1.005	172.6	77 25.7	1.005	172.4	77 55.6	1.005	172.2	79 55.5	09 08	171.1	03
4	75 23.1	1.006	170.8	75 52.9	09 07	170.6	76 52.6	09 07	170.1	77 22.4	09 07	169.9	77 52.2	09 07	169.6	79 51.2	09 08	168.2	04
05	75 19.2	09 08	168.5	75 49.0	09 08	168.2	76 48.4	09 08	167.7	77 18.1	09 09	167.4	77 47.8	09 09	167.0	79 46.3	09 10	165.4	05
6	75 14.5	09 09	166.2	75 44.1	09 09	165.9	76 43.4	09 10	165.3	77 13.0	09 10	164.9	77 42.5	09 10	164.5	79 40.3	09 12	162.5	06
7	75 09.6	09 11	164.0	75 38.5	09 11	163.6	76 37.5	09 11	162.9	77 06.9	09 12	162.4	77 36.3	09 12	162.0	79 35.4	09 13	159.7	07
8	75 02.6	09 12	161.8	75 32.0	09 12	161.4	76 30.7	09 13	160.5	77 00.0	09 13	160.0	77 29.2	09 13	159.5	79 28.4	09 14	157.0	08
9	74 55.5	09 13	159.6	75 24.8	09 13	159.1	76 23.2	09 14	158.2	76 52.3	09 14	157.7	77 21.3	09 15	157.1	79 16.6	09 15	154.3	09
10	74 47.6	09 14	157.4	75 16.7	09 15	156.9	76 14.8	09 15	155.9	76 43.7	09 16	155.3	77 12.5	09 16	154.7	79 06.8	09 18	151.7	10
1	74 39.0	09 16	155.3	75 07.9	09 16	154.8	76 05.6	09 17	153.6	76 34.3	09 17	153.0	77 02.9	09 17	152.4	79 00.8	09 19	149.2	11
2	74 29.6	09 17	153.2	74 58.4	09 17	152.6	75 55.7	09 18	151.4	76 24.2	09 18	150.8	76 52.6	09 18	150.1	79 00.8	09 20	146.7	12
3	74 19.6	09 18	151.1	74 48.1	09 18	150.5	75 45.0	09 19	149.3	76 13.3	09 19	148.6	76 41.5	09 20	147.8	79 00.5	09 20	144.3	13
4	74 08.8	09 19	149.1	74 37.2	09 19	148.5	75 33.7	09 20	147.1	76 01.8	09 20	146.4	76 29.7	09 21	145.7	79 00.5	09 21	142.0	14
15	73 57.4	09 20	147.1	74 25.7	09 20	146.4	75 21.7	09 21	145.1	75 49.6	09 21	144.3	76 17.2	09 22	143.5	79 06.2	09 22	139.7	15
6	73 45.4	09 21	145.1	74 13.4	09 21	144.4	75 09.1	09 22	143.0	75 36.7	09 22	142.2	76 04.1	09 23	141.4	79 06.2	09 23	137.5	16
7	73 32.8	09 22	143.2	74 00.7	09 22	142.5	74 55.9	09 23	141.0	75 23.2	09 23	140.2	75 50.4	09 24	139.4	79 06.2	09 24	133.6	17
8	73 19.7	09 23	141.3	73 47.3	09 23	140.6	74 42.1	09 24	139.1	75 09.2	09 24	138.3	75 36.2	09 25	137.4	79 05.8	09 25	133.3	18
9	73 06.0	09 24	139.4	73 33.4	09 24	138.7	74 27.7	09 25	137.2	74 54.6	09 25	136.3	75 21.3	09 26	135.5	79 05.9	09 27	131.3	19
20	72 51.7	09 25	137.6	73 18.9	09 26	136.9	74 12.8	09 26	135.3	74 39.5	09 26	134.5	75 06.0	09 27	133.6	79 05.5	09 28	129.4	20
1	72 37.0	09 26	135.8	73 04.0	09 26	135.1	73 57.5	09 26	133.5	74 24.0	09 27	132.7	75 00.2	09 27	131.7	79 05.2	09 28	127.5	21
2	72 21.8	09 28	134.1	72 48.6	09 28	133.4	73 41.7	09 28	131.7	74 07.9	09 28	130.9	74 33.9	09 28	129.9	79 05.7	09 28	125.0	22
3	72 06.1	09 29	132.4	72 32.7	09 29	131.7	73 25.4	09 28	130.0	73 51.4	09 28	129.1	74 17.2	09 28	128.2	79 05.7	09 29	122.2	23
4	71 50.0	09 28	130.8	72 16.5	09 28	130.0	73 08.7	09 28	128.3	73 34.6	09 29	127.4	74 00.1	09 29	126.5	79 05.7	09 29	122.5	24
25	71 33.5	09 28	129.1	71 59.8	09 28	128.3	72 51.7	09 29	126.7	73 17.3	09 29	125.8	73 42.7	09 30	124.8	79 07.8	09 30	123.9	25
6	71 16.7	09 29	127.5	71 42.7	09 29	126.7	72 34.3	09 30	125.1	72 59.7	09 30	124.2	73 24.9	09 30	123.2	79 07.8	09 31	122.2	26
7	70 59.4	09 29	126.0	71 25.3	09 30	125.2	72 16.5	09 30	123.5	72 41.7	09 30	122.6	73 06.9	09 31	121.7	79 07.8	09 31	117.4	27
8	70 41.9	09 30	124.4	71 07.6	09 30	123.6	71 58.4	09 31	122.0	72 23.5	09 31	121.1	72 48.3	09 31	120.1	79 07.8	09 31	115.9	28
9	70 24.0	09 30	122.9	70 49.5	09 31	122.2	71 40.0	09 31	120.5	72 04.9	09 31	119.6	72 29.5	09 32	118.6	79 05.9	09 32	117.7	29
30	70 05.8	09 31	121.5	70 31.2	09 31	120.7	71 21.3	09 32	119.0	71 46.1	09 32	118.1	72 10.5	09 32	117.2	79 05.7	09 32	116.2	30
1	69 47.3	09 31	120.0	70 12.6	09 31	119.2	71 02.4	09 32	117.6	71 27.0	09 32	116.7	71 51.3	09 32	115.7	79 05.7	09 32	114.8	31
2	69 28.6	09 32	118.6	69 53.7	09 32	117.8	70 43.2	09 32	116.2	71 07.6	09 33	115.3	71 31.8	09 33	114.4	79 05.7	09 33	113.4	32
3	69 09.6	09 32	117.3	69 34.5	09 32	116.5	70 23.8	09 33	114.8	70 48.1	09 33	113.9	71 12.1	09 33	113.0	79 05.7	09 33	112.0	33
4	68 50.3	09 32	115.9	69 15.2	09 32	115.1	70 04.2	09 33	113.5	70 28.3	09 33	112.6	71 02.2	09 33	111.7	79 05.7	09 33	110.7	34
35	68 30.9	09 33	114.6	68 55.6	09 33	113.8	69 44.4	09 33	112.1	70 08.4	09 34	111.3	70 32.1	09 34	110.4	79 05.6	09 34	109.4	35
6	68 11.2	09 33	113.3	68 35.8	09 33	112.5	69 24.4	09 34	110.9	69 48.3	09 34	110.0	70 11.9	09 34	109.1	79 05.7	09 34	108.2	36
7	67 51.4	09 33	112.0	68 15.9	09 34	111.2	69 04.2	09 34	109.6	69 28.0	09 34	108.7	69 51.5	09 34	107.8	79 05.7	09 34	106.9	37
8	67 31.4	09 34	110.8	67 55.8	09 34	110.0	68 43.9	09 34	108.4	69 07.6	09 34	107.5	69 31.0	09 34	106.6	79 05.7	09 34	105.7	38
9	67 11.2	09 34	109.5	67 35.5	09 34	108.8	68 23.4	09 34	107.2	68 47.0	09 34	106.3	69 10.3	09 35	105.4	79 05.7	09 35	104.5	39
40	66 50.8	09 34	108.3	67 15.0	09 34	107.6	68 02.8	09 35	106.0	68 26.3	09 35	105.1	68 49.5	09 35	104.3	79 05.6	09 35	103.4	40
1	66 30.4	09 34	107.1	66 54.5	09 34	106.4	67 42.0	09 35	104.8	68 05.5	09 35	104.0	68 28.6	09 35	103.1	79 05.5	09 35	102.2	41
2	66 09.7	09 35	106.0	66 33.8	09 35	105.2	67 21.2	09 35	103.6	67 44.5	09 35	102.8	68 07.6	09 35	102.0	79 05.5	09 35	101.1	42
3	65 49.0	09 35	104.8	66 13.0	09 35	104.1	67 00.3	09 35	102.5	67 23.5	09 35	101.7	67 46.6	09 35	100.9	79 05.5	09 35	100.0	43
4	65 28.2	09 35	103.7	65 52.1	09 35	103.0	66 39.2	09 35	101.4	67 02.4	09 35	100.6	67 25.4	09 35	99.8	79 05.5	09 35	98.9	44
45	65 07.2	09 35	102.6	65 31.1	09 35	101.8	66 18.1	09 35	100.3	66 41.3	09 35	99.5	67 04.2	09 35	98.7	79 05.5	09 35	97.9	45
6	64 46.2	09 35	101.5	65 10.0	09 35	100.8	65 56.9	09 35	99.3	66 20.0	09 35	98.5	66 42.9	09 35	97.7	79 05.5	09 35	96.8	46
7	64 25.1	09 35	100.4	64 48.8	09 35	99.7	65 35.7	09 35	98.2	65 58.7	09 35	97.4	66 21.6	09 35	96.6	79 05.5	09 35	95.8	47
8	64 03.9	09 35	99.3	64 27.6	09 35	98.6	65 14.4	09 35	97.1	65 37.4	09 35	96.4	66 00.0	09 35	95.6	79 05.5	09 35	94.8	48
9	63 42.7	09 35	98.3	64 06.3	09 35	97.6	64 53.0	09 35	96.1	65 16.0	09 35	95.4	65 38.8	09 35	94.6	79 05.5	09 35	93.8	49
50	63 21.4	09 35	97.3	63 45.0	09 35	96.6	64 31.6	09 35	95.1	64 54.6	09 35	94.4	65 17.3	09 35	93.6	79 05.5	09 35	92.8	50
1	63 00.0	09 35	96.2	63 23.6	09 35	95.6	64 10.2	09 35	94.1	64 33.1	09 35	93							

Main data table with columns for H.A., Alt., Az., and declination values for various latitude ranges from 91 to 180.

Lat. 69°

DECLINATION SAME NAME AS LATITUDE

Lat. 69°

Table with columns for Latitude (H.A.), Declination (60° 00', 60° 30', 62° 00', 62° 30', 63° 00', 69° 00', 69° 30', 74° 30'), and Right Ascension (Ait., Az.). Each declination column contains two sub-columns for Ait. and Az. values. The table is organized in 5-degree latitude blocks, with each block containing 10 rows of data.

## DECLINATION SAME NAME AS LATITUDE

H.A.	60° 00'			60° 30'			62° 00'			62° 30'			63° 00'			69° 00'			69° 30'			74° 30'			H.A.
	Alt.	Ad At.	Az.																						
91	53 38.8	80 30	57.5	54 02.6	79 30	57.0	55 13.3	78 29	55.4	55 36.6	77 29	54.8	55 59.7	77 29	54.3	60 22.9	69 26	46.5	60 43.4	68 26	45.7	63 53.4	68 22	37.4	91
2	53 20.7	80 30	56.8	53 44.7	80 30	56.3	54 55.7	78 29	54.7	55 19.1	78 29	54.2	55 42.3	77 29	53.6	60 07.3	70 26	46.0	60 28.1	69 26	45.8	63 40.4	69 22	37.0	2
3	53 02.8	80 30	56.2	53 26.8	80 29	55.7	54 38.2	79 29	54.1	55 01.7	78 29	53.6	55 25.1	77 29	53.0	59 51.9	70 26	45.5	60 12.9	69 26	45.2	63 27.5	69 22	36.7	3
4	52 45.0	81 29	55.5	53 09.2	80 29	55.0	54 20.8	79 29	53.5	54 44.5	79 28	52.9	55 08.0	78 28	52.4	59 36.7	71 26	45.0	59 57.8	70 26	44.3	63 14.7	61 21	36.3	4
95	52 27.4	81 29	54.8	52 51.6	81 29	54.3	54 03.6	79 28	52.8	54 27.4	79 28	52.3	54 51.0	78 28	51.8	59 21.6	71 26	44.5	59 42.9	71 26	43.8	63 02.1	62 21	36.0	95
6	52 09.9	81 29	54.2	52 34.2	81 29	53.7	53 46.6	80 28	52.2	54 10.4	79 28	51.7	54 34.2	79 28	51.2	59 06.6	72 26	44.0	59 28.0	71 24	43.8	62 49.5	63 21	35.6	6
7	51 52.5	82 29	53.5	52 17.0	81 28	53.0	53 29.7	80 28	51.6	53 53.6	80 28	51.1	54 17.5	79 28	50.5	58 51.7	73 26	43.5	59 13.4	72 24	42.8	62 37.0	63 21	35.2	7
8	51 35.3	82 28	52.8	51 59.9	82 28	52.4	53 12.9	81 28	50.9	53 37.0	80 28	50.4	54 01.0	80 27	49.9	58 37.0	73 24	43.0	58 58.8	73 24	42.3	62 24.7	64 20	34.8	8
9	51 18.2	82 28	52.2	51 42.9	82 28	51.7	52 56.3	81 27	50.3	53 20.5	81 27	49.8	53 44.6	80 27	49.3	58 22.4	74 24	42.5	58 44.4	73 24	41.8	62 12.5	65 20	34.5	9
100	51 01.3	83 28	51.5	51 26.1	82 28	51.1	52 39.8	81 27	49.7	53 04.2	81 27	49.2	53 28.4	81 27	48.7	58 08.0	74 24	41.9	58 30.2	74 24	41.3	62 00.4	66 20	34.1	100
1	50 44.6	83 28	50.9	51 09.5	83 28	50.4	52 23.5	82 27	49.0	52 48.0	81 27	48.6	53 12.3	81 27	48.1	57 53.6	75 24	41.4	58 16.0	74 23	40.8	61 48.4	67 20	33.7	1
2	50 28.0	83 27	50.2	50 53.0	83 27	49.8	52 07.3	82 27	48.4	52 31.9	82 26	47.9	52 56.4	81 26	47.5	57 39.5	76 23	40.9	58 02.1	75 23	40.3	61 36.5	68 20	33.3	2
3	50 11.5	84 27	49.6	50 36.6	84 27	49.1	51 51.3	82 26	47.8	52 16.0	82 26	47.3	52 40.6	82 26	46.9	57 25.5	76 23	40.4	57 48.2	76 23	39.8	61 24.7	68 19	33.0	3
4	49 55.3	84 27	48.9	50 20.5	84 27	48.5	51 35.5	83 26	47.2	52 00.3	83 26	46.7	52 25.0	82 26	46.2	57 11.6	77 23	39.9	57 34.5	76 23	39.3	61 13.1	69 19	32.6	4
105	49 39.1	85 27	48.2	50 04.6	84 26	47.8	51 19.8	83 26	46.5	51 44.7	83 26	46.1	52 09.5	83 26	45.6	56 57.9	77 23	39.4	57 21.0	77 23	38.8	61 01.6	70 19	32.2	105
6	49 23.2	85 26	47.6	49 48.6	85 26	47.2	51 04.3	84 26	45.9	51 29.3	83 26	45.5	51 54.3	83 26	45.0	56 44.3	78 22	38.9	57 07.6	77 22	38.3	60 50.2	71 19	31.8	6
7	49 07.4	85 26	46.9	49 32.9	85 26	46.5	50 48.9	84 26	45.3	51 14.1	84 26	44.8	51 39.1	83 26	44.4	56 30.9	78 22	38.4	56 54.3	77 22	37.8	60 38.9	71 19	31.4	7
8	48 51.8	86 26	46.3	49 17.4	85 26	45.9	50 33.7	84 26	44.7	50 59.0	84 26	44.2	51 24.2	84 26	43.8	56 17.6	79 22	37.9	56 41.2	78 22	37.3	60 27.7	72 18	31.0	8
9	48 36.3	86 26	45.6	49 02.0	86 26	45.2	50 18.7	85 26	44.0	50 44.1	84 26	43.6	51 09.4	84 24	43.2	56 04.4	79 22	37.4	56 28.2	79 21	36.8	60 16.7	73 18	30.6	9
110	48 21.0	86 25	45.0	48 46.8	86 25	44.6	50 03.8	85 24	43.4	50 29.3	85 24	43.0	50 54.7	85 24	42.6	55 51.5	80 21	36.9	56 15.4	80 21	36.3	60 05.8	74 18	30.2	110
1	48 05.9	87 25	44.3	48 31.8	86 25	44.0	49 49.1	86 24	42.8	50 14.7	85 24	42.4	50 40.3	85 24	42.0	55 38.6	81 21	36.4	56 02.7	80 21	35.8	59 55.1	74 18	29.9	1
2	47 51.0	87 25	43.7	48 17.0	87 24	43.3	49 34.6	86 24	42.2	50 00.3	86 24	41.8	50 26.0	85 24	41.4	55 26.0	81 21	35.8	55 50.2	81 21	35.3	59 44.4	75 18	29.5	2
3	47 36.2	87 24	43.0	48 02.3	87 24	42.7	49 20.3	86 24	41.5	49 46.1	86 24	41.2	50 11.9	86 23	40.8	55 13.5	82 21	35.3	55 37.9	81 20	34.8	59 33.9	76 17	29.1	3
4	47 21.6	88 24	42.4	47 47.8	87 24	42.0	49 06.1	87 23	40.9	49 32.0	86 23	40.5	49 57.9	86 23	40.1	55 01.1	82 20	34.8	55 25.7	82 20	34.3	59 23.5	77 17	28.7	4
115	47 07.2	88 24	41.8	47 33.5	88 24	41.4	48 52.1	87 23	40.3	49 18.2	87 23	39.9	49 44.1	86 23	39.5	54 48.9	83 20	34.3	55 13.6	82 20	33.8	59 13.7	77 17	28.2	115
6	46 53.0	88 23	41.1	47 19.4	88 23	40.8	48 38.3	87 23	39.7	49 04.4	87 23	39.3	49 30.5	87 23	38.9	54 36.9	83 20	33.8	55 01.7	83 20	33.3	59 03.2	78 17	27.8	6
7	46 38.9	89 23	40.5	47 05.4	88 23	40.1	48 24.6	88 22	39.1	48 50.9	87 22	38.7	49 17.1	87 22	38.3	54 25.0	84 20	33.3	54 50.0	83 19	32.8	58 53.2	79 16	27.4	7
8	46 25.1	89 23	39.8	46 51.7	89 23	39.5	48 11.2	88 22	38.4	48 37.6	88 22	38.1	49 03.9	88 22	37.7	54 13.3	84 19	32.8	54 38.4	84 19	32.3	58 43.4	79 16	27.0	8
9	46 11.4	89 22	39.2	46 38.1	89 22	38.8	47 57.9	88 22	37.8	48 24.8	88 22	37.5	48 50.8	88 21	37.1	54 01.7	85 19	32.3	54 27.0	84 19	31.8	58 33.7	80 16	26.6	9
120	45 57.9	89 22	38.5	46 24.7	89 22	38.2	47 44.8	89 22	37.2	48 11.4	89 21	36.9	48 37.9	89 21	36.5	53 50.3	85 19	31.7	54 15.8	85 18	31.3	58 24.1	81 16	26.2	120
1	45 44.6	90 22	37.9	46 11.5	90 22	37.6	47 31.9	89 21	36.6	47 58.6	89 21	36.2	48 25.2	89 21	35.9	53 39.1	86 18	31.2	54 04.7	85 18	30.8	58 14.7	81 15	25.8	1
2	45 31.5	90 22	37.2	45 58.5	90 21	36.9	47 19.2	89 21	36.0	47 46.0	89 21	35.6	48 12.7	89 21	35.3	53 28.0	86 18	30.7	53 53.8	86 18	30.3	58 05.4	82 15	25.4	2
3	45 18.6	90 21	36.6	45 45.7	90 21	36.3	47 06.6	90 21	35.3	47 33.5	90 20	35.0	48 00.4	89 20	34.7	53 17.1	86 18	30.2	53 43.0	86 18	29.8	57 56.2	82 15	25.0	3
4	45 05.8	91 21	36.0	45 33.0	91 21	35.7	46 54.3	90 20	34.7	47 21.3	90 20	34.4	47 48.2	90 20	34.1	53 06.4	87 18	29.7	53 32.4	87 17	29.2	57 47.2	83 15	24.6	4
125	44 53.3	91 21	35.3	45 20.6	91 20	35.0	46 42.1	90 20	34.1	47 09.2	90 20	33.8	47 36.3	90 20	33.5	52 55.9	87 17	29.1	53 22.0	87 17	28.7	57 38.4	84 15	24.1	125
6	44 41.0	91 20	34.7	45 08.3	91 20	34.4	46 30.2	91 20	33.5	46 57.4	91 19	33.2	47 24.5	90 19	32.9	52 45.5	88 17	28.6	53 11.8	88 17	28.2	57 29.6	84 14	23.7	6
7	44 28.8	92 20	34.0	44 56.3	91 20	33.7	46 18.4	91 19	32.9	46 45.7	91 19	32.6	47 12.9	91 19	32.3	52 35.3	88 17	28.1	53 01.7	88 17	27.7	57 21.1	85 14	23.3	7
8	44 16.9	92 20	33.4	44 44.5	92 19	33.1	46 06.8	91 19	32.3	46 34.2	91 19	32.0	47 01.5	91 19	31.7	52 25.2	89 16	27.6	52 51.8	88 16	27.2	57 12.6	86 14	22.9	8
9	44 05.2	92 19	32.7	44 32.8	92 19	32.5	45 55.5	92 19	31.6	46 22.9	91 18	31.3	46 50.4	91 18	31.0	52 15.3	89 16	27.1	52 42.0	89 16	26.7	57 04.3	86 14	22.5	9
130	43 53.6	92 19	32.1	44 21.4	92 19	31.8	45 44.3	92 18	31.0	46 11.8	92 18	30.7	46 39.4	92 18	30.4	52 05.6	89 16	26.5	52 32.4	89 16	26.2	56 56.2	86 13	22.0	130
1	43 42.3	93 19	31.5	44 10.1	93 18	31.2	45 33.3	92 18	30.4	46 01.0	92 18	30.1	46 28.6	92 18	29.8	51									

# STAR IDENTIFICATION TABLE

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ALTITUDE

Lat.  
69°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.																					
00	25	180	29	180	33	180	37	180	41	180	45	180	49	180	53	180	57	180	61	180	65	180	00
4	25	176	29	175	33	175	37	175	41	175	45	175	49	175	53	174	57	174	61	174	65	173	4
8	25	171	29	171	33	171	37	170	41	170	45	170	49	169	53	169	57	168	61	167	65	166	8
12	25	167	28	166	32	166	36	166	40	165	44	165	48	164	52	163	56	162	60	161	64	160	12
16	24	162	28	162	32	161	36	161	40	160	44	160	48	159	52	158	56	157	60	155	64	153	16
20	24	158	28	158	32	157	36	156	39	155	43	155	47	154	51	152	55	151	59	149	63	147	20
24	23	154	27	153	31	152	35	152	39	151	43	150	47	148	51	147	54	146	58	144	62	141	24
28	22	150	26	149	30	148	34	147	38	146	42	145	46	143	50	142	54	140	57	138	61	136	28
32	22	145	26	144	29	143	33	142	37	141	41	140	45	139	49	137	53	135	56	133	60	130	32
36	21	141	25	140	29	139	32	138	36	137	40	135	44	134	48	132	52	130	55	128	59	125	36
40	20	137	24	136	28	135	31	134	35	132	39	131	43	129	47	127	50	125	54	123	58	120	40
44	19	133	23	132	27	131	30	129	34	128	38	126	42	125	46	123	49	121	53	118	57	115	44
48	18	129	22	128	25	126	29	125	33	124	37	122	41	120	44	118	48	116	52	114	55	111	48
52	17	125	20	124	24	122	28	121	32	119	36	118	39	116	43	114	47	112	50	109	54	106	52
56	15	121	19	120	23	118	27	117	31	115	34	114	38	112	42	110	45	108	49	105	52	102	56
60	14	117	18	116	22	114	25	113	29	111	33	110	37	108	40	106	44	103	48	101	51	98	60
64	13	113	17	112	20	110	24	109	28	107	32	106	35	104	39	102	43	99	46	97	50	94	64
68	11	109	15	108	19	106	23	105	26	103	30	102	34	100	37	98	41	96	45	93	48	90	68
72	10	105	14	104	18	103	21	101	25	99	29	98	32	96	36	94	40	92	43	89	47	87	72
76	09	102	12	100	16	99	20	97	24	96	27	94	31	92	35	90	38	88	42	86	45	83	76
80	07	98	11	96	15	95	18	93	22	92	26	90	30	88	33	86	37	84	40	82	44	79	80
84	06	94	10	93	13	91	17	90	21	88	24	86	28	85	32	83	35	81	39	78	42	76	84
88	04	90	08	89	12	88	16	86	19	84	23	83	27	81	30	79	34	77	38	75	41	73	88
92	03	87	07	85	10	84	14	82	18	81	22	79	25	77	29	76	33	74	36	72	40	69	92
96	02	83	05	82	09	80	13	79	17	77	20	76	24	74	28	72	31	70	35	68	38	66	96
100	00	79	04	78	08	76	11	75	15	73	19	72	23	70	26	69	30	67	34	65	37	63	100
104	01	75	03	74	06	73	10	71	14	70	17	68	21	67	25	65	29	63	32	62	36	59	104
108	03	72	01	70	05	69	09	68	12	66	16	65	20	63	24	62	27	60	31	58	35	56	108
112	04	68	00	67	04	65	07	64	11	63	15	61	19	60	22	58	26	57	30	55	34	53	112
116	05	64	01	63	02	62	06	60	10	59	14	58	17	56	21	55	25	53	29	52	32	50	116
120	07	60	03	59	01	58	05	57	09	55	12	54	16	53	20	51	24	50	28	48	31	47	120
124	08	57	04	55	00	54	04	53	08	52	11	51	15	49	19	48	23	47	27	45	30	44	124
128	09	53	05	52	01	50	03	49	06	48	10	47	14	46	18	45	22	43	26	42	29	41	128
132	10	49	06	48	02	47	02	46	05	45	09	43	13	42	17	41	21	40	25	39	28	37	132
136	11	45	07	44	03	43	01	42	04	41	08	40	12	39	16	38	20	37	24	36	28	34	136
140	12	41	08	40	04	39	00	38	04	37	07	36	11	35	15	34	19	33	23	32	27	31	140
144	13	37	09	36	05	35	01	34	03	34	07	33	11	32	14	31	18	30	22	29	26	28	144
148	14	33	10	32	06	31	02	31	02	30	06	29	10	28	14	28	18	27	22	26	25	25	148
152	15	29	11	28	07	28	03	27	01	26	05	26	09	25	13	24	17	23	21	23	25	22	152
156	15	25	11	24	07	24	03	23	01	22	05	22	09	21	13	21	16	20	20	19	24	19	156
160	16	21	12	20	08	20	04	19	00	19	04	18	08	18	12	17	16	17	20	16	24	16	160
164	16	17	12	16	08	16	04	15	00	15	04	15	08	14	12	14	16	13	20	13	24	12	164
168	17	12	13	12	09	12	05	12	01	11	03	11	07	11	11	10	15	10	19	10	23	09	168
172	17	08	13	08	09	08	05	08	01	08	03	07	07	07	11	07	15	07	19	06	23	06	172
176	17	04	13	04	09	04	05	04	01	04	03	04	07	04	11	03	15	03	19	03	23	03	176
180	17	00	13	00	09	00	05	00	01	00	03	00	07	00	11	00	15	00	19	00	23	00	180

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

16-16330

# STAR IDENTIFICATION TABLE

## ALTITUDE

261

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.	Lat. 69°
	Dec.	H.A.																						
00	69	180	73	180	77	180	81	180	85	180	89	180	87	00	83	00	79	00	75	00	71	00	00	00
4	69	173	73	172	77	170	81	167	85	160	88	122	87	22	83	08	79	04	75	02	71	00	4	4
8	69	165	73	163	77	161	80	155	84	144	87	105	86	38	83	15	79	07	75	03	71	01	8	8
12	68	158	72	155	76	151	80	145	83	131	85	97	85	48	82	22	79	11	75	05	71	01	12	12
16	68	151	71	148	75	143	79	135	82	121	84	92	84	53	82	27	78	14	75	06	71	02	16	16
20	67	144	71	141	74	135	78	127	81	113	83	88	83	57	81	31	78	16	75	08	71	02	20	20
24	66	138	70	134	73	128	76	120	79	106	81	85	82	58	80	35	77	19	74	09	71	02	24	24
28	65	132	69	128	72	122	75	113	78	101	80	82	80	59	79	37	77	21	74	10	71	03	28	28
32	64	127	67	122	71	116	74	108	76	96	78	80	79	60	78	39	76	23	74	11	71	03	32	32
36	63	121	66	117	69	111	72	103	75	92	77	77	78	59	77	41	76	25	73	12	71	04	36	36
40	61	116	65	112	68	106	71	98	74	88	76	75	77	59	76	42	75	26	73	13	70	04	40	40
44	60	111	63	107	67	101	70	94	72	85	74	73	75	58	76	42	75	27	73	14	70	04	44	44
48	59	107	62	103	65	97	68	90	71	82	73	71	74	57	75	42	74	28	72	15	70	04	48	48
52	57	103	61	98	64	93	67	87	69	79	71	68	73	56	74	42	73	28	72	16	70	05	52	52
56	56	99	59	94	62	89	65	83	68	76	70	66	72	55	73	42	73	29	72	16	70	05	56	56
60	54	95	58	91	61	86	64	80	67	73	69	64	71	54	72	42	72	29	71	16	70	05	60	60
64	53	91	56	87	60	82	63	77	65	70	68	62	69	52	71	41	71	29	71	17	70	05	64	64
68	52	87	55	83	58	79	61	74	64	67	66	60	68	51	70	40	71	29	70	17	70	05	68	68
72	50	83	54	80	57	76	60	71	63	65	65	58	67	49	69	40	70	29	70	17	70	05	72	72
76	49	80	52	77	55	73	58	68	61	62	64	56	66	48	68	39	69	28	70	17	69	06	76	76
80	47	77	51	73	54	69	57	65	60	60	63	54	65	46	67	38	68	28	69	17	69	06	80	80
84	46	73	49	70	53	66	56	62	59	57	62	52	64	45	66	37	68	27	69	17	69	06	84	84
88	45	70	48	67	51	63	55	60	58	55	60	49	63	43	65	35	67	27	68	16	69	06	88	88
92	43	67	47	64	50	61	53	57	56	52	59	47	62	41	65	34	67	26	68	16	69	06	92	92
96	42	64	45	61	49	58	52	54	55	50	58	45	61	40	64	33	66	25	68	16	69	05	96	96
100	41	60	44	58	48	55	51	52	54	48	57	43	60	38	63	32	65	24	67	15	69	05	100	100
104	39	57	43	55	47	52	50	49	53	45	56	41	59	36	62	30	65	23	67	15	68	05	104	104
108	38	54	42	52	45	49	49	46	52	43	55	39	59	34	62	29	64	22	66	14	68	05	108	108
112	37	51	41	49	44	46	48	44	51	41	55	37	58	33	61	27	64	21	66	14	68	05	112	112
116	36	48	40	46	43	44	47	41	50	38	54	35	57	31	60	26	63	20	66	13	68	05	116	116
120	35	45	39	43	42	41	46	39	50	36	53	33	56	29	60	24	63	19	65	13	68	05	120	120
124	34	42	38	40	41	38	45	36	49	33	52	30	56	27	59	23	62	18	65	12	68	04	124	124
128	33	39	37	37	41	35	44	33	48	31	52	28	55	25	58	21	62	17	65	11	68	04	128	128
132	32	36	36	34	40	33	44	31	47	29	51	26	54	23	58	20	61	16	65	10	68	04	132	132
136	31	33	35	32	39	30	43	28	47	26	50	24	54	21	58	18	61	14	64	10	68	04	136	136
140	31	30	35	29	38	27	42	26	46	24	50	22	53	19	57	17	61	13	64	09	67	03	140	140
144	30	27	34	26	38	25	42	23	45	22	49	20	53	18	57	15	60	12	64	08	67	03	144	144
148	29	24	33	23	37	22	41	21	45	19	49	18	53	16	56	13	60	11	64	07	67	03	148	148
152	29	21	33	20	37	19	41	18	44	17	48	15	52	14	56	12	60	09	64	06	67	02	152	152
156	28	18	32	17	36	16	40	15	44	14	48	13	52	12	56	10	60	08	63	05	67	02	156	156
160	28	15	32	14	36	14	40	13	44	12	48	11	52	10	56	08	59	07	63	05	67	02	160	160
164	28	12	32	11	36	11	40	10	43	10	47	09	51	08	55	07	59	05	63	04	67	01	164	164
168	27	09	31	09	35	08	39	08	43	07	47	07	51	06	55	05	59	04	63	03	67	01	168	168
172	27	06	31	06	35	05	39	05	43	05	47	04	51	04	55	03	59	03	63	02	67	01	172	172
176	27	03	31	03	35	03	39	03	43	02	47	02	51	02	55	02	59	01	63	01	67	00	176	176
180	27	00	31	00	35	00	39	00	43	00	47	00	51	00	55	00	59	00	63	00	67	00	180	180

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

ALTITUDE CORRECTION FOR D. R. LATITUDE

LATITUDE DIFFERENCE (minutes of arc)																LAT. DIFF. (tenths of minutes of arc)																		
Az.	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	Az.	0.1'	0.2'	0.3'	0.4'	0.5'	0.6'	0.7'	0.8'	0.9'	Az.								
0	180	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	0	180	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0	180					
1	179	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	1	179												1	179			
2	178	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	2	178													2	178		
3	177	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	3	177													3	177		
4	176	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	4	176													4	176		
5	175	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	5	175	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	5	175					
6	174	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	9.9	10.9	11.9	12.9	13.9	14.9	6	174													6	174		
7	173	1.0	2.0	3.0	4.0	5.0	6.0	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	7	173													7	173		
8	172	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	8	172													8	172		
9	171	1.0	2.0	3.0	4.0	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.8	13.8	14.8	9	171													9	171		
10	170	1.0	2.0	3.0	3.9	4.9	5.9	6.9	7.9	8.9	9.8	10.8	11.8	12.8	13.8	14.8	10	170	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	10	170					
11	169	1.0	2.0	2.9	3.9	4.9	5.9	6.9	7.9	8.8	9.8	10.8	11.8	12.8	13.7	14.7	11	169													11	169		
12	168	1.0	2.0	2.9	3.9	4.9	5.9	6.8	7.8	8.8	9.8	10.8	11.7	12.7	13.7	14.7	12	168													12	168		
13	167	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.8	9.7	10.7	11.7	12.6	13.6	14.6	13	167													13	167		
14	166	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7	10.7	11.6	12.6	13.6	14.6	14	166													14	166		
15	165	1.0	1.9	2.9	3.9	4.8	5.8	6.8	7.7	8.7	9.7	10.6	11.6	12.6	13.5	14.5	15	165	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	15	165					
16	164	1.0	1.9	2.9	3.8	4.8	5.8	6.7	7.7	8.7	9.6	10.6	11.5	12.5	13.5	14.4	16	164													16	164		
17	163	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.7	8.6	9.6	10.5	11.5	12.4	13.4	14.3	17	163													17	163		
18	162	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.6	8.6	9.5	10.5	11.4	12.4	13.3	14.3	18	162													18	162		
19	161	0.9	1.9	2.8	3.8	4.7	5.7	6.6	7.6	8.5	9.5	10.4	11.3	12.3	13.2	14.2	19	161												0.9	19	161		
20	160	0.9	1.9	2.8	3.8	4.7	5.6	6.6	7.5	8.5	9.4	10.3	11.3	12.2	13.2	14.1	20	160	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	20	160					
21	159	0.9	1.9	2.8	3.7	4.7	5.6	6.5	7.5	8.4	9.3	10.3	11.2	12.1	13.1	14.0	21	159													21	159		
22	158	0.9	1.9	2.8	3.7	4.6	5.6	6.5	7.4	8.3	9.3	10.2	11.1	12.1	13.0	13.9	22	158													22	158		
23	157	0.9	1.8	2.8	3.7	4.6	5.5	6.4	7.4	8.3	9.2	10.1	11.0	12.0	12.9	13.8	23	157						0.6	0.6					23	157			
24	156	0.9	1.8	2.7	3.7	4.6	5.5	6.4	7.3	8.2	9.1	10.0	11.0	11.9	12.8	13.7	24	156						0.5							24	156		
25	155	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.3	8.2	9.1	10.0	10.9	11.8	12.7	13.6	25	155	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	25	155					
26	154	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	26	154					0.4								26	154		
27	153	0.9	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0	8.9	9.8	10.7	11.6	12.5	13.4	27	153												0.4	27	153		
28	152	0.9	1.8	2.6	3.5	4.4	5.3	6.2	7.1	7.9	8.8	9.7	10.6	11.5	12.4	13.2	28	152												0.3	28	152		
29	151	0.9	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.9	8.7	9.6	10.5	11.4	12.2	13.1	29	151												0.3	29	151		
30	150	0.9	1.7	2.6	3.5	4.3	5.2	6.1	7.0	7.8	8.7	9.5	10.4	11.3	12.1	13.0	30	150	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	30	150					
31	149	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.9	7.7	8.6	9.4	10.3	11.1	12.0	12.9	31	149														31	149	
32	148	0.8	1.7	2.5	3.4	4.2	5.1	5.9	6.8	7.6	8.5	9.3	10.2	11.0	11.9	12.7	32	148														32	148	
33	147	0.8	1.7	2.5	3.4	4.2	5.0	5.9	6.7	7.5	8.4	9.2	10.1	10.9	11.7	12.6	33	147					0.3								33	147		
34	146	0.8	1.7	2.5	3.3	4.1	5.0	5.8	6.6	7.5	8.3	9.1	9.9	10.8	11.6	12.4	34	146					0.2								34	146		
35	145	0.8	1.6	2.5	3.3	4.1	4.9	5.7	6.6	7.4	8.2	9.0	9.8	10.6	11.5	12.3	35	145	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	35	145					
36	144	0.8	1.6	2.4	3.2	4.0	4.9	5.7	6.5	7.3	8.1	8.9	9.7	10.5	11.3	12.1	36	144												0.6	36	144		
37	143	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	37	143												0.6	37	143		
38	142	0.8	1.6	2.4	3.2	3.9	4.7	5.5	6.3	7.1	7.9	8.7	9.5	10.2	11.0	11.8	38	142												0.6	38	142		
39	141	0.8	1.6	2.3	3.1	3.9	4.7	5.4	6.2	7.0	7.8	8.5	9.3	10.1	10.9	11.7	39	141												0.5	39	141		
40	140	0.8	1.5	2.3	3.1	3.8	4.6	5.4	6.1	6.9	7.7	8.4	9.2	10.0	10.7	11.5	40	140	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	40	140					
41	139	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5	8.3	9.1	9.8	10.6	11.3	41	139		0.2												41	139	
42	138	0.7	1.5	2.2	3.0	3.7	4.5	5.2	5.9	6.7	7.4	8.2	8.9	9.7	10.4	11.1	42	138												0.1	42	138		
43	137	0.7	1.5	2.2	2.9	3.7	4.4	5.1	5.9	6.6	7.3	8.0	8.8	9.5	10.2	11.0	43	137													0.7	43	137	
44	136	0.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9	8.6	9.4	10.1	10.8	44	136													0.6	44	136	
45	135	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.7	6.4	7.1	7.8	8.5	9.2	9.9	10.6	45	135	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	45	135					
46	134	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.6	8.3	9.0	9.7	10.4	46	134					0.3									46	134	
47	133	0.7	1.4	2.0	2.7	3.4	4.1	4.8	5.5	6.1	6.8	7.5	8.2	8.9	9.5	10.2	47	133													0.5	47	133	
48	132	0.7	1.3	2.0	2.7	3.3	4.0	4.7	5.4	6.0	6.7	7.4	8.0	8.7	9.4	10.0	48	132															48	132
49	131	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.9	6.6	7.2	7.9	8.5	9.2	9.8	49	131												0.5	49	131		
50	130	0.6	1.3	1.9	2.6	3.2	3.9	4.5	5.1	5.8	6.4	7.1	7.7	8.4	9.0	9.6	50	130	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	50	130					
51	129	0.6	1.3	1.9	2.5	3.1	3.8	4.4	5.0	5.7	6.3	6.9	7.6	8																				

ALTITUDE CORRECTION FOR D. R. LATITUDE

LATITUDE DIFFERENCE (minutes of arc)														LAT. DIFF. (tenths of minutes of arc)																												
Az.	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'	26'	27'	28'	29'	30'	Az.	0.1'	0.2'	0.3'	0.4'	0.5'	0.6'	0.7'	0.8'	0.9'	Az.																
0	180	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	0	180	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0	180													
1	179	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	1	179														1	179									
2	178	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	2	178															2	178								
3	177	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	3	177																3	177							
4	176	16.0	17.0	18.0	19.0	20.0	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.9	28.9	29.9	4	176																4	176							
5	175	15.9	16.9	17.9	18.9	19.9	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.9	28.9	29.9	5	175	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	5	175													
6	174	15.9	16.9	17.9	18.9	19.9	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.8	28.8	29.8	6	174																6	174							
7	173	15.9	16.9	17.9	18.9	19.9	20.8	21.8	22.8	23.8	24.8	25.8	26.8	27.8	28.8	29.8	7	173																	7	173						
8	172	15.8	16.8	17.8	18.8	19.8	20.8	21.8	22.8	23.8	24.8	25.7	26.7	27.7	28.7	29.7	8	172																	8	172						
9	171	15.8	16.8	17.8	18.8	19.8	20.7	21.7	22.7	23.7	24.7	25.7	26.7	27.7	28.6	29.6	9	171																	9	171						
10	170	15.8	16.7	17.7	18.7	19.7	20.7	21.7	22.7	23.6	24.6	25.6	26.6	27.6	28.6	29.5	10	170	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	10	170													
11	169	15.7	16.7	17.7	18.7	19.6	20.6	21.6	22.6	23.6	24.5	25.5	26.5	27.5	28.5	29.4	11	169																	11	169						
12	168	15.7	16.6	17.6	18.6	19.6	20.5	21.5	22.5	23.5	24.5	25.4	26.4	27.4	28.4	29.3	12	168																	12	168						
13	167	15.6	16.6	17.5	18.5	19.5	20.5	21.4	22.4	23.4	24.4	25.3	26.3	27.3	28.3	29.2	13	167																	13	167						
14	166	15.5	16.5	17.5	18.4	19.4	20.4	21.3	22.3	23.3	24.3	25.2	26.2	27.2	28.1	29.1	14	166																	14	166						
15	165	15.5	16.4	17.4	18.4	19.3	20.3	21.3	22.2	23.2	24.1	25.1	26.1	27.0	28.0	29.0	15	165	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	15	165													
16	164	15.4	16.3	17.3	18.3	19.2	20.2	21.1	22.1	23.1	24.0	25.0	26.0	26.9	27.9	28.8	16	164																	16	164						
17	163	15.3	16.3	17.2	18.2	19.1	20.1	21.0	22.0	23.0	23.9	24.9	25.8	26.8	27.7	28.7	17	163																	17	163						
18	162	15.2	16.2	17.1	18.1	19.0	20.0	20.9	21.9	22.8	23.8	24.7	25.7	26.6	27.6	28.5	18	162																	18	162						
19	161	15.1	16.1	17.0	18.0	18.9	19.9	20.8	21.7	22.7	23.6	24.6	25.5	26.5	27.4	28.4	19	161															0.9		19	161						
20	160	15.0	16.0	16.9	17.9	18.8	19.7	20.7	21.6	22.6	23.5	24.4	25.4	26.3	27.3	28.2	20	160	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8	20	160													
21	159	14.9	15.9	16.8	17.7	18.6	19.6	20.5	21.5	22.4	23.3	24.3	25.2	26.1	27.1	28.0	21	159														0.7	0.7	21	159							
22	158	14.8	15.8	16.7	17.6	18.5	19.5	20.4	21.3	22.3	23.2	24.1	25.0	26.0	26.9	27.8	22	158														0.6		22	158							
23	157	14.7	15.6	16.6	17.5	18.4	19.3	20.3	21.2	22.1	23.0	23.9	24.9	25.8	26.7	27.6	23	157														0.6		23	157							
24	156	14.6	15.5	16.4	17.4	18.3	19.2	20.1	21.0	21.9	22.8	23.8	24.7	25.6	26.5	27.4	24	156														0.5		24	156							
25	155	14.5	15.4	16.3	17.2	18.1	19.0	19.9	20.8	21.8	22.7	23.6	24.5	25.4	26.3	27.2	25	155	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	25	155													
26	154	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	26	154														0.4		26	154							
27	153	14.3	15.1	16.0	16.9	17.8	18.7	19.6	20.5	21.4	22.3	23.2	24.1	24.9	25.8	26.7	27	153																	27	153						
28	152	14.1	15.0	15.9	16.8	17.7	18.5	19.4	20.3	21.2	22.1	23.0	23.8	24.7	25.6	26.5	28	152																	28	152						
29	151	14.0	14.9	15.7	16.6	17.5	18.4	19.2	20.1	21.0	21.9	22.8	23.6	24.5	25.4	26.2	29	151														0.4	0.3		29	151						
30	150	13.9	14.7	15.6	16.5	17.3	18.2	19.1	19.9	20.8	21.7	22.5	23.4	24.2	25.1	26.0	30	150	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	30	150													
31	149	13.7	14.6	15.4	16.3	17.1	18.0	18.9	19.7	20.6	21.4	22.3	23.1	24.0	24.9	25.7	31	149																		31	149					
32	148	13.6	14.4	15.3	16.1	17.0	17.8	18.7	19.5	20.4	21.2	22.0	22.9	23.7	24.6	25.4	32	148																		32	148					
33	147	13.4	14.3	15.1	15.9	16.8	17.6	18.5	19.3	20.1	21.0	21.8	22.6	23.5	24.3	25.2	33	147																	0.8		33	147				
34	146	13.3	14.1	14.9	15.8	16.6	17.4	18.2	19.1	19.9	20.7	21.6	22.4	23.2	24.0	24.9	34	146																	0.7		34	146				
35	145	13.1	13.9	14.7	15.6	16.4	17.2	18.0	18.8	19.7	20.5	21.3	22.1	22.9	23.8	24.6	35	145	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	35	145													
36	144	12.9	13.8	14.6	15.4	16.2	17.0	17.8	18.6	19.4	20.2	21.0	21.8	22.7	23.5	24.3	36	144																	0.6		36	144				
37	143	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6	22.4	23.2	24.0	37	143																		0.6		37	143			
38	142	12.6	13.4	14.2	15.0	15.8	16.5	17.3	18.1	18.9	19.7	20.5	21.3	22.1	22.9	23.6	38	142																		0.6		38	142			
39	141	12.4	13.2	14.0	14.8	15.5	16.3	17.1	17.9	18.7	19.4	20.2	21.0	21.8	22.5	23.3	39	141																		0.5		39	141			
40	140	12.3	13.0	13.8	14.6	15.3	16.1	16.9	17.6	18.4	19.2	19.9	20.7	21.4	22.2	23.0	40	140	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	40	140													
41	139	12.1	12.8	13.6	14.3	15.1	15.8	16.6	17.4	18.1	18.9	19.6	20.4	21.1	21.9	22.6	41	139																		0.5		41	139			
42	138	11.9	12.6	13.4	14.1	14.9	15.6	16.3	17.1	17.8	18.6	19.3	20.1	20.8	21.6	22.3	42	138																		0.4		42	138			
43	137	11.7	12.4	13.2	13.9	14.6	15.4	16.1	16.8	17.6	18.3	19.0	19.7	20.5	21.2	21.9	43	137																				0.7		43	137	
44	136	11.5	12.2	13.0	13.7	14.4	15.1	15.8	16.5	17.3	18.0	18.7	19.4	20.1	20.9	21.6	44	136																					0.6		44	136
45	135	11.3	12.0	12.7	13.4	14.1	14.8	15.6	16.3	17.0	17.7	18.4	19.1	19.8	20.5	21.2	45	135	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	45	135													
46	134	11.1	11.8	12.5	13.2	13.9	14.6	15.3	16.0	16.7	17.4	18.1	18.8																													





THE HISTORY OF THE  
CITY OF BOSTON

BY  
NATHANIEL BENTLEY  
MAYOR OF BOSTON  
CONTAINING  
A HISTORY OF THE CITY  
FROM THE FIRST SETTLEMENT  
TO THE PRESENT TIME  
IN TWO VOLUMES  
VOL. I.