Integer

Sight Reduction Tables

Latitude 84° to 90°

USE OF THE TABLES.

The Greenwich Hour Angle (GHA) and Declination of the SUN are taken from the current year's Sun Almanac for the precise date and time of the observation.
The GHA is combined with an Assumed Longitude, somewhere close to your actual position (obtained from your GPS or, if you are a traditionalist, your Dead Reckoning position) to give your Local Hour Angle (LHA).
The resulting LHA must be a whole degree of latitude.

If LHA and Declination = SAME
Start at the first page and work forward until you find the page with your LHA.
Enter the table with your Declination and Latitude, and read off Hc, d' and Z.
Take care to note whether d' is +ve or -ve.

If LHA and Declination = CONTRARY
Start at the last page and work backwards until you find the page with your LHA.
Enter the table with your Declination and Latitude, and read of Hc, d' and Z.
Take care to note whether d' is +ve or -ve.

NOTE: Values of Hc, d' and Z are always in **BOLD** text whenever LHA and Declination are contrary.

Hc, the computed Altitude, must now be corrected for minutes of Declination by means of the correction table at the end of the tables.
Enter the table with minutes of declination and d'. It doesn't matter which way round you use the table.
If d' is -ve, SUBTRACT the value obtained from the correction table from Hc to determine the corrected value of Hc.
If d' is +ve, ADD the value obtained from the correction table to HC to determine the corrected value of Hc.

Accuracy and Precision
This particular set of tables returns Hc, d' and Z as INTEGERS.
In the majority of situations this will give you satisfactory results as well as simplifying the entire sight reduction process.

These tables have been compared to the US National Imagery and Mapping Agency Sight Reduction Tables for Air Navigation Pub249 with the following results.

No difference for Hc° has been identified by the author.
No difference in D' has been identified by the author.
No difference in Z° has been identified by the author.

Disclaimer
While the author has taken great care with these tables, no warranty is implied or expressed as to their fitness for purpose.

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

0° 360° LHA — Latitude SAME as Declination — 0° 360° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	6°00'	+60'	180°	5°00'	+60'	180°	4°00'	+60'	180°	3°00'	+60'	180°	2°00'	+60'	180°	1°00'	+60'	180°	0°00'	+60'	90°	0
1	7°00'	+60'	180°	6°00'	+60'	180°	5°00'	+60'	180°	4°00'	+60'	180°	3°00'	+60'	180°	2°00'	+60'	180°	1°00'	+60'	180°	1
2	8°00'	+60'	180°	7°00'	+60'	180°	6°00'	+60'	180°	5°00'	+60'	180°	4°00'	+60'	180°	3°00'	+60'	180°	2°00'	+60'	180°	2
3	9°00'	+60'	180°	8°00'	+60'	180°	7°00'	+60'	180°	6°00'	+60'	180°	5°00'	+60'	180°	4°00'	+60'	180°	3°00'	+60'	180°	3
4	10°00'	+60'	180°	9°00'	+60'	180°	8°00'	+60'	180°	7°00'	+60'	180°	6°00'	+60'	180°	5°00'	+60'	180°	4°00'	+60'	0°	4
5	11°00'	+60'	180°	10°00'	+60'	180°	9°00'	+60'	180°	8°00'	+60'	180°	7°00'	+60'	180°	6°00'	+60'	180°	5°00'	+60'	0°	5
6	12°00'	+60'	180°	11°00'	+60'	180°	10°00'	+60'	180°	9°00'	+60'	180°	8°00'	+60'	180°	7°00'	+60'	180°	6°00'	+60'	0°	6
7	13°00'	+60'	180°	12°00'	+60'	180°	11°00'	+60'	180°	10°00'	+60'	180°	9°00'	+60'	180°	8°00'	+60'	180°	7°00'	+60'	0°	7
8	14°00'	+60'	180°	13°00'	+60'	180°	12°00'	+60'	180°	11°00'	+60'	180°	10°00'	+60'	180°	9°00'	+60'	180°	8°00'	+60'	0°	8
9	15°00'	+60'	180°	14°00'	+60'	180°	13°00'	+60'	180°	12°00'	+60'	180°	11°00'	+60'	180°	10°00'	+60'	180°	9°00'	+60'	180°	9
10	16°00'	+60'	180°	15°00'	+60'	180°	14°00'	+60'	180°	13°00'	+60'	180°	12°00'	+60'	180°	11°00'	+60'	180°	10°00'	+60'	180°	10
11	17°00'	+60'	180°	16°00'	+60'	180°	15°00'	+60'	180°	14°00'	+60'	180°	13°00'	+60'	180°	12°00'	+60'	180°	11°00'	+60'	180°	11
12	18°00'	+60'	180°	17°00'	+60'	180°	16°00'	+60'	180°	15°00'	+60'	180°	14°00'	+60'	180°	13°00'	+60'	180°	12°00'	+60'	0°	12
13	19°00'	+60'	180°	18°00'	+60'	180°	17°00'	+60'	180°	16°00'	+60'	180°	15°00'	+60'	180°	14°00'	+60'	180°	13°00'	+60'	0°	13
14	20°00'	+60'	180°	19°00'	+60'	180°	18°00'	+60'	180°	17°00'	+60'	180°	16°00'	+60'	180°	15°00'	+60'	180°	14°00'	+60'	180°	14
15	21°00'	+60'	180°	20°00'	+60'	180°	19°00'	+60'	180°	18°00'	+60'	180°	17°00'	+60'	180°	16°00'	+60'	180°	15°00'	+60'	180°	15
16	22°00'	+60'	180°	21°00'	+60'	180°	20°00'	+60'	180°	19°00'	+60'	180°	18°00'	+60'	180°	17°00'	+60'	180°	16°00'	+60'	180°	16
17	23°00'	+60'	180°	22°00'	+60'	180°	21°00'	+60'	180°	20°00'	+60'	180°	19°00'	+60'	180°	18°00'	+60'	180°	17°00'	+60'	0°	17
18	24°00'	+60'	180°	23°00'	+60'	180°	22°00'	+60'	180°	21°00'	+60'	180°	20°00'	+60'	180°	19°00'	+60'	180°	18°00'	+60'	0°	18
19	25°00'	+60'	180°	24°00'	+60'	180°	23°00'	+60'	180°	22°00'	+60'	180°	21°00'	+60'	180°	20°00'	+60'	180°	19°00'	+60'	0°	19
20	26°00'	+60'	180°	25°00'	+60'	180°	24°00'	+60'	180°	23°00'	+60'	180°	22°00'	+60'	180°	21°00'	+60'	180°	20°00'	+60'	0°	20
21	27°00'	+60'	180°	26°00'	+60'	180°	25°00'	+60'	180°	24°00'	+60'	180°	23°00'	+60'	180°	22°00'	+60'	180°	21°00'	+60'	180°	21
22	28°00'	+60'	180°	27°00'	+60'	180°	26°00'	+60'	180°	25°00'	+60'	180°	24°00'	+60'	180°	23°00'	+60'	180°	22°00'	+60'	0°	22
23	29°00'	+60'	180°	28°00'	+60'	180°	27°00'	+60'	180°	26°00'	+60'	180°	25°00'	+60'	180°	24°00'	+60'	180°	23°00'	+60'	180°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

0° 360° LHA — Latitude SAME as Declination — 0° 360° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

1° 359° LHA — Latitude SAME as Declination — 1° 359° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	6°00'	+60'	179°	5°00'	+60'	179°	4°00'	+60'	179°	3°00'	+60'	179°	2°00'	+60'	179°	1°00'	+60'	179°	0°00'	+60'	179°	0
1	7°00'	+60'	179°	6°00'	+60'	179°	5°00'	+60'	179°	4°00'	+60'	179°	3°00'	+60'	179°	2°00'	+60'	179°	1°00'	+60'	180°	1
2	8°00'	+60'	179°	7°00'	+60'	179°	6°00'	+60'	179°	5°00'	+60'	179°	4°00'	+60'	179°	3°00'	+60'	179°	2°00'	+60'	180°	2
3	9°00'	+60'	179°	8°00'	+60'	179°	7°00'	+60'	179°	6°00'	+60'	179°	5°00'	+60'	179°	4°00'	+60'	179°	3°00'	+60'	180°	3
4	10°00'	+60'	179°	9°00'	+60'	179°	8°00'	+60'	179°	7°00'	+60'	179°	6°00'	+60'	179°	5°00'	+60'	179°	4°00'	+60'	155°	4
5	11°00'	+60'	179°	10°00'	+60'	179°	9°00'	+60'	179°	8°00'	+60'	179°	7°00'	+60'	179°	6°00'	+60'	179°	5°00'	+60'	133°	5
6	12°00'	+60'	179°	11°00'	+60'	179°	10°00'	+60'	179°	9°00'	+60'	179°	8°00'	+60'	179°	7°00'	+60'	179°	6°00'	+60'	133°	6
7	13°00'	+60'	179°	12°00'	+60'	179°	11°00'	+60'	179°	10°00'	+60'	179°	9°00'	+60'	179°	8°00'	+60'	179°	7°00'	+60'	133°	7
8	14°00'	+60'	179°	13°00'	+60'	179°	12°00'	+60'	179°	11°00'	+60'	179°	10°00'	+60'	179°	9°00'	+60'	179°	8°00'	+60'	117°	8
9	15°00'	+60'	179°	14°00'	+60'	179°	13°00'	+60'	179°	12°00'	+60'	179°	11°00'	+60'	179°	10°00'	+60'	179°	9°00'	+60'	157°	9
10	16°00'	+60'	179°	15°00'	+60'	179°	14°00'	+60'	179°	13°00'	+60'	179°	12°00'	+60'	179°	11°00'	+60'	179°	10°00'	+60'	157°	10
11	17°00'	+60'	179°	16°00'	+60'	179°	15°00'	+60'	179°	14°00'	+60'	179°	13°00'	+60'	179°	12°00'	+60'	179°	11°00'	+60'	157°	11
12	18°00'	+60'	179°	17°00'	+60'	179°	16°00'	+60'	179°	15°00'	+60'	179°	14°00'	+60'	179°	13°00'	+60'	179°	12°00'	+60'	180°	12
13	19°00'	+60'	179°	18°00'	+60'	179°	17°00'	+60'	179°	16°00'	+60'	179°	15°00'	+60'	179°	14°00'	+60'	179°	13°00'	+60'	180°	13
14	20°00'	+60'	179°	19°00'	+60'	179°	18°00'	+60'	179°	17°00'	+60'	179°	16°00'	+60'	179°	15°00'	+60'	179°	14°00'	+60'	159°	14
15	21°00'	+60'	179°	20°00'	+60'	179°	19°00'	+60'	179°	18°00'	+60'	179°	17°00'	+60'	179°	16°00'	+60'	179°	15°00'	+60'	160°	15
16	22°00'	+60'	179°	21°00'	+60'	179°	20°00'	+60'	179°	19°00'	+60'	179°	18°00'	+60'	179°	17°00'	+60'	179°	16°00'	+60'	161°	16
17	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	179°	20°00'	+60'	179°	19°00'	+60'	179°	18°00'	+60'	179°	17°00'	+60'	161°	17
18	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	179°	20°00'	+60'	179°	19°00'	+60'	179°	18°00'	+60'	162°	18
19	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	179°	20°00'	+60'	179°	19°00'	+60'	163°	19
20	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	179°	20°00'	+60'	165°	20
21	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	90°	21
22	28°00'	+60'	179°	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	180°	22
23	29°00'	+60'	179°	28°00'	+60'	179°	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

1° 359° LHA — Latitude SAME as Declination — 1° 359° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

2° 358° LHA — Latitude SAME as Declination — 2° 358° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°00'	+60'	178°	5°00'	+60'	178°	4°00'	+60'	178°	3°00'	+60'	178°	2°00'	+60'	178°	1°00'	+60'	178°	0°00'	+60'	178°	0
1	7°00'	+60'	178°	6°00'	+60'	178°	5°00'	+60'	178°	4°00'	+60'	178°	3°00'	+60'	178°	2°00'	+60'	178°	1°00'	+60'	180°	1
2	8°00'	+60'	178°	7°00'	+60'	178°	6°00'	+60'	178°	5°00'	+60'	178°	4°00'	+60'	178°	3°00'	+60'	178°	2°00'	+60'	180°	2
3	9°00'	+60'	178°	8°00'	+60'	178°	7°00'	+60'	178°	6°00'	+60'	178°	5°00'	+60'	178°	4°00'	+60'	178°	3°00'	+60'	180°	3
4	10°00'	+60'	178°	9°00'	+60'	178°	8°00'	+60'	178°	7°00'	+60'	178°	6°00'	+60'	178°	5°00'	+60'	178°	4°00'	+60'	155°	4
5	11°00'	+60'	178°	10°00'	+60'	178°	9°00'	+60'	178°	8°00'	+60'	178°	7°00'	+60'	178°	6°00'	+60'	178°	5°00'	+60'	133°	5
6	12°00'	+60'	179°	11°00'	+60'	179°	10°00'	+60'	179°	9°00'	+60'	179°	8°00'	+60'	179°	7°00'	+60'	179°	6°00'	+60'	133°	6
7	13°00'	+60'	179°	12°00'	+60'	179°	11°00'	+60'	179°	10°00'	+60'	179°	9°00'	+60'	179°	8°00'	+60'	179°	7°00'	+60'	133°	7
8	14°00'	+60'	179°	13°00'	+60'	179°	12°00'	+60'	179°	11°00'	+60'	179°	10°00'	+60'	179°	9°00'	+60'	179°	8°00'	+60'	117°	8
9	15°00'	+60'	179°	14°00'	+60'	179°	13°00'	+60'	179°	12°00'	+60'	179°	11°00'	+60'	179°	10°00'	+60'	179°	9°00'	+60'	157°	9
10	16°00'	+60'	179°	15°00'	+60'	179°	14°00'	+60'	179°	13°00'	+60'	179°	12°00'	+60'	179°	11°00'	+60'	179°	10°00'	+60'	157°	10
11	17°00'	+60'	179°	16°00'	+60'	179°	15°00'	+60'	179°	14°00'	+60'	179°	13°00'	+60'	179°	12°00'	+60'	179°	11°00'	+60'	157°	11
12	18°00'	+60'	179°	17°00'	+60'	179°	16°00'	+60'	179°	15°00'	+60'	179°	14°00'	+60'	179°	13°00'	+60'	179°	12°00'	+60'	180°	12
13	19°00'	+60'	179°	18°00'	+60'	179°	17°00'	+60'	179°	16°00'	+60'	179°	15°00'	+60'	179°	14°00'	+60'	179°	13°00'	+60'	180°	13
14	20°00'	+60'	179°	19°00'	+60'	179°	18°00'	+60'	179°	17°00'	+60'	179°	16°00'	+60'	179°	15°00'	+60'	179°	14°00'	+60'	159°	14
15	21°00'	+60'	179°	20°00'	+60'	179°	19°00'	+60'	179°	18°00'	+60'	179°	17°00'	+60'	179°	16°00'	+60'	179°	15°00'	+60'	160°	15
16	22°00'	+60'	179°	21°00'	+60'	179°	20°00'	+60'	179°	19°00'	+60'	179°	18°00'	+60'	179°	17°00'	+60'	179°	16°00'	+60'	161°	16
17	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	179°	20°00'	+60'	179°	19°00'	+60'	179°	18°00'	+60'	179°	17°00'	+60'	161°	17
18	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	179°	20°00'	+60'	179°	19°00'	+60'	179°	18°00'	+60'	162°	18
19	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	179°	20°00'	+60'	179°	19°00'	+60'	163°	19
20	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	179°	20°00'	+60'	165°	20
21	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	179°	21°00'	+60'	90°	21
22	28°00'	+60'	179°	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	179°	22°00'	+60'	180°	22
23	29°00'	+60'	179°	28°00'	+60'	179°	27°00'	+60'	179°	26°00'	+60'	179°	25°00'	+60'	179°	24°00'	+60'	179°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

2° 358° LHA — Latitude SAME as Declination — 2° 358° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

3° 357° LHA — Latitude SAME as Declination — 3° 357° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°00'	+60'	177°	5°00'	+60'	177°	4°00'	+60'	177°	3°00'	+60'	177°	2°00'	+60'	177°	1°00'	+60'	177°	0°00'	+60'	177°	0
1	7°00'	+60'	177°	6°00'	+60'	177°	5°00'	+60'	177°	4°00'	+60'	177°	3°00'	+60'	177°	2°00'	+60'	177°	1°00'	+60'	180°	1
2	8°00'	+60'	177°	7°00'	+60'	177°	6°00'	+60'	177°	5°00'	+60'	177°	4°00'	+60'	177°	3°00'	+60'	177°	2°00'	+60'	180°	2
3	9°00'	+60'	177°	8°00'	+60'	177°	7°00'	+60'	177°	6°00'	+60'	177°	5°00'	+60'	177°	4°00'	+60'	177°	3°00'	+60'	180°	3
4	10°00'	+60'	177°	9°00'	+60'	177°	8°00'	+60'	177°	7°00'	+60'	177°	6°00'	+60'	177°	5°00'	+60'	177°	4°00'	+60'	155°	4
5	11°00'	+60'	177°	10°00'	+60'	177°	9°00'	+60'	177°	8°00'	+60'	177°	7°00'	+60'	177°	6°00'	+60'	177°	5°00'	+60'	133°	5
6	11°59'	+60'	177°	11°00'	+60'	177°	10°00'	+60'	177°	9°00'	+60'	177°	8°00'	+60'	177°	7°00'	+60'	177°	6°00'	+60'	133°	6
7	12°59'	+60'	177°	12°00'	+60'	177°	11°00'	+60'	177°	10°00'	+60'	177°	9°00'	+60'	177°	8°00'	+60'	177°	7°00'	+60'	133°	7
8	13°59'	+60'	177°	13°00'	+60'	177°	12°00'	+60'	177°	11°00'	+60'	177°	10°00'	+60'	177°	9°00'	+60'	177°	8°00'	+60'	117°	8
9	14°59'	+60'	177°	14°00'	+60'	177°	13°00'	+60'	177°	12°00'	+60'	177°	11°00'	+60'	177°	10°00'	+60'	177°	9°00'	+60'	157°	9
10	15°59'	+60'	177°	15°00'	+60'	177°	14°00'	+60'	177°	13°00'	+60'	177°	12°00'	+60'	177°	11°00'	+60'	177°	10°00'	+60'	157°	10
11	16°59'	+60'	177°	16°00'	+60'	177°	15°00'	+60'	177°	14°00'	+60'	177°	13°00'	+60'	177°	12°00'	+60'	177°	11°00'	+60'	157°	11
12	17°59'	+60'	177°	17°00'	+60'	177°	16°00'	+60'	177°	15°00'	+60'	177°	14°00'	+60'	177°	13°00'	+60'	177°	12°00'	+60'	180°	12
13	18°59'	+60'	177°	18°00'	+60'	177°	17°00'	+60'	177°	16°00'	+60'	177°	15°00'	+60'	177°	14°00'	+60'	177°	13°00'	+60'	180°	13
14	19°59'	+60'	177°	19°00'	+60'	177°	18°00'	+60'	177°	17°00'	+60'	177°	16°00'	+60'	177°	15°00'	+60'	177°	14°00'	+60'	159°	14
15	20°59'	+60'	177°	20°00'	+60'	177°	19°00'	+60'	177°	18°00'	+60'	177°	17°00'	+60'	177°	16°00'	+60'	177°	15°00'	+60'	160°	15
16	21°59'	+60'	177°	21°00'	+60'	177°	20°00'	+60'	177°	19°00'	+60'	177°	18°00'	+60'	177°	17°00'	+60'	177°	16°00'	+60'	161°	16
17	22°59'	+60'	177°	22°00'	+60'	177°	21°00'	+60'	177°	20°00'	+60'	177°	19°00'	+60'	177°	18°00'	+60'	177°	17°00'	+60'	161°	17
18	23°59'	+60'	177°	23°00'	+60'	177°	22°00'	+60'	177°	21°00'	+60'	177°	20°00'	+60'	177°	19°00'	+60'	177°	18°00'	+60'	162°	18
19	24°59'	+60'	177°	24°00'	+60'	177°	23°00'	+60'	177°	22°00'	+60'	177°	21°00'	+60'	177°	20°00'	+60'	177°	19°00'	+60'	163°	19
20	25°59'	+60'	177°	25°00'	+60'	177°	24°00'	+60'	177°	23°00'	+60'	177°	22°00'	+60'	177°	21°00'	+60'	177°	20°00'	+60'	165°	20
21	26°59'	+60'	177°	26°00'	+60'	177°	25°00'	+60'	177°	24°00'	+60'	177°	23°00'	+60'	177°	22°00'	+60'	177°	21°00'	+60'	90°	21
22	27°59'	+60'	177°	27°00'	+60'	177°	26°00'	+60'	177°	25°00'	+60'	177°	24°00'	+60'	177°	23°00'	+60'	177°	22°00'	+60'	180°	22
23	28°59'	+60'	177°	28°00'	+60'	177°	27°00'	+60'	177°	26°00'	+60'	177°	25°00'	+60'	177°	24°00'	+60'	177°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

3° 357° LHA — Latitude SAME as Declination — 3° 357° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

4° 356° LHA — Latitude SAME as Declination — 4° 356° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°59'	+60'	176°	4°59'	+60'	176°	3°59'	+60'	176°	3°00'	+60'	176°	2°00'	+60'	176°	1°00'	+60'	176°	0°00'	+60'	176°	0
1	6°59'	+60'	176°	5°59'	+60'	176°	4°59'	+60'	176°	4°00'	+60'	176°	3°00'	+60'	176°	2°00'	+60'	176°	1°00'	+60'	180°	1
2	7°59'	+60'	176°	6°59'	+60'	176°	5°59'	+60'	176°	5°00'	+60'	176°	4°00'	+60'	176°	3°00'	+60'	176°	2°00'	+60'	180°	2
3	8°59'	+60'	176°	7°59'	+60'	176°	6°59'	+60'	176°	6°00'	+60'	176°	5°00'	+60'	176°	4°00'	+60'	176°	3°00'	+60'	180°	3
4	9°59'	+60'	176°	8°59'	+60'	176°	7°59'	+60'	176°	7°00'	+60'	176°	6°00'	+60'	176°	5°00'	+60'	176°	4°00'	+60'	155°	4
5	10°59'	+60'	176°	9°59'	+60'	176°	8°59'	+60'	176°	8°00'	+60'	176°	7°00'	+60'	176°	6°00'	+60'	176°	5°00'	+60'	133°	5
6	11°59'	+60'	176°	10°59'	+60'	176°	9°59'	+60'	176°	9°00'	+60'	176°	8°00'	+60'	176°	7°00'	+60'	176°	6°00'	+60'	133°	6
7	12°59'	+60'	176°	11°59'	+60'	176°	10°59'	+60'	176°	10°00'	+60'	176°	9°00'	+60'	176°	8°00'	+60'	176°	7°00'	+60'	133°	7
8	13°59'	+60'	176°	12°59'	+60'	176°	11°59'	+60'	176°	11°00'	+60'	176°	10°00'	+60'	176°	9°00'	+60'	176°	8°00'	+60'	117°	8
9	14°59'	+60'	176°	13°59'	+60'	176°	12°59'	+60'	176°	12°00'	+60'	176°	11°00'	+60'	176°	10°00'	+60'	176°	9°00'	+60'	157°	9
10	15°59'	+60'	176°	14°59'	+60'	176°	13°59'	+60'	176°	13°00'	+60'	176°	12°00'	+60'	176°	11°00'	+60'	176°	10°00'	+60'	157°	10
11	16°59'	+60'	176°	15°59'	+60'	176°	14°59'	+60'	176°	14°00'	+60'	176°	13°00'	+60'	176°	12°00'	+60'	176°	11°00'	+60'	157°	11
12	17°59'	+60'	176°	16°59'	+60'	176°	15°59'	+60'	176°	15°00'	+60'	176°	14°00'	+60'	176°	13°00'	+60'	176°	12°00'	+60'	180°	12
13	18°59'	+60'	176°	17°59'	+60'	176°	16°59'	+60'	176°	16°00'	+60'	176°	15°00'	+60'	176°	14°00'	+60'	176°	13°00'	+60'	180°	13
14	19°59'	+60'	176°	18°59'	+60'	176°	17°59'	+60'	176°	17°00'	+60'	176°	16°00'	+60'	176°	15°00'	+60'	176°	14°00'	+60'	159°	14
15	20°59'	+60'	176°	19°59'	+60'	176°	18°59'	+60'	176°	18°00'	+60'	176°	17°00'	+60'	176°	16°00'	+60'	176°	15°00'	+60'	160°	15
16	21°59'	+60'	176°	20°59'	+60'	176°	19°59'	+60'	176°	19°00'	+60'	176°	18°00'	+60'	176°	17°00'	+60'	176°	16°00'	+60'	161°	16
17	22°59'	+60'	176°	21°59'	+60'	176°	20°59'	+60'	176°	20°00'	+60'	176°	19°00'	+60'	176°	18°00'	+60'	176°	17°00'	+60'	161°	17
18	23°59'	+60'	176°	22°59'	+60'	176°	21°59'	+60'	176°	21°00'	+60'	176°	20°00'	+60'	176°	19°00'	+60'	176°	18°00'	+60'	162°	18
19	24°59'	+60'	176°	23°59'	+60'	176°	22°59'	+60'	176°	22°00'	+60'	176°	21°00'	+60'	176°	20°00'	+60'	176°	19°00'	+60'	163°	19
20	25°59'	+60'	176°	24°59'	+60'	176°	23°59'	+60'	176°	23°00'	+60'	176°	22°00'	+60'	176°	21°00'	+60'	176°	20°00'	+60'	165°	20
21	26°59'	+60'	176°	25°59'	+60'	176°	24°59'	+60'	176°	24°00'	+60'	176°	23°00'	+60'	176°	22°00'	+60'	176°	21°00'	+60'	90°	21
22	27°59'	+60'	176°	26°59'	+60'	176°	25°59'	+60'	176°	25°00'	+60'	176°	24°00'	+60'	176°	23°00'	+60'	176°	22°00'	+60'	180°	22
23	28°59'	+60'	176°	27°59'	+60'	176°	26°59'	+60'	176°	26°00'	+60'	176°	25°00'	+60'	176°	24°00'	+60'	176°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

4° 356° LHA — Latitude SAME as Declination — 4° 356° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

5° 355° LHA — Latitude SAME as Declination — 5° 355° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°59'	+60'	175°	4°59'	+60'	175°	3°59'	+60'	175°	2°59'	+60'	175°	2°00'	+60'	175°	1°00'	+60'	175°	0°00'	+60'	175°	0
1	6°59'	+60'	175°	5°59'	+60'	175°	4°59'	+60'	175°	3°59'	+60'	175°	3°00'	+60'	175°	2°00'	+60'	175°	1°00'	+60'	180°	1
2	7°59'	+60'	175°	6°59'	+60'	175°	5°59'	+60'	175°	4°59'	+60'	175°	4°00'	+60'	175°	3°00'	+60'	175°	2°00'	+60'	180°	2
3	8°59'	+60'	175°	7°59'	+60'	175°	6°59'	+60'	175°	5°59'	+60'	175°	5°00'	+60'	175°	4°00'	+60'	175°	3°00'	+60'	180°	3
4	9°59'	+60'	175°	8°59'	+60'	175°	7°59'	+60'	175°	6°59'	+60'	175°	6°00'	+60'	175°	5°00'	+60'	175°	4°00'	+60'	155°	4
5	10°59'	+60'	175°	9°59'	+60'	175°	8°59'	+60'	175°	7°59'	+60'	175°	7°00'	+60'	175°	6°00'	+60'	175°	5°00'	+60'	133°	5
6	11°59'	+60'	175°	10°59'	+60'	175°	9°59'	+60'	175°	8°59'	+60'	175°	8°00'	+60'	175°	7°00'	+60'	175°	6°00'	+60'	133°	6
7	12°59'	+60'	175°	11°59'	+60'	175°	10°59'	+60'	175°	9°59'	+60'	175°	9°00'	+60'	175°	8°00'	+60'	175°	7°00'	+60'	133°	7
8	13°59'	+60'	175°	12°59'	+60'	175°	11°59'	+60'	175°	10°59'	+60'	175°	10°00'	+60'	175°	9°00'	+60'	175°	8°00'	+60'	117°	8
9	14°59'	+60'	175°	13°59'	+60'	175°	12°59'	+60'	175°	11°59'	+60'	175°	11°00'	+60'	175°	10°00'	+60'	175°	9°00'	+60'	157°	9
10	15°59'	+60'	175°	14°59'	+60'	175°	13°59'	+60'	175°	12°59'	+60'	175°	12°00'	+60'	175°	11°00'	+60'	175°	10°00'	+60'	157°	10
11	16°59'	+60'	175°	15°59'	+60'	175°	14°59'	+60'	175°	13°59'	+60'	175°	13°00'	+60'	175°	12°00'	+60'	175°	11°00'	+60'	157°	11
12	17°59'	+60'	175°	16°59'	+60'	175°	15°59'	+60'	175°	14°59'	+60'	175°	14°00'	+60'	175°	13°00'	+60'	175°	12°00'	+60'	180°	12
13	18°59'	+60'	175°	17°59'	+60'	175°	16°59'	+60'	175°	15°59'	+60'	175°	15°00'	+60'	175°	14°00'	+60'	175°	13°00'	+60'	180°	13
14	19°59'	+60'	175°	18°59'	+60'	175°	17°59'	+60'	175°	16°59'	+60'	175°	16°00'	+60'	175°	15°00'	+60'	175°	14°00'	+60'	159°	14
15	20°59'	+60'	175°	19°59'	+60'	175°	18°59'	+60'	175°	17°59'	+60'	175°	17°00'	+60'	175°	16°00'	+60'	175°	15°00'	+60'	160°	15
16	21°59'	+60'	175°	20°59'	+60'	175°	19°59'	+60'	175°	18°59'	+60'	175°	18°00'	+60'	175°	17°00'	+60'	175°	16°00'	+60'	161°	16
17	22°59'	+60'	175°	21°59'	+60'	175°	20°59'	+60'	175°	19°59'	+60'	175°	19°00'	+60'	175°	18°00'	+60'	175°	17°00'	+60'	161°	17
18	23°59'	+60'	175°	22°59'	+60'	175°	21°59'	+60'	175°	20°59'	+60'	175°	20°00'	+60'	175°	19°00'	+60'	175°	18°00'	+60'	162°	18
19	24°59'	+60'	175°	23°59'	+60'	175°	22°59'	+60'	175°	21°59'	+60'	175°	21°00'	+60'	175°	20°00'	+60'	175°	19°00'	+60'	163°	19
20	25°59'	+60'	175°	24°59'	+60'	175°	23°59'	+60'	175°	22°59'	+60'	175°	22°00'	+60'	175°	21°00'	+60'	175°	20°00'	+60'	165°	20
21	26°59'	+60'	175°	25°59'	+60'	175°	24°59'	+60'	175°	23°59'	+60'	175°	23°00'	+60'	175°	22°00'	+60'	175°	21°00'	+60'	90°	21
22	27°59'	+60'	175°	26°59'	+60'	175°	25°59'	+60'	175°	24°59'	+60'	175°	24°00'	+60'	175°	23°00'	+60'	175°	22°00'	+60'	180°	22
23	28°59'	+60'	175°	27°59'	+60'	175°	26°59'	+60'	175°	25°59'	+60'	175°	25°00'	+60'	175°	24°00'	+60'	175°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

5° 355° LHA — Latitude SAME as Declination — 5° 355° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

6° 354° LHA — Latitude SAME as Declination — 6° 354° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°58'	+60'	174°	4°58'	+60'	174°	3°59'	+60'	174°	2°59'	+60'	174°	1°59'	+60'	174°	1°00'	+60'	174°	0°00'	+60'	174°	0
1	6°58'	+60'	174°	5°58'	+60'	174°	4°59'	+60'	174°	3°59'	+60'	174°	2°59'	+60'	174°	2°00'	+60'	174°	1°00'	+60'	180°	1
2	7°58'	+60'	174°	6°58'	+60'	174°	5°59'	+60'	174°	4°59'	+60'	174°	3°59'	+60'	174°	3°00'	+60'	174°	2°00'	+60'	180°	2
3	8°58'	+60'	174°	7°58'	+60'	174°	6°59'	+60'	174°	5°59'	+60'	174°	4°59'	+60'	174°	4°00'	+60'	174°	3°00'	+60'	180°	3
4	9°58'	+60'	174°	8°58'	+60'	174°	7°59'	+60'	174°	6°59'	+60'	174°	5°59'	+60'	174°	5°00'	+60'	174°	4°00'	+60'	155°	4
5	10°58'	+60'	174°	9°58'	+60'	174°	8°59'	+60'	174°	7°59'	+60'	174°	6°59'	+60'	174°	6°00'	+60'	174°	5°00'	+60'	133°	5
6	11°58'	+60'	174°	10°58'	+60'	174°	9°59'	+60'	174°	8°59'	+60'	174°	7°59'	+60'	174°	7°00'	+60'	174°	6°00'	+60'	133°	6
7	12°58'	+60'	174°	11°58'	+60'	174°	10°59'	+60'	174°	9°59'	+60'	174°	8°59'	+60'	174°	8°00'	+60'	174°	7°00'	+60'	133°	7
8	13°58'	+60'	174°	12°58'	+60'	174°	11°59'	+60'	174°	10°59'	+60'	174°	9°59'	+60'	174°	9°00'	+60'	174°	8°00'	+60'	117°	8
9	14°58'	+60'	174°	13°58'	+60'	174°	12°59'	+60'	174°	11°59'	+60'	174°	10°59'	+60'	174°	10°00'	+60'	174°	9°00'	+60'	157°	9
10	15°58'	+60'	174°	14°58'	+60'	174°	13°59'	+60'	174°	12°59'	+60'	174°	11°59'	+60'	174°	11°00'	+60'	174°	10°00'	+60'	157°	10
11	16°58'	+60'	174°	15°58'	+60'	174°	14°59'	+60'	174°	13°59'	+60'	174°	12°59'	+60'	174°	12°00'	+60'	174°	11°00'	+60'	157°	11
12	17°58'	+60'	174°	16°58'	+60'	174°	15°59'	+60'	174°	14°59'	+60'	174°	13°59'	+60'	174°	13°00'	+60'	174°	12°00'	+60'	180°	12
13	18°58'	+60'	174°	17°58'	+60'	174°	16°59'	+60'	174°	15°59'	+60'	174°	14°59'	+60'	174°	14°00'	+60'	174°	13°00'	+60'	180°	13
14	19°58'	+60'	174°	18°58'	+60'	174°	17°59'	+60'	174°	16°59'	+60'	174°	15°59'	+60'	174°	15°00'	+60'	174°	14°00'	+60'	159°	14
15	20°58'	+60'	174°	19°58'	+60'	174°	18°59'	+60'	174°	17°59'	+60'	174°	16°59'	+60'	174°	16°00'	+60'	174°	15°00'	+60'	160°	15
16	21°58'	+60'	174°	20°58'	+60'	174°	19°59'	+60'	174°	18°59'	+60'	174°	17°59'	+60'	174°	17°00'	+60'	174°	16°00'	+60'	161°	16
17	22°58'	+60'	174°	21°58'	+60'	174°	20°59'	+60'	174°	19°59'	+60'	174°	18°59'	+60'	174°	18°00'	+60'	174°	17°00'	+60'	161°	17
18	23°58'	+60'	174°	22°58'	+60'	174°	21°59'	+60'	174°	20°59'	+60'	174°	19°59'	+60'	174°	19°00'	+60'	174°	18°00'	+60'	162°	18
19	24°58'	+60'	174°	23°58'	+60'	174°	22°59'	+60'	174°	21°59'	+60'	174°	20°59'	+60'	174°	20°00'	+60'	174°	19°00'	+60'	163°	19
20	25°58'	+60'	174°	24°58'	+60'	174°	23°59'	+60'	174°	22°59'	+60'	174°	21°59'	+60'	174°	21°00'	+60'	174°	20°00'	+60'	165°	20
21	26°58'	+60'	174°	25°58'	+60'	174°	24°59'	+60'	174°	23°59'	+60'	174°	22°59'	+60'	174°	22°00'	+60'	174°	21°00'	+60'	90°	21
22	27°58'	+60'	174°	26°58'	+60'	174°	25°59'	+60'	174°	24°59'	+60'	174°	23°59'	+60'	174°	23°00'	+60'	174°	22°00'	+60'	180°	22
23	28°58'	+60'	174°	27°58'	+60'	174°	26°59'	+60'	174°	25°59'	+60'	174°	24°59'	+60'	174°	24°00'	+60'	174°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

6° 354° LHA — Latitude SAME as Declination — 6° 354° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

7° 353° LHA — Latitude SAME as Declination — 7° 353° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°57'	+60'	173°	4°58'	+60'	173°	3°58'	+60'	173°	2°59'	+60'	173°	1°59'	+60'	173°	1°00'	+60'	173°	0°00'	+60'	173°	0
1	6°57'	+60'	173°	5°58'	+60'	173°	4°58'	+60'	173°	3°59'	+60'	173°	2°59'	+60'	173°	2°00'	+60'	173°	1°00'	+60'	180°	1
2	7°57'	+60'	173°	6°58'	+60'	173°	5°58'	+60'	173°	4°59'	+60'	173°	3°59'	+60'	173°	3°00'	+60'	173°	2°00'	+60'	180°	2
3	8°57'	+60'	173°	7°58'	+60'	173°	6°58'	+60'	173°	5°59'	+60'	173°	4°59'	+60'	173°	4°00'	+60'	173°	3°00'	+60'	180°	3
4	9°57'	+60'	173°	8°58'	+60'	173°	7°58'	+60'	173°	6°59'	+60'	173°	5°59'	+60'	173°	5°00'	+60'	173°	4°00'	+60'	155°	4
5	10°57'	+60'	173°	9°58'	+60'	173°	8°58'	+60'	173°	7°59'	+60'	173°	6°59'	+60'	173°	6°00'	+60'	173°	5°00'	+60'	133°	5
6	11°57'	+60'	173°	10°58'	+60'	173°	9°58'	+60'	173°	8°59'	+60'	173°	7°59'	+60'	173°	7°00'	+60'	173°	6°00'	+60'	133°	6
7	12°57'	+60'	173°	11°58'	+60'	173°	10°58'	+60'	173°	9°59'	+60'	173°	8°59'	+60'	173°	8°00'	+60'	173°	7°00'	+60'	133°	7
8	13°57'	+60'	173°	12°58'	+60'	173°	11°58'	+60'	173°	10°59'	+60'	173°	9°59'	+60'	173°	9°00'	+60'	173°	8°00'	+60'	117°	8
9	14°57'	+60'	173°	13°58'	+60'	173°	12°58'	+60'	173°	11°59'	+60'	173°	10°59'	+60'	173°	10°00'	+60'	173°	9°00'	+60'	157°	9
10	15°57'	+60'	173°	14°58'	+60'	173°	13°58'	+60'	173°	12°59'	+60'	173°	11°59'	+60'	173°	11°00'	+60'	173°	10°00'	+60'	157°	10
11	16°57'	+60'	173°	15°58'	+60'	173°	14°58'	+60'	173°	13°59'	+60'	173°	12°59'	+60'	173°	12°00'	+60'	173°	11°00'	+60'	157°	11
12	17°57'	+60'	173°	16°58'	+60'	173°	15°58'	+60'	173°	14°59'	+60'	173°	13°59'	+60'	173°	13°00'	+60'	173°	12°00'	+60'	180°	12
13	18°57'	+60'	173°	17°58'	+60'	173°	16°58'	+60'	173°	15°59'	+60'	173°	14°59'	+60'	173°	14°00'	+60'	173°	13°00'	+60'	180°	13
14	19°57'	+60'	173°	18°58'	+60'	173°	17°58'	+60'	173°	16°59'	+60'	173°	15°59'	+60'	173°	15°00'	+60'	173°	14°00'	+60'	159°	14
15	20°57'	+60'	173°	19°58'	+60'	173°	18°58'	+60'	173°	17°59'	+60'	173°	16°59'	+60'	173°	16°00'	+60'	173°	15°00'	+60'	160°	15
16	21°57'	+60'	173°	20°58'	+60'	173°	19°58'	+60'	173°	18°59'	+60'	173°	17°59'	+60'	173°	17°00'	+60'	173°	16°00'	+60'	161°	16
17	22°57'	+60'	173°	21°58'	+60'	173°	20°58'	+60'	173°	19°59'	+60'	173°	18°59'	+60'	173°	18°00'	+60'	173°	17°00'	+60'	161°	17
18	23°57'	+60'	173°	22°58'	+60'	173°	21°58'	+60'	173°	20°59'	+60'	173°	19°59'	+60'	173°	19°00'	+60'	173°	18°00'	+60'	162°	18
19	24°57'	+60'	173°	23°58'	+60'	173°	22°58'	+60'	173°	21°59'	+60'	173°	20°59'	+60'	173°	20°00'	+60'	173°	19°00'	+60'	163°	19
20	25°57'	+60'	173°	24°58'	+60'	173°	23°58'	+60'	173°	22°59'	+60'	173°	21°59'	+60'	173°	21°00'	+60'	173°	20°00'	+60'	165°	20
21	26°57'	+60'	173°	25°58'	+60'	173°	24°58'	+60'	173°	23°59'	+60'	173°	22°59'	+60'	173°	22°00'	+60'	173°	21°00'	+60'	90°	21
22	27°57'	+60'	173°	26°58'	+60'	173°	25°58'	+60'	173°	24°59'	+60'	173°	23°59'	+60'	173°	23°00'	+60'	173°	22°00'	+60'	180°	22
23	28°57'	+60'	173°	27°58'	+60'	173°	26°58'	+60'	173°	25°59'	+60'	173°	24°59'	+60'	173°	24°00'	+60'	173°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

7° 353° LHA — Latitude SAME as Declination — 7° 353° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

8° 352° LHA — Latitude SAME as Declination — 8° 352° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°56'	+60'	172°	4°57'	+60'	172°	3°58'	+60'	172°	2°58'	+60'	172°	1°59'	+60'	172°	0°59'	+60'	172°	0°00'	+60'	172°	0
1	6°56'	+60'	172°	5°57'	+60'	172°	4°58'	+60'	172°	3°58'	+60'	172°	2°59'	+60'	172°	1°59'	+60'	172°	1°00'	+60'	164°	1
2	7°56'	+60'	172°	6°57'	+60'	172°	5°58'	+60'	172°	4°58'	+60'	172°	3°59'	+60'	172°	2°59'	+60'	172°	2°00'	+60'	180°	2
3	8°56'	+60'	172°	7°57'	+60'	172°	6°58'	+60'	172°	5°58'	+60'	172°	4°59'	+60'	172°	3°59'	+60'	172°	3°00'	+60'	180°	3
4	9°56'	+60'	172°	8°57'	+60'	172°	7°58'	+60'	172°	6°58'	+60'	172°	5°59'	+60'	172°	4°59'	+60'	172°	4°00'	+60'	155°	4
5	10°56'	+60'	172°	9°57'	+60'	172°	8°58'	+60'	172°	7°58'	+60'	172°	6°59'	+60'	172°	5°59'	+60'	172°	5°00'	+60'	133°	5
6	11°56'	+60'	172°	10°57'	+60'	172°	9°58'	+60'	172°	8°58'	+60'	172°	7°59'	+60'	172°	6°59'	+60'	172°	6°00'	+60'	133°	6
7	12°56'	+60'	172°	11°57'	+60'	172°	10°58'	+60'	172°	9°58'	+60'	172°	8°59'	+60'	172°	7°59'	+60'	172°	7°00'	+60'	133°	7
8	13°56'	+60'	172°	12°57'	+60'	172°	11°58'	+60'	172°	10°58'	+60'	172°	9°59'	+60'	172°	8°59'	+60'	172°	8°00'	+60'	117°	8
9	14°56'	+60'	172°	13°57'	+60'	172°	12°58'	+60'	172°	11°58'	+60'	172°	10°59'	+60'	172°	9°59'	+60'	172°	9°00'	+60'	157°	9
10	15°56'	+60'	172°	14°57'	+60'	172°	13°58'	+60'	172°	12°58'	+60'	172°	11°59'	+60'	172°	10°59'	+60'	172°	10°00'	+60'	157°	10
11	16°56'	+60'	172°	15°57'	+60'	172°	14°58'	+60'	172°	13°58'	+60'	172°	12°59'	+60'	172°	11°59'	+60'	172°	11°00'	+60'	157°	11
12	17°56'	+60'	172°	16°57'	+60'	172°	15°58'	+60'	172°	14°58'	+60'	172°	13°59'	+60'	172°	12°59'	+60'	172°	12°00'	+60'	180°	12
13	18°56'	+60'	172°	17°57'	+60'	172°	16°58'	+60'	172°	15°58'	+60'	172°	14°59'	+60'	172°	13°59'	+60'	172°	13°00'	+60'	180°	13
14	19°56'	+60'	172°	18°57'	+60'	172°	17°58'	+60'	172°	16°58'	+60'	172°	15°59'	+60'	172°	14°59'	+60'	172°	14°00'	+60'	159°	14
15	20°56'	+60'	172°	19°57'	+60'	172°	18°58'	+60'	172°	17°58'	+60'	172°	16°59'	+60'	172°	15°59'	+60'	172°	15°00'	+60'	160°	15
16	21°56'	+60'	172°	20°57'	+60'	172°	19°58'	+60'	172°	18°58'	+60'	172°	17°59'	+60'	172°	16°59'	+60'	172°	16°00'	+60'	161°	16
17	22°56'	+60'	172°	21°57'	+60'	172°	20°58'	+60'	172°	19°58'	+60'	172°	18°59'	+60'	172°	17°59'	+60'	172°	17°00'	+60'	161°	17
18	23°56'	+60'	172°	22°57'	+60'	172°	21°58'	+60'	172°	20°58'	+60'	172°	19°59'	+60'	172°	18°59'	+60'	172°	18°00'	+60'	162°	18
19	24°56'	+60'	172°	23°57'	+60'	172°	22°58'	+60'	172°	21°58'	+60'	172°	20°59'	+60'	172°	19°59'	+60'	172°	19°00'	+60'	163°	19
20	25°56'	+60'	172°	24°57'	+60'	172°	23°58'	+60'	172°	22°58'	+60'	172°	21°59'	+60'	172°	20°59'	+60'	172°	20°00'	+60'	165°	20
21	26°56'	+60'	172°	25°57'	+60'	172°	24°58'	+60'	172°	23°58'	+60'	172°	22°59'	+60'	172°	21°59'	+60'	172°	21°00'	+60'	90°	21
22	27°56'	+60'	172°	26°57'	+60'	172°	25°58'	+60'	172°	24°58'	+60'	172°	23°59'	+60'	172°	22°59'	+60'	172°	22°00'	+60'	180°	22
23	28°56'	+60'	172°	27°57'	+60'	172°	26°58'	+60'	172°	25°58'	+60'	172°	24°59'	+60'	172°	23°59'	+60'	172°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

8° 352° LHA — Latitude SAME as Declination — 8° 352° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

9° 351° LHA — Latitude SAME as Declination — 9° 351° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°56'	+60'	171°	4°56'	+60'	171°	3°57'	+60'	171°	2°58'	+60'	171°	1°59'	+60'	171°	0°59'	+60'	171°	0°00'	+60'	171°	0
1	6°56'	+60'	171°	5°56'	+60'	171°	4°57'	+60'	171°	3°58'	+60'	171°	2°59'	+60'	171°	1°59'	+60'	171°	1°00'	+60'	164°	1
2	7°56'	+60'	171°	6°56'	+60'	171°	5°57'	+60'	171°	4°58'	+60'	171°	3°59'	+60'	171°	2°59'	+60'	171°	2°00'	+60'	180°	2
3	8°56'	+60'	171°	7°56'	+60'	171°	6°57'	+60'	171°	5°58'	+60'	171°	4°59'	+60'	171°	3°59'	+60'	171°	3°00'	+60'	180°	3
4	9°56'	+60'	171°	8°56'	+60'	171°	7°57'	+60'	171°	6°58'	+60'	171°	5°59'	+60'	171°	4°59'	+60'	171°	4°00'	+60'	155°	4
5	10°56'	+60'	171°	9°56'	+60'	171°	8°57'	+60'	171°	7°58'	+60'	171°	6°59'	+60'	171°	5°59'	+60'	171°	5°00'	+60'	133°	5
6	11°56'	+60'	171°	10°56'	+60'	171°	9°57'	+60'	171°	8°58'	+60'	171°	7°59'	+60'	171°	6°59'	+60'	171°	6°00'	+60'	133°	6
7	12°55'	+60'	171°	11°56'	+60'	171°	10°57'	+60'	171°	9°58'	+60'	171°	8°59'	+60'	171°	7°59'	+60'	171°	7°00'	+60'	133°	7
8	13°55'	+60'	171°	12°56'	+60'	171°	11°57'	+60'	171°	10°58'	+60'	171°	9°59'	+60'	171°	8°59'	+60'	171°	8°00'	+60'	117°	8
9	14°55'	+60'	171°	13°56'	+60'	171°	12°57'	+60'	171°	11°58'	+60'	171°	10°59'	+60'	171°	9°59'	+60'	171°	9°00'	+60'	157°	9
10	15°55'	+60'	171°	14°56'	+60'	171°	13°57'	+60'	171°	12°58'	+60'	171°	11°59'	+60'	171°	10°59'	+60'	171°	10°00'	+60'	157°	10
11	16°55'	+60'	171°	15°56'	+60'	171°	14°57'	+60'	171°	13°58'	+60'	171°	12°59'	+60'	171°	11°59'	+60'	171°	11°00'	+60'	157°	11
12	17°55'	+60'	171°	16°56'	+60'	171°	15°57'	+60'	171°	14°58'	+60'	171°	13°59'	+60'	171°	12°59'	+60'	171°	12°00'	+60'	180°	12
13	18°55'	+60'	171°	17°56'	+60'	171°	16°57'	+60'	171°	15°58'	+60'	171°	14°59'	+60'	171°	13°59'	+60'	171°	13°00'	+60'	180°	13
14	19°55'	+60'	171°	18°56'	+60'	171°	17°57'	+60'	171°	16°58'	+60'	171°	15°59'	+60'	171°	14°59'	+60'	171°	14°00'	+60'	159°	14
15	20°55'	+60'	171°	19°56'	+60'	171°	18°57'	+60'	171°	17°58'	+60'	171°	16°59'	+60'	171°	15°59'	+60'	171°	15°00'	+60'	160°	15
16	21°55'	+60'	171°	20°56'	+60'	171°	19°57'	+60'	171°	18°58'	+60'	171°	17°59'	+60'	171°	16°59'	+60'	171°	16°00'	+60'	161°	16
17	22°55'	+60'	171°	21°56'	+60'	171°	20°57'	+60'	171°	19°58'	+60'	171°	18°59'	+60'	171°	17°59'	+60'	171°	17°00'	+60'	161°	17
18	23°55'	+60'	171°	22°56'	+60'	171°	21°57'	+60'	171°	20°58'	+60'	171°	19°59'	+60'	171°	18°59'	+60'	171°	18°00'	+60'	162°	18
19	24°55'	+60'	171°	23°56'	+60'	171°	22°57'	+60'	171°	21°58'	+60'	171°	20°59'	+60'	171°	19°59'	+60'	171°	19°00'	+60'	163°	19
20	25°55'	+60'	171°	24°56'	+60'	171°	23°57'	+60'	171°	22°58'	+60'	171°	21°59'	+60'	171°	20°59'	+60'	171°	20°00'	+60'	165°	20
21	26°55'	+60'	171°	25°56'	+60'	171°	24°57'	+60'	171°	23°58'	+60'	171°	22°59'	+60'	171°	21°59'	+60'	171°	21°00'	+60'	90°	21
22	27°55'	+60'	171°	26°56'	+60'	171°	25°57'	+60'	171°	24°58'	+60'	171°	23°59'	+60'	171°	22°59'	+60'	171°	22°00'	+60'	180°	22
23	28°55'	+60'	171°	27°56'	+60'	171°	26°57'	+60'	171°	25°58'	+60'	171°	24°58'	+60'	171°	23°59'	+60'	171°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

9° 351° LHA — Latitude SAME as Declination — 9° 351° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

10° 350° LHA — Latitude SAME as Declination — 10° 350° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°55'	+60'	170°	4°55'	+60'	170°	3°56'	+60'	170°	2°57'	+60'	170°	1°58'	+60'	170°	0°59'	+60'	170°	0°00'	+60'	170°	0
1	6°55'	+60'	170°	5°55'	+60'	170°	4°56'	+60'	170°	3°57'	+60'	170°	2°58'	+60'	170°	1°59'	+60'	170°	1°00'	+60'	164°	1
2	7°54'	+60'	170°	6°55'	+60'	170°	5°56'	+60'	170°	4°57'	+60'	170°	3°58'	+60'	170°	2°59'	+60'	170°	2°00'	+60'	180°	2
3	8°54'	+60'	170°	7°55'	+60'	170°	6°56'	+60'	170°	5°57'	+60'	170°	4°58'	+60'	170°	3°59'	+60'	170°	3°00'	+60'	180°	3
4	9°54'	+60'	170°	8°55'	+60'	170°	7°56'	+60'	170°	6°57'	+60'	170°	5°58'	+60'	170°	4°59'	+60'	170°	4°00'	+60'	155°	4
5	10°54'	+60'	170°	9°55'	+60'	170°	8°56'	+60'	170°	7°57'	+60'	170°	6°58'	+60'	170°	5°59'	+60'	170°	5°00'	+60'	133°	5
6	11°54'	+60'	170°	10°55'	+60'	170°	9°56'	+60'	170°	8°57'	+60'	170°	7°58'	+60'	170°	6°59'	+60'	170°	6°00'	+60'	133°	6
7	12°54'	+60'	170°	11°55'	+60'	170°	10°56'	+60'	170°	9°57'	+60'	170°	8°58'	+60'	170°	7°59'	+60'	170°	7°00'	+60'	133°	7
8	13°54'	+60'	170°	12°55'	+60'	170°	11°56'	+60'	170°	10°57'	+60'	170°	9°58'	+60'	170°	8°59'	+60'	170°	8°00'	+60'	117°	8
9	14°54'	+60'	170°	13°55'	+60'	170°	12°56'	+60'	170°	11°57'	+60'	170°	10°58'	+60'	170°	9°59'	+60'	170°	9°00'	+60'	157°	9
10	15°54'	+60'	170°	14°55'	+60'	170°	13°56'	+60'	170°	12°57'	+60'	170°	11°58'	+60'	170°	10°59'	+60'	170°	10°00'	+60'	157°	10
11	16°54'	+60'	170°	15°55'	+60'	170°	14°56'	+60'	170°	13°57'	+60'	170°	12°58'	+60'	170°	11°59'	+60'	170°	11°00'	+60'	157°	11
12	17°54'	+60'	170°	16°55'	+60'	170°	15°56'	+60'	170°	14°57'	+60'	170°	13°58'	+60'	170°	12°59'	+60'	170°	12°00'	+60'	180°	12
13	18°54'	+60'	170°	17°55'	+60'	170°	16°56'	+60'	170°	15°57'	+60'	170°	14°58'	+60'	170°	13°59'	+60'	170°	13°00'	+60'	180°	13
14	19°54'	+60'	170°	18°55'	+60'	170°	17°56'	+60'	170°	16°57'	+60'	170°	15°58'	+60'	170°	14°59'	+60'	170°	14°00'	+60'	159°	14
15	20°54'	+60'	170°	19°55'	+60'	170°	18°56'	+60'	170°	17°57'	+60'	170°	16°58'	+60'	170°	15°59'	+60'	170°	15°00'	+60'	160°	15
16	21°54'	+60'	170°	20°55'	+60'	170°	19°56'	+60'	170°	18°57'	+60'	170°	17°58'	+60'	170°	16°59'	+60'	170°	16°00'	+60'	161°	16
17	22°54'	+60'	170°	21°55'	+60'	170°	20°56'	+60'	170°	19°57'	+60'	170°	18°58'	+60'	170°	17°59'	+60'	170°	17°00'	+60'	161°	17
18	23°54'	+60'	170°	22°55'	+60'	170°	21°56'	+60'	170°	20°57'	+60'	170°	19°58'	+60'	170°	18°59'	+60'	170°	18°00'	+60'	162°	18
19	24°54'	+60'	170°	23°55'	+60'	170°	22°56'	+60'	170°	21°57'	+60'	170°	20°58'	+60'	170°	19°59'	+60'	170°	19°00'	+60'	163°	19
20	25°54'	+60'	170°	24°55'	+60'	170°	23°56'	+60'	170°	22°57'	+60'	170°	21°58'	+60'	170°	20°59'	+60'	170°	20°00'	+60'	165°	20
21	26°54'	+60'	170°	25°55'	+60'	170°	24°56'	+60'	170°	23°57'	+60'	170°	22°58'	+60'	170°	21°59'	+60'	170°	21°00'	+60'	90°	21
22	27°54'	+60'	170°	26°55'	+60'	170°	25°56'	+60'	170°	24°57'	+60'	170°	23°58'	+60'	170°	22°59'	+60'	170°	22°00'	+60'	180°	22
23	28°54'	+60'	169°	27°55'	+60'	170°	26°56'	+60'	170°	25°57'	+60'	170°	24°58'	+60'	170°	23°59'	+60'	170°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

10° 350° LHA — Latitude SAME as Declination — 10° 350° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

11° 349° LHA — Latitude SAME as Declination — 11° 349° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°53'	+60'	169°	4°54'	+60'	169°	3°56'	+60'	169°	2°57'	+60'	169°	1°58'	+60'	169°	0°59'	+60'	169°	0°00'	+60'	169°	0
1	6°53'	+60'	169°	5°54'	+60'	169°	4°56'	+60'	169°	3°57'	+60'	169°	2°58'	+60'	169°	1°59'	+60'	169°	1°00'	+60'	164°	1
2	7°53'	+60'	169°	6°54'	+60'	169°	5°56'	+60'	169°	4°57'	+60'	169°	3°58'	+60'	169°	2°59'	+60'	169°	2°00'	+60'	180°	2
3	8°53'	+60'	169°	7°54'	+60'	169°	6°56'	+60'	169°	5°57'	+60'	169°	4°58'	+60'	169°	3°59'	+60'	169°	3°00'	+60'	180°	3
4	9°53'	+60'	169°	8°54'	+60'	169°	7°56'	+60'	169°	6°57'	+60'	169°	5°58'	+60'	169°	4°59'	+60'	169°	4°00'	+60'	155°	4
5	10°53'	+60'	169°	9°54'	+60'	169°	8°56'	+60'	169°	7°57'	+60'	169°	6°58'	+60'	169°	5°59'	+60'	169°	5°00'	+60'	133°	5
6	11°53'	+60'	169°	10°54'	+60'	169°	9°56'	+60'	169°	8°57'	+60'	169°	7°58'	+60'	169°	6°59'	+60'	169°	6°00'	+60'	133°	6
7	12°53'	+60'	169°	11°54'	+60'	169°	10°56'	+60'	169°	9°57'	+60'	169°	8°58'	+60'	169°	7°59'	+60'	169°	7°00'	+60'	133°	7
8	13°53'	+60'	169°	12°54'	+60'	169°	11°56'	+60'	169°	10°57'	+60'	169°	9°58'	+60'	169°	8°59'	+60'	169°	8°00'	+60'	117°	8
9	14°53'	+60'	169°	13°54'	+60'	169°	12°56'	+60'	169°	11°57'	+60'	169°	10°58'	+60'	169°	9°59'	+60'	169°	9°00'	+60'	157°	9
10	15°53'	+60'	169°	14°54'	+60'	169°	13°56'	+60'	169°	12°57'	+60'	169°	11°58'	+60'	169°	10°59'	+60'	169°	10°00'	+60'	157°	10
11	16°53'	+60'	169°	15°54'	+60'	169°	14°56'	+60'	169°	13°57'	+60'	169°	12°58'	+60'	169°	11°59'	+60'	169°	11°00'	+60'	157°	11
12	17°53'	+60'	169°	16°54'	+60'	169°	15°56'	+60'	169°	14°57'	+60'	169°	13°58'	+60'	169°	12°59'	+60'	169°	12°00'	+60'	180°	12
13	18°53'	+60'	169°	17°54'	+60'	169°	16°56'	+60'	169°	15°57'	+60'	169°	14°58'	+60'	169°	13°59'	+60'	169°	13°00'	+60'	180°	13
14	19°53'	+60'	169°	18°54'	+60'	169°	17°56'	+60'	169°	16°57'	+60'	169°	15°58'	+60'	169°	14°59'	+60'	169°	14°00'	+60'	159°	14
15	20°53'	+60'	169°	19°54'	+60'	169°	18°56'	+60'	169°	17°57'	+60'	169°	16°58'	+60'	169°	15°59'	+60'	169°	15°00'	+60'	160°	15
16	21°53'	+60'	169°	20°54'	+60'	169°	19°55'	+60'	169°	18°57'	+60'	169°	17°58'	+60'	169°	16°59'	+60'	169°	16°00'	+60'	161°	16
17	22°53'	+60'	169°	21°54'	+60'	169°	20°55'	+60'	169°	19°57'	+60'	169°	18°58'	+60'	169°	17°59'	+60'	169°	17°00'	+60'	161°	17
18	23°53'	+60'	169°	22°54'	+60'	169°	21°55'	+60'	169°	20°57'	+60'	169°	19°58'	+60'	169°	18°59'	+60'	169°	18°00'	+60'	162°	18
19	24°53'	+60'	169°	23°54'	+60'	169°	22°55'	+60'	169°	21°57'	+60'	169°	20°58'	+60'	169°	19°59'	+60'	169°	19°00'	+60'	163°	19
20	25°53'	+60'	169°	24°54'	+60'	169°	23°55'	+60'	169°	22°57'	+60'	169°	21°58'	+60'	169°	20°59'	+60'	169°	20°00'	+60'	165°	20
21	26°53'	+60'	168°	25°54'	+60'	169°	24°55'	+60'	169°	23°57'	+60'	169°	22°58'	+60'	169°	21°59'	+60'	169°	21°00'	+60'	90°	21
22	27°53'	+60'	168°	26°54'	+60'	169°	25°55'	+60'	169°	24°57'	+60'	169°	23°58'	+60'	169°	22°59'	+60'	169°	22°00'	+60'	180°	22
23	28°53'	+60'	168°	27°54'	+60'	169°	26°55'	+60'	169°	25°57'	+60'	169°	24°58'	+60'	169°	23°59'	+60'	169°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

11° 349° LHA — Latitude SAME as Declination — 11° 349° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

12° 348° LHA — Latitude SAME as Declination — 12° 348° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°52'	+60'	168°	4°53'	+60'	168°	3°55'	+60'	168°	2°56'	+60'	168°	1°57'	+60'	168°	0°59'	+60'	168°	0°00'	+60'	168°	0
1	6°52'	+60'	168°	5°53'	+60'	168°	4°55'	+60'	168°	3°56'	+60'	168°	2°57'	+60'	168°	1°59'	+60'	168°	1°00'	+60'	164°	1
2	7°52'	+60'	168°	6°53'	+60'	168°	5°55'	+60'	168°	4°56'	+60'	168°	3°57'	+60'	168°	2°59'	+60'	168°	2°00'	+60'	180°	2
3	8°52'	+60'	168°	7°53'	+60'	168°	6°55'	+60'	168°	5°56'	+60'	168°	4°57'	+60'	168°	3°59'	+60'	168°	3°00'	+60'	180°	3
4	9°52'	+60'	168°	8°53'	+60'	168°	7°55'	+60'	168°	6°56'	+60'	168°	5°57'	+60'	168°	4°59'	+60'	168°	4°00'	+60'	155°	4
5	10°52'	+60'	168°	9°53'	+60'	168°	8°55'	+60'	168°	7°56'	+60'	168°	6°57'	+60'	168°	5°59'	+60'	168°	5°00'	+60'	133°	5
6	11°52'	+60'	168°	10°53'	+60'	168°	9°55'	+60'	168°	8°56'	+60'	168°	7°57'	+60'	168°	6°59'	+60'	168°	6°00'	+60'	133°	6
7	12°52'	+60'	168°	11°53'	+60'	168°	10°55'	+60'	168°	9°56'	+60'	168°	8°57'	+60'	168°	7°59'	+60'	168°	7°00'	+60'	133°	7
8	13°52'	+60'	168°	12°53'	+60'	168°	11°55'	+60'	168°	10°56'	+60'	168°	9°57'	+60'	168°	8°59'	+60'	168°	8°00'	+60'	117°	8
9	14°52'	+60'	168°	13°53'	+60'	168°	12°55'	+60'	168°	11°56'	+60'	168°	10°57'	+60'	168°	9°59'	+60'	168°	9°00'	+60'	157°	9
10	15°52'	+60'	168°	14°53'	+60'	168°	13°55'	+60'	168°	12°56'	+60'	168°	11°57'	+60'	168°	10°59'	+60'	168°	10°00'	+60'	157°	10
11	16°52'	+60'	168°	15°53'	+60'	168°	14°55'	+60'	168°	13°56'	+60'	168°	12°57'	+60'	168°	11°59'	+60'	168°	11°00'	+60'	157°	11
12	17°52'	+60'	168°	16°53'	+60'	168°	15°55'	+60'	168°	14°56'	+60'	168°	13°57'	+60'	168°	12°59'	+60'	168°	12°00'	+60'	180°	12
13	18°52'	+60'	168°	17°53'	+60'	168°	16°55'	+60'	168°	15°56'	+60'	168°	14°57'	+60'	168°	13°59'	+60'	168°	13°00'	+60'	180°	13
14	19°52'	+60'	168°	18°53'	+60'	168°	17°55'	+60'	168°	16°56'	+60'	168°	15°57'	+60'	168°	14°59'	+60'	168°	14°00'	+60'	159°	14
15	20°52'	+60'	168°	19°53'	+60'	168°	18°55'	+60'	168°	17°56'	+60'	168°	16°57'	+60'	168°	15°59'	+60'	168°	15°00'	+60'	160°	15
16	21°52'	+60'	168°	20°53'	+60'	168°	19°55'	+60'	168°	18°56'	+60'	168°	17°57'	+60'	168°	16°59'	+60'	168°	16°00'	+60'	161°	16
17	22°52'	+60'	168°	21°53'	+60'	168°	20°55'	+60'	168°	19°56'	+60'	168°	18°57'	+60'	168°	17°59'	+60'	168°	17°00'	+60'	161°	17
18	23°52'	+60'	168°	22°53'	+60'	168°	21°55'	+60'	168°	20°56'	+60'	168°	19°57'	+60'	168°	18°59'	+60'	168°	18°00'	+60'	162°	18
19	24°52'	+60'	167°	23°53'	+60'	168°	22°55'	+60'	168°	21°56'	+60'	168°	20°57'	+60'	168°	19°59'	+60'	168°	19°00'	+60'	163°	19
20	25°52'	+60'	167°	24°53'	+60'	168°	23°55'	+60'	168°	22°56'	+60'	168°	21°57'	+60'	168°	20°59'	+60'	168°	20°00'	+60'	165°	20
21	26°52'	+60'	167°	25°53'	+60'	168°	24°55'	+60'	168°	23°56'	+60'	168°	22°57'	+60'	168°	21°59'	+60'	168°	21°00'	+60'	90°	21
22	27°52'	+60'	167°	26°53'	+60'	168°	25°55'	+60'	168°	24°56'	+60'	168°	23°57'	+60'	168°	22°59'	+60'	168°	22°00'	+60'	180°	22
23	28°52'	+60'	167°	27°53'	+60'	167°	26°55'	+60'	168°	25°56'	+60'	168°	24°57'	+60'	168°	23°59'	+60'	168°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

12° 348° LHA — Latitude SAME as Declination — 12° 348° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

13° 347° LHA — Latitude SAME as Declination — 13° 347° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°51'	+60'	167°	4°52'	+60'	167°	3°54'	+60'	167°	2°55'	+60'	167°	1°57'	+60'	167°	0°58'	+60'	167°	0°00'	+60'	167°	0
1	6°51'	+60'	167°	5°52'	+60'	167°	4°54'	+60'	167°	3°55'	+60'	167°	2°57'	+60'	167°	1°58'	+60'	167°	1°00'	+60'	164°	1
2	7°51'	+60'	167°	6°52'	+60'	167°	5°54'	+60'	167°	4°55'	+60'	167°	3°57'	+60'	167°	2°58'	+60'	167°	2°00'	+60'	180°	2
3	8°51'	+60'	167°	7°52'	+60'	167°	6°54'	+60'	167°	5°55'	+60'	167°	4°57'	+60'	167°	3°58'	+60'	167°	3°00'	+60'	180°	3
4	9°51'	+60'	167°	8°52'	+60'	167°	7°54'	+60'	167°	6°55'	+60'	167°	5°57'	+60'	167°	4°58'	+60'	167°	4°00'	+60'	155°	4
5	10°51'	+60'	167°	9°52'	+60'	167°	8°54'	+60'	167°	7°55'	+60'	167°	6°57'	+60'	167°	5°58'	+60'	167°	5°00'	+60'	133°	5
6	11°51'	+60'	167°	10°52'	+60'	167°	9°54'	+60'	167°	8°55'	+60'	167°	7°57'	+60'	167°	6°58'	+60'	167°	6°00'	+60'	133°	6
7	12°51'	+60'	167°	11°52'	+60'	167°	10°54'	+60'	167°	9°55'	+60'	167°	8°57'	+60'	167°	7°58'	+60'	167°	7°00'	+60'	133°	7
8	13°51'	+60'	167°	12°52'	+60'	167°	11°54'	+60'	167°	10°55'	+60'	167°	9°57'	+60'	167°	8°58'	+60'	167°	8°00'	+60'	117°	8
9	14°51'	+60'	167°	13°52'	+60'	167°	12°54'	+60'	167°	11°55'	+60'	167°	10°57'	+60'	167°	9°58'	+60'	167°	9°00'	+60'	157°	9
10	15°51'	+60'	167°	14°52'	+60'	167°	13°54'	+60'	167°	12°55'	+60'	167°	11°57'	+60'	167°	10°58'	+60'	167°	10°00'	+60'	157°	10
11	16°51'	+60'	167°	15°52'	+60'	167°	14°54'	+60'	167°	13°55'	+60'	167°	12°57'	+60'	167°	11°58'	+60'	167°	11°00'	+60'	157°	11
12	17°51'	+60'	167°	16°52'	+60'	167°	15°54'	+60'	167°	14°55'	+60'	167°	13°57'	+60'	167°	12°58'	+60'	167°	12°00'	+60'	180°	12
13	18°51'	+60'	167°	17°52'	+60'	167°	16°54'	+60'	167°	15°55'	+60'	167°	14°57'	+60'	167°	13°58'	+60'	167°	13°00'	+60'	180°	13
14	19°50'	+60'	167°	18°52'	+60'	167°	17°54'	+60'	167°	16°55'	+60'	167°	15°57'	+60'	167°	14°58'	+60'	167°	14°00'	+60'	159°	14
15	20°50'	+60'	167°	19°52'	+60'	167°	18°54'	+60'	167°	17°55'	+60'	167°	16°57'	+60'	167°	15°58'	+60'	167°	15°00'	+60'	160°	15
16	21°50'	+60'	167°	20°52'	+60'	167°	19°54'	+60'	167°	18°55'	+60'	167°	17°57'	+60'	167°	16°58'	+60'	167°	16°00'	+60'	161°	16
17	22°50'	+60'	167°	21°52'	+60'	167°	20°54'	+60'	167°	19°55'	+60'	167°	18°57'	+60'	167°	17°58'	+60'	167°	17°00'	+60'	161°	17
18	23°50'	+60'	166°	22°52'	+60'	167°	21°54'	+60'	167°	20°55'	+60'	167°	19°57'	+60'	167°	18°58'	+60'	167°	18°00'	+60'	162°	18
19	24°50'	+60'	166°	23°52'	+60'	167°	22°54'	+60'	167°	21°55'	+60'	167°	20°57'	+60'	167°	19°58'	+60'	167°	19°00'	+60'	163°	19
20	25°50'	+60'	166°	24°52'	+60'	167°	23°54'	+60'	167°	22°55'	+60'	167°	21°57'	+60'	167°	20°58'	+60'	167°	20°00'	+60'	165°	20
21	26°50'	+60'	166°	25°52'	+60'	167°	24°54'	+60'	167°	23°55'	+60'	167°	22°57'	+60'	167°	21°58'	+60'	167°	21°00'	+60'	90°	21
22	27°50'	+60'	166°	26°52'	+60'	166°	25°54'	+60'	167°	24°55'	+60'	167°	23°57'	+60'	167°	22°58'	+60'	167°	22°00'	+60'	180°	22
23	28°50'	+60'	166°	27°52'	+60'	166°	26°54'	+60'	167°	25°55'	+60'	167°	24°57'	+60'	167°	23°58'	+60'	167°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

13° 347° LHA — Latitude SAME as Declination — 13° 347° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

14° 346° LHA — Latitude SAME as Declination — 14° 346° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°49'	+60'	166°	4°51'	+60'	166°	3°53'	+60'	166°	2°55'	+60'	166°	1°56'	+60'	166°	0°58'	+60'	166°	0°00'	+60'	166°	0
1	6°49'	+60'	166°	5°51'	+60'	166°	4°53'	+60'	166°	3°55'	+60'	166°	2°56'	+60'	166°	1°58'	+60'	166°	1°00'	+60'	164°	1
2	7°49'	+60'	166°	6°51'	+60'	166°	5°53'	+60'	166°	4°55'	+60'	166°	3°56'	+60'	166°	2°58'	+60'	166°	2°00'	+60'	180°	2
3	8°49'	+60'	166°	7°51'	+60'	166°	6°53'	+60'	166°	5°55'	+60'	166°	4°56'	+60'	166°	3°58'	+60'	166°	3°00'	+60'	180°	3
4	9°49'	+60'	166°	8°51'	+60'	166°	7°53'	+60'	166°	6°55'	+60'	166°	5°56'	+60'	166°	4°58'	+60'	166°	4°00'	+60'	155°	4
5	10°49'	+60'	166°	9°51'	+60'	166°	8°53'	+60'	166°	7°55'	+60'	166°	6°56'	+60'	166°	5°58'	+60'	166°	5°00'	+60'	133°	5
6	11°49'	+60'	166°	10°51'	+60'	166°	9°53'	+60'	166°	8°55'	+60'	166°	7°56'	+60'	166°	6°58'	+60'	166°	6°00'	+60'	133°	6
7	12°49'	+60'	166°	11°51'	+60'	166°	10°53'	+60'	166°	9°55'	+60'	166°	8°56'	+60'	166°	7°58'	+60'	166°	7°00'	+60'	133°	7
8	13°49'	+60'	166°	12°51'	+60'	166°	11°53'	+60'	166°	10°55'	+60'	166°	9°56'	+60'	166°	8°58'	+60'	166°	8°00'	+60'	117°	8
9	14°49'	+60'	166°	13°51'	+60'	166°	12°53'	+60'	166°	11°55'	+60'	166°	10°56'	+60'	166°	9°58'	+60'	166°	9°00'	+60'	157°	9
10	15°49'	+60'	166°	14°51'	+60'	166°	13°53'	+60'	166°	12°55'	+60'	166°	11°56'	+60'	166°	10°58'	+60'	166°	10°00'	+60'	157°	10
11	16°49'	+60'	166°	15°51'	+60'	166°	14°53'	+60'	166°	13°55'	+60'	166°	12°56'	+60'	166°	11°58'	+60'	166°	11°00'	+60'	157°	11
12	17°49'	+60'	166°	16°51'	+60'	166°	15°53'	+60'	166°	14°55'	+60'	166°	13°56'	+60'	166°	12°58'	+60'	166°	12°00'	+60'	180°	12
13	18°49'	+60'	166°	17°51'	+60'	166°	16°53'	+60'	166°	15°55'	+60'	166°	14°56'	+60'	166°	13°58'	+60'	166°	13°00'	+60'	180°	13
14	19°49'	+60'	166°	18°51'	+60'	166°	17°53'	+60'	166°	16°55'	+60'	166°	15°56'	+60'	166°	14°58'	+60'	166°	14°00'	+60'	159°	14
15	20°49'	+60'	166°	19°51'	+60'	166°	18°53'	+60'	166°	17°55'	+60'	166°	16°56'	+60'	166°	15°58'	+60'	166°	15°00'	+60'	160°	15
16	21°49'	+60'	165°	20°51'	+60'	166°	19°53'	+60'	166°	18°55'	+60'	166°	17°56'	+60'	166°	16°58'	+60'	166°	16°00'	+60'	161°	16
17	22°49'	+60'	165°	21°51'	+60'	166°	20°53'	+60'	166°	19°55'	+60'	166°	18°56'	+60'	166°	17°58'	+60'	166°	17°00'	+60'	161°	17
18	23°49'	+60'	165°	22°51'	+60'	166°	21°53'	+60'	166°	20°55'	+60'	166°	19°56'	+60'	166°	18°58'	+60'	166°	18°00'	+60'	162°	18
19	24°49'	+60'	165°	23°51'	+60'	166°	22°53'	+60'	166°	21°55'	+60'	166°	20°56'	+60'	166°	19°58'	+60'	166°	19°00'	+60'	163°	19
20	25°49'	+60'	165°	24°51'	+60'	165°	23°53'	+60'	166°	22°55'	+60'	166°	21°56'	+60'	166°	20°58'	+60'	166°	20°00'	+60'	165°	20
21	26°49'	+60'	165°	25°51'	+60'	165°	24°53'	+60'	166°	23°55'	+60'	166°	22°56'	+60'	166°	21°58'	+60'	166°	21°00'	+60'	90°	21
22	27°49'	+60'	165°	26°51'	+60'	165°	25°53'	+60'	166°	24°55'	+60'	166°	23°56'	+60'	166°	22°58'	+60'	166°	22°00'	+60'	180°	22
23	28°49'	+60'	165°	27°51'	+60'	165°	26°53'	+60'	166°	25°55'	+60'	166°	24°56'	+60'	166°	23°58'	+60'	166°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

14° 346° LHA — Latitude SAME as Declination — 14° 346° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

15° 345° LHA — Latitude SAME as Declination — 15° 345° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°48'	+60'	165°	4°50'	+60'	165°	3°52'	+60'	165°	2°54'	+60'	165°	1°56'	+60'	165°	0°58'	+60'	165°	0°00'	+60'	165°	0
1	6°48'	+60'	165°	5°50'	+60'	165°	4°52'	+60'	165°	3°54'	+60'	165°	2°56'	+60'	165°	1°58'	+60'	165°	1°00'	+60'	164°	1
2	7°48'	+60'	165°	6°50'	+60'	165°	5°52'	+60'	165°	4°54'	+60'	165°	3°56'	+60'	165°	2°58'	+60'	165°	2°00'	+60'	180°	2
3	8°48'	+60'	165°	7°50'	+60'	165°	6°52'	+60'	165°	5°54'	+60'	165°	4°56'	+60'	165°	3°58'	+60'	165°	3°00'	+60'	180°	3
4	9°48'	+60'	165°	8°50'	+60'	165°	7°52'	+60'	165°	6°54'	+60'	165°	5°56'	+60'	165°	4°58'	+60'	165°	4°00'	+60'	155°	4
5	10°48'	+60'	165°	9°50'	+60'	165°	8°52'	+60'	165°	7°54'	+60'	165°	6°56'	+60'	165°	5°58'	+60'	165°	5°00'	+60'	133°	5
6	11°48'	+60'	165°	10°50'	+60'	165°	9°52'	+60'	165°	8°54'	+60'	165°	7°56'	+60'	165°	6°58'	+60'	165°	6°00'	+60'	133°	6
7	12°48'	+60'	165°	11°50'	+60'	165°	10°52'	+60'	165°	9°54'	+60'	165°	8°56'	+60'	165°	7°58'	+60'	165°	7°00'	+60'	133°	7
8	13°48'	+60'	165°	12°50'	+60'	165°	11°52'	+60'	165°	10°54'	+60'	165°	9°56'	+60'	165°	8°58'	+60'	165°	8°00'	+60'	117°	8
9	14°47'	+60'	165°	13°50'	+60'	165°	12°52'	+60'	165°	11°54'	+60'	165°	10°56'	+60'	165°	9°58'	+60'	165°	9°00'	+60'	157°	9
10	15°47'	+60'	165°	14°50'	+60'	165°	13°52'	+60'	165°	12°54'	+60'	165°	11°56'	+60'	165°	10°58'	+60'	165°	10°00'	+60'	157°	10
11	16°47'	+60'	165°	15°50'	+60'	165°	14°52'	+60'	165°	13°54'	+60'	165°	12°56'	+60'	165°	11°58'	+60'	165°	11°00'	+60'	157°	11
12	17°47'	+60'	165°	16°50'	+60'	165°	15°52'	+60'	165°	14°54'	+60'	165°	13°56'	+60'	165°	12°58'	+60'	165°	12°00'	+60'	180°	12
13	18°47'	+60'	165°	17°50'	+60'	165°	16°52'	+60'	165°	15°54'	+60'	165°	14°56'	+60'	165°	13°58'	+60'	165°	13°00'	+60'	180°	13
14	19°47'	+60'	165°	18°50'	+60'	165°	17°52'	+60'	165°	16°54'	+60'	165°	15°56'	+60'	165°	14°58'	+60'	165°	14°00'	+60'	159°	14
15	20°47'	+60'	164°	19°50'	+60'	165°	18°52'	+60'	165°	17°54'	+60'	165°	16°56'	+60'	165°	15°58'	+60'	165°	15°00'	+60'	160°	15
16	21°47'	+60'	164°	20°49'	+60'	165°	19°52'	+60'	165°	18°54'	+60'	165°	17°56'	+60'	165°	16°58'	+60'	165°	16°00'	+60'	161°	16
17	22°47'	+60'	164°	21°49'	+60'	165°	20°52'	+60'	165°	19°54'	+60'	165°	18°56'	+60'	165°	17°58'	+60'	165°	17°00'	+60'	161°	17
18	23°47'	+60'	164°	22°49'	+60'	165°	21°52'	+60'	165°	20°54'	+60'	165°	19°56'	+60'	165°	18°58'	+60'	165°	18°00'	+60'	162°	18
19	24°47'	+60'	164°	23°49'	+60'	164°	22°52'	+60'	165°	21°54'	+60'	165°	20°56'	+60'	165°	19°58'	+60'	165°	19°00'	+60'	163°	19
20	25°47'	+60'	164°	24°49'	+60'	164°	23°52'	+60'	165°	22°54'	+60'	165°	21°56'	+60'	165°	20°58'	+60'	165°	20°00'	+60'	165°	20
21	26°47'	+60'	164°	25°49'	+60'	164°	24°52'	+60'	165°	23°54'	+60'	165°	22°56'	+60'	165°	21°58'	+60'	165°	21°00'	+60'	90°	21
22	27°47'	+60'	164°	26°49'	+60'	164°	25°52'	+60'	165°	24°54'	+60'	165°	23°56'	+60'	165°	22°58'	+60'	165°	22°00'	+60'	180°	22
23	28°47'	+60'	164°	27°49'	+60'	164°	26°52'	+60'	165°	25°54'	+60'	165°	24°56'	+60'	165°	23°58'	+60'	165°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

15° 345° LHA — Latitude SAME as Declination — 15° 345° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

16° 344° LHA — Latitude SAME as Declination — 16° 344° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°46'	+60'	164°	4°48'	+60'	164°	3°51'	+60'	164°	2°53'	+60'	164°	1°55'	+60'	164°	0°58'	+60'	164°	0°00'	+60'	164°	0
1	6°46'	+60'	164°	5°48'	+60'	164°	4°51'	+60'	164°	3°53'	+60'	164°	2°55'	+60'	164°	1°58'	+60'	164°	1°00'	+60'	164°	1
2	7°46'	+60'	164°	6°48'	+60'	164°	5°51'	+60'	164°	4°53'	+60'	164°	3°55'	+60'	164°	2°58'	+60'	164°	2°00'	+60'	155°	2
3	8°46'	+60'	164°	7°48'	+60'	164°	6°51'	+60'	164°	5°53'	+60'	164°	4°55'	+60'	164°	3°58'	+60'	164°	3°00'	+60'	155°	3
4	9°46'	+60'	164°	8°48'	+60'	164°	7°51'	+60'	164°	6°53'	+60'	164°	5°55'	+60'	164°	4°58'	+60'	164°	4°00'	+60'	155°	4
5	10°46'	+60'	164°	9°48'	+60'	164°	8°51'	+60'	164°	7°53'	+60'	164°	6°55'	+60'	164°	5°58'	+60'	164°	5°00'	+60'	133°	5
6	11°46'	+60'	164°	10°48'	+60'	164°	9°51'	+60'	164°	8°53'	+60'	164°	7°55'	+60'	164°	6°58'	+60'	164°	6°00'	+60'	133°	6
7	12°46'	+60'	164°	11°48'	+60'	164°	10°51'	+60'	164°	9°53'	+60'	164°	8°55'	+60'	164°	7°58'	+60'	164°	7°00'	+60'	133°	7
8	13°46'	+60'	164°	12°48'	+60'	164°	11°51'	+60'	164°	10°53'	+60'	164°	9°55'	+60'	164°	8°58'	+60'	164°	8°00'	+60'	117°	8
9	14°46'	+60'	164°	13°48'	+60'	164°	12°51'	+60'	164°	11°53'	+60'	164°	10°55'	+60'	164°	9°58'	+60'	164°	9°00'	+60'	157°	9
10	15°46'	+60'	164°	14°48'	+60'	164°	13°51'	+60'	164°	12°53'	+60'	164°	11°55'	+60'	164°	10°58'	+60'	164°	10°00'	+60'	157°	10
11	16°46'	+60'	164°	15°48'	+60'	164°	14°51'	+60'	164°	13°53'	+60'	164°	12°55'	+60'	164°	11°58'	+60'	164°	11°00'	+60'	157°	11
12	17°46'	+60'	164°	16°48'	+60'	164°	15°51'	+60'	164°	14°53'	+60'	164°	13°55'	+60'	164°	12°58'	+60'	164°	12°00'	+60'	180°	12
13	18°46'	+60'	164°	17°48'	+60'	164°	16°51'	+60'	164°	15°53'	+60'	164°	14°55'	+60'	164°	13°58'	+60'	164°	13°00'	+60'	180°	13
14	19°46'	+60'	163°	18°48'	+60'	164°	17°51'	+60'	164°	16°53'	+60'	164°	15°55'	+60'	164°	14°58'	+60'	164°	14°00'	+60'	159°	14
15	20°46'	+60'	163°	19°48'	+60'	164°	18°51'	+60'	164°	17°53'	+60'	164°	16°55'	+60'	164°	15°58'	+60'	164°	15°00'	+60'	160°	15
16	21°46'	+60'	163°	20°48'	+60'	164°	19°51'	+60'	164°	18°53'	+60'	164°	17°55'	+60'	164°	16°58'	+60'	164°	16°00'	+60'	161°	16
17	22°46'	+60'	163°	21°48'	+60'	164°	20°50'	+60'	164°	19°53'	+60'	164°	18°55'	+60'	164°	17°58'	+60'	164°	17°00'	+60'	161°	17
18	23°46'	+60'	163°	22°48'	+60'	163°	21°50'	+60'	164°	20°53'	+60'	164°	19°55'	+60'	164°	18°58'	+60'	164°	18°00'	+60'	162°	18
19	24°45'	+60'	163°	23°48'	+60'	163°	22°50'	+60'	164°	21°53'	+60'	164°	20°55'	+60'	164°	19°58'	+60'	164°	19°00'	+60'	163°	19
20	25°45'	+60'	163°	24°48'	+60'	163°	23°50'	+60'	164°	22°53'	+60'	164°	21°55'	+60'	164°	20°58'	+60'	164°	20°00'	+60'	165°	20
21	26°45'	+60'	163°	25°48'	+60'	163°	24°50'	+60'	164°	23°53'	+60'	164°	22°55'	+60'	164°	21°58'	+60'	164°	21°00'	+60'	90°	21
22	27°45'	+60'	163°	26°48'	+60'	163°	25°50'	+60'	164°	24°53'	+60'	164°	23°55'	+60'	164°	22°58'	+60'	164°	22°00'	+60'	180°	22
23	28°45'	+60'	163°	27°48'	+60'	163°	26°50'	+60'	163°	25°53'	+60'	164°	24°55'	+60'	164°	23°58'	+60'	164°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

16° 344° LHA — Latitude SAME as Declination — 16° 344° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

17° 343° LHA — Latitude SAME as Declination — 17° 343° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°44'	+60'	163°	4°47'	+60'	163°	3°49'	+60'	163°	2°52'	+60'	163°	1°55'	+60'	163°	0°57'	+60'	163°	0°00'	+60'	163°	0
1	6°44'	+60'	163°	5°47'	+60'	163°	4°49'	+60'	163°	3°52'	+60'	163°	2°55'	+60'	163°	1°57'	+60'	163°	1°00'	+60'	164°	1
2	7°44'	+60'	163°	6°47'	+60'	163°	5°49'	+60'	163°	4°52'	+60'	163°	3°55'	+60'	163°	2°57'	+60'	163°	2°00'	+60'	155°	2
3	8°44'	+60'	163°	7°47'	+60'	163°	6°49'	+60'	163°	5°52'	+60'	163°	4°55'	+60'	163°	3°57'	+60'	163°	3°00'	+60'	155°	3
4	9°44'	+60'	163°	8°47'	+60'	163°	7°49'	+60'	163°	6°52'	+60'	163°	5°55'	+60'	163°	4°57'	+60'	163°	4°00'	+60'	155°	4
5	10°44'	+60'	163°	9°47'	+60'	163°	8°49'	+60'	163°	7°52'	+60'	163°	6°55'	+60'	163°	5°57'	+60'	163°	5°00'	+60'	133°	5
6	11°44'	+60'	163°	10°47'	+60'	163°	9°49'	+60'	163°	8°52'	+60'	163°	7°55'	+60'	163°	6°57'	+60'	163°	6°00'	+60'	133°	6
7	12°44'	+60'	163°	11°47'	+60'	163°	10°49'	+60'	163°	9°52'	+60'	163°	8°55'	+60'	163°	7°57'	+60'	163°	7°00'	+60'	133°	7
8	13°44'	+60'	163°	12°47'	+60'	163°	11°49'	+60'	163°	10°52'	+60'	163°	9°55'	+60'	163°	8°57'	+60'	163°	8°00'	+60'	117°	8
9	14°44'	+60'	163°	13°47'	+60'	163°	12°49'	+60'	163°	11°52'	+60'	163°	10°55'	+60'	163°	9°57'	+60'	163°	9°00'	+60'	157°	9
10	15°44'	+60'	163°	14°47'	+60'	163°	13°49'	+60'	163°	12°52'	+60'	163°	11°55'	+60'	163°	10°57'	+60'	163°	10°00'	+60'	157°	10
11	16°44'	+60'	163°	15°47'	+60'	163°	14°49'	+60'	163°	13°52'	+60'	163°	12°55'	+60'	163°	11°57'	+60'	163°	11°00'	+60'	157°	11
12	17°44'	+60'	163°	16°47'	+60'	163°	15°49'	+60'	163°	14°52'	+60'	163°	13°55'	+60'	163°	12°57'	+60'	163°	12°00'	+60'	180°	12
13	18°44'	+60'	162°	17°47'	+60'	163°	16°49'	+60'	163°	15°52'	+60'	163°	14°55'	+60'	163°	13°57'	+60'	163°	13°00'	+60'	180°	13
14	19°44'	+60'	162°	18°47'	+60'	163°	17°49'	+60'	163°	16°52'	+60'	163°	15°55'	+60'	163°	14°57'	+60'	163°	14°00'	+60'	159°	14
15	20°44'	+60'	162°	19°47'	+60'	163°	18°49'	+60'	163°	17°52'	+60'	163°	16°55'	+60'	163°	15°57'	+60'	163°	15°00'	+60'	160°	15
16	21°44'	+60'	162°	20°47'	+60'	163°	19°49'	+60'	163°	18°52'	+60'	163°	17°55'	+60'	163°	16°57'	+60'	163°	16°00'	+60'	161°	16
17	22°44'	+60'	162°	21°47'	+60'	162°	20°49'	+60'	163°	19°52'	+60'	163°	18°55'	+60'	163°	17°57'	+60'	163°	17°00'	+60'	161°	17
18	23°44'	+60'	162°	22°46'	+60'	162°	21°49'	+60'	163°	20°52'	+60'	163°	19°55'	+60'	163°	18°57'	+60'	163°	18°00'	+60'	162°	18
19	24°44'	+60'	162°	23°46'	+60'	162°	22°49'	+60'	163°	21°52'	+60'	163°	20°55'	+60'	163°	19°57'	+60'	163°	19°00'	+60'	163°	19
20	25°44'	+60'	162°	24°46'	+60'	162°	23°49'	+60'	163°	22°52'	+60'	163°	21°55'	+60'	163°	20°57'	+60'	163°	20°00'	+60'	165°	20
21	26°44'	+60'	162°	25°46'	+60'	162°	24°49'	+60'	162°	23°52'	+60'	163°	22°55'	+60'	163°	21°57'	+60'	163°	21°00'	+60'	90°	21
22	27°44'	+60'	162°	26°46'	+60'	162°	25°49'	+60'	162°	24°52'	+60'	163°	23°55'	+60'	163°	22°57'	+60'	163°	22°00'	+60'	180°	22
23	28°43'	+60'	162°	27°46'	+60'	162°	26°49'	+60'	162°	25°52'	+60'	163°	24°55'	+60'	163°	23°57'	+60'	163°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

17° 343° LHA — Latitude SAME as Declination — 17° 343° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

18° 342° LHA — Latitude SAME as Declination — 18° 342° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°42'	+60'	162°	4°45'	+60'	162°	3°48'	+60'	162°	2°51'	+60'	162°	1°54'	+60'	162°	0°57'	+60'	162°	0°00'	+60'	162°	0
1	6°42'	+60'	162°	5°45'	+60'	162°	4°48'	+60'	162°	3°51'	+60'	162°	2°54'	+60'	162°	1°57'	+60'	162°	1°00'	+60'	164°	1
2	7°42'	+60'	162°	6°45'	+60'	162°	5°48'	+60'	162°	4°51'	+60'	162°	3°54'	+60'	162°	2°57'	+60'	162°	2°00'	+60'	155°	2
3	8°42'	+60'	162°	7°45'	+60'	162°	6°48'	+60'	162°	5°51'	+60'	162°	4°54'	+60'	162°	3°57'	+60'	162°	3°00'	+60'	155°	3
4	9°42'	+60'	162°	8°45'	+60'	162°	7°48'	+60'	162°	6°51'	+60'	162°	5°54'	+60'	162°	4°57'	+60'	162°	4°00'	+60'	155°	4
5	10°42'	+60'	162°	9°45'	+60'	162°	8°48'	+60'	162°	7°51'	+60'	162°	6°54'	+60'	162°	5°57'	+60'	162°	5°00'	+60'	133°	5
6	11°42'	+60'	162°	10°45'	+60'	162°	9°48'	+60'	162°	8°51'	+60'	162°	7°54'	+60'	162°	6°57'	+60'	162°	6°00'	+60'	133°	6
7	12°42'	+60'	162°	11°45'	+60'	162°	10°48'	+60'	162°	9°51'	+60'	162°	8°54'	+60'	162°	7°57'	+60'	162°	7°00'	+60'	133°	7
8	13°42'	+60'	162°	12°45'	+60'	162°	11°48'	+60'	162°	10°51'	+60'	162°	9°54'	+60'	162°	8°57'	+60'	162°	8°00'	+60'	117°	8
9	14°42'	+60'	162°	13°45'	+60'	162°	12°48'	+60'	162°	11°51'	+60'	162°	10°54'	+60'	162°	9°57'	+60'	162°	9°00'	+60'	157°	9
10	15°42'	+60'	162°	14°45'	+60'	162°	13°48'	+60'	162°	12°51'	+60'	162°	11°54'	+60'	162°	10°57'	+60'	162°	10°00'	+60'	157°	10
11	16°42'	+60'	162°	15°45'	+60'	162°	14°48'	+60'	162°	13°51'	+60'	162°	12°54'	+60'	162°	11°57'	+60'	162°	11°00'	+60'	157°	11
12	17°42'	+60'	162°	16°45'	+60'	162°	15°48'	+60'	162°	14°51'	+60'	162°	13°54'	+60'	162°	12°57'	+60'	162°	12°00'	+60'	180°	12
13	18°42'	+60'	161°	17°45'	+60'	162°	16°48'	+60'	162°	15°51'	+60'	162°	14°54'	+60'	162°	13°57'	+60'	162°	13°00'	+60'	180°	13
14	19°42'	+60'	161°	18°45'	+60'	162°	17°48'	+60'	162°	16°51'	+60'	162°	15°54'	+60'	162°	14°57'	+60'	162°	14°00'	+60'	159°	14
15	20°42'	+60'	161°	19°45'	+60'	162°	18°48'	+60'	162°	17°51'	+60'	162°	16°54'	+60'	162°	15°57'	+60'	162°	15°00'	+60'	160°	15
16	21°42'	+60'	161°	20°45'	+60'	161°	19°48'	+60'	162°	18°51'	+60'	162°	17°54'	+60'	162°	16°57'	+60'	162°	16°00'	+60'	161°	16
17	22°42'	+60'	161°	21°45'	+60'	161°	20°48'	+60'	162°	19°51'	+60'	162°	18°54'	+60'	162°	17°57'	+60'	162°	17°00'	+60'	161°	17
18	23°42'	+60'	161°	22°45'	+60'	161°	21°48'	+60'	162°	20°51'	+60'	162°	19°54'	+60'	162°	18°57'	+60'	162°	18°00'	+60'	162°	18
19	24°42'	+60'	161°	23°45'	+60'	161°	22°48'	+60'	162°	21°51'	+60'	162°	20°54'	+60'	162°	19°57'	+60'	162°	19°00'	+60'	163°	19
20	25°42'	+60'	161°	24°45'	+60'	161°	23°48'	+60'	161°	22°51'	+60'	162°	21°54'	+60'	162°	20°57'	+60'	162°	20°00'	+60'	165°	20
21	26°42'	+60'	161°	25°45'	+60'	161°	24°48'	+60'	161°	23°51'	+60'	162°	22°54'	+60'	162°	21°57'	+60'	162°	21°00'	+60'	90°	21
22	27°42'	+60'	161°	26°45'	+60'	161°	25°48'	+60'	161°	24°51'	+60'	162°	23°54'	+60'	162°	22°57'	+60'	162°	22°00'	+60'	180°	22
23	28°42'	+60'	161°	27°45'	+60'	161°	26°48'	+60'	161°	25°51'	+60'	162°	24°54'	+60'	162°	23°57'	+60'	162°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

18° 342° LHA — Latitude SAME as Declination — 18° 342° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

19° 341° LHA — Latitude SAME as Declination — 19° 341° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°40'	+60'	161°	4°44'	+60'	161°	3°47'	+60'	161°	2°50'	+60'	161°	1°53'	+60'	161°	0°57'	+60'	161°	0°00'	+60'	161°	0
1	6°40'	+60'	161°	5°44'	+60'	161°	4°47'	+60'	161°	3°50'	+60'	161°	2°53'	+60'	161°	1°57'	+60'	161°	1°00'	+60'	164°	1
2	7°40'	+60'	161°	6°44'	+60'	161°	5°47'	+60'	161°	4°50'	+60'	161°	3°53'	+60'	161°	2°57'	+60'	161°	2°00'	+60'	155°	2
3	8°40'	+60'	161°	7°44'	+60'	161°	6°47'	+60'	161°	5°50'	+60'	161°	4°53'	+60'	161°	3°57'	+60'	161°	3°00'	+60'	155°	3
4	9°40'	+60'	161°	8°44'	+60'	161°	7°47'	+60'	161°	6°50'	+60'	161°	5°53'	+60'	161°	4°57'	+60'	161°	4°00'	+60'	155°	4
5	10°40'	+60'	161°	9°43'	+60'	161°	8°47'	+60'	161°	7°50'	+60'	161°	6°53'	+60'	161°	5°57'	+60'	161°	5°00'	+60'	133°	5
6	11°40'	+60'	161°	10°43'	+60'	161°	9°47'	+60'	161°	8°50'	+60'	161°	7°53'	+60'	161°	6°57'	+60'	161°	6°00'	+60'	133°	6
7	12°40'	+60'	161°	11°43'	+60'	161°	10°47'	+60'	161°	9°50'	+60'	161°	8°53'	+60'	161°	7°57'	+60'	161°	7°00'	+60'	133°	7
8	13°40'	+60'	161°	12°43'	+60'	161°	11°47'	+60'	161°	10°50'	+60'	161°	9°53'	+60'	161°	8°57'	+60'	161°	8°00'	+60'	117°	8
9	14°40'	+60'	161°	13°43'	+60'	161°	12°47'	+60'	161°	11°50'	+60'	161°	10°53'	+60'	161°	9°57'	+60'	161°	9°00'	+60'	157°	9
10	15°40'	+60'	161°	14°43'	+60'	161°	13°47'	+60'	161°	12°50'	+60'	161°	11°53'	+60'	161°	10°57'	+60'	161°	10°00'	+60'	157°	10
11	16°40'	+60'	161°	15°43'	+60'	161°	14°47'	+60'	161°	13°50'	+60'	161°	12°53'	+60'	161°	11°57'	+60'	161°	11°00'	+60'	157°	11
12	17°40'	+60'	160°	16°43'	+60'	161°	15°47'	+60'	161°	14°50'	+60'	161°	13°53'	+60'	161°	12°57'	+60'	161°	12°00'	+60'	180°	12
13	18°40'	+60'	160°	17°43'	+60'	161°	16°47'	+60'	161°	15°50'	+60'	161°	14°53'	+60'	161°	13°57'	+60'	161°	13°00'	+60'	180°	13
14	19°40'	+60'	160°	18°43'	+60'	161°	17°47'	+60'	161°	16°50'	+60'	161°	15°53'	+60'	161°	14°57'	+60'	161°	14°00'	+60'	159°	14
15	20°40'	+60'	160°	19°43'	+60'	160°	18°47'	+60'	161°	17°50'	+60'	161°	16°53'	+60'	161°	15°57'	+60'	161°	15°00'	+60'	160°	15
16	21°40'	+60'	160°	20°43'	+60'	160°	19°47'	+60'	161°	18°50'	+60'	161°	17°53'	+60'	161°	16°57'	+60'	161°	16°00'	+60'	161°	16
17	22°40'	+60'	160°	21°43'	+60'	160°	20°47'	+60'	161°	19°50'	+60'	161°	18°53'	+60'	161°	17°57'	+60'	161°	17°00'	+60'	161°	17
18	23°40'	+60'	160°	22°43'	+60'	160°	21°47'	+60'	161°	20°50'	+60'	161°	19°53'	+60'	161°	18°57'	+60'	161°	18°00'	+60'	162°	18
19	24°40'	+60'	160°	23°43'	+60'	160°	22°47'	+60'	160°	21°50'	+60'	161°	20°53'	+60'	161°	19°57'	+60'	161°	19°00'	+60'	163°	19
20	25°40'	+60'	160°	24°43'	+60'	160°	23°47'	+60'	160°	22°50'	+60'	161°	21°53'	+60'	161°	20°57'	+60'	161°	20°00'	+60'	165°	20
21	26°40'	+60'	160°	25°43'	+60'	160°	24°47'	+60'	160°	23°50'	+60'	161°	22°53'	+60'	161°	21°57'	+60'	161°	21°00'	+60'	90°	21
22	27°39'	+60'	160°	26°43'	+60'	160°	25°47'	+60'	160°	24°50'	+60'	161°	23°53'	+60'	161°	22°57'	+60'	161°	22°00'	+60'	180°	22
23	28°39'	+60'	160°	27°43'	+60'	160°	26°47'	+60'	160°	25°50'	+60'	161°	24°53'	+60'	161°	23°57'	+60'	161°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

19° 341° LHA — Latitude SAME as Declination — 19° 341° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

20° 340° LHA — Latitude SAME as Declination — 20° 340° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°38'	+60'	160°	4°42'	+60'	160°	3°46'	+60'	160°	2°49'	+60'	160°	1°53'	+60'	160°	0°56'	+60'	160°	0°00'	+60'	160°	0
1	6°38'	+60'	160°	5°42'	+60'	160°	4°45'	+60'	160°	3°49'	+60'	160°	2°53'	+60'	160°	1°56'	+60'	160°	1°00'	+60'	164°	1
2	7°38'	+60'	160°	6°42'	+60'	160°	5°45'	+60'	160°	4°49'	+60'	160°	3°53'	+60'	160°	2°56'	+60'	160°	2°00'	+60'	155°	2
3	8°38'	+60'	160°	7°42'	+60'	160°	6°45'	+60'	160°	5°49'	+60'	160°	4°53'	+60'	160°	3°56'	+60'	160°	3°00'	+60'	155°	3
4	9°38'	+60'	160°	8°42'	+60'	160°	7°45'	+60'	160°	6°49'	+60'	160°	5°53'	+60'	160°	4°56'	+60'	160°	4°00'	+60'	155°	4
5	10°38'	+60'	160°	9°42'	+60'	160°	8°45'	+60'	160°	7°49'	+60'	160°	6°53'	+60'	160°	5°56'	+60'	160°	5°00'	+60'	133°	5
6	11°38'	+60'	160°	10°42'	+60'	160°	9°45'	+60'	160°	8°49'	+60'	160°	7°53'	+60'	160°	6°56'	+60'	160°	6°00'	+60'	133°	6
7	12°38'	+60'	160°	11°42'	+60'	160°	10°45'	+60'	160°	9°49'	+60'	160°	8°53'	+60'	160°	7°56'	+60'	160°	7°00'	+60'	133°	7
8	13°38'	+60'	160°	12°42'	+60'	160°	11°45'	+60'	160°	10°49'	+60'	160°	9°53'	+60'	160°	8°56'	+60'	160°	8°00'	+60'	117°	8
9	14°38'	+60'	160°	13°42'	+60'	160°	12°45'	+60'	160°	11°49'	+60'	160°	10°53'	+60'	160°	9°56'	+60'	160°	9°00'	+60'	157°	9
10	15°38'	+60'	160°	14°42'	+60'	160°	13°45'	+60'	160°	12°49'	+60'	160°	11°53'	+60'	160°	10°56'	+60'	160°	10°00'	+60'	157°	10
11	16°38'	+60'	159°	15°42'	+60'	160°	14°45'	+60'	160°	13°49'	+60'	160°	12°53'	+60'	160°	11°56'	+60'	160°	11°00'	+60'	157°	11
12	17°38'	+60'	159°	16°42'	+60'	160°	15°45'	+60'	160°	14°49'	+60'	160°	13°53'	+60'	160°	12°56'	+60'	160°	12°00'	+60'	180°	12
13	18°38'	+60'	159°	17°42'	+60'	160°	16°45'	+60'	160°	15°49'	+60'	160°	14°53'	+60'	160°	13°56'	+60'	160°	13°00'	+60'	180°	13
14	19°38'	+60'	159°	18°41'	+60'	159°	17°45'	+60'	160°	16°49'	+60'	160°	15°53'	+60'	160°	14°56'	+60'	160°	14°00'	+60'	159°	14
15	20°38'	+60'	159°	19°41'	+60'	159°	18°45'	+60'	160°	17°49'	+60'	160°	16°53'	+60'	160°	15°56'	+60'	160°	15°00'	+60'	160°	15
16	21°38'	+60'	159°	20°41'	+60'	159°	19°45'	+60'	160°	18°49'	+60'	160°	17°53'	+60'	160°	16°56'	+60'	160°	16°00'	+60'	161°	16
17	22°38'	+60'	159°	21°41'	+60'	159°	20°45'	+60'	160°	19°49'	+60'	160°	18°53'	+60'	160°	17°56'	+60'	160°	17°00'	+60'	161°	17
18	23°37'	+60'	159°	22°41'	+60'	159°	21°45'	+60'	159°	20°49'	+60'	160°	19°53'	+60'	160°	18°56'	+60'	160°	18°00'	+60'	162°	18
19	24°37'	+60'	159°	23°41'	+60'	159°	22°45'	+60'	159°	21°49'	+60'	160°	20°53'	+60'	160°	19°56'	+60'	160°	19°00'	+60'	163°	19
20	25°37'	+60'	159°	24°41'	+60'	159°	23°45'	+60'	159°	22°49'	+60'	160°	21°53'	+60'	160°	20°56'	+60'	160°	20°00'	+60'	165°	20
21	26°37'	+60'	159°	25°41'	+60'	159°	24°45'	+60'	159°	23°49'	+60'	160°	22°53'	+60'	160°	21°56'	+60'	160°	21°00'	+60'	90°	21
22	27°37'	+60'	159°	26°41'	+60'	159°	25°45'	+60'	159°	24°49'	+60'	160°	23°53'	+60'	160°	22°56'	+60'	160°	22°00'	+60'	180°	22
23	28°37'	+60'	159°	27°41'	+60'	159°	26°45'	+60'	159°	25°49'	+60'	160°	24°53'	+60'	160°	23°56'	+60'	160°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

20° 340° LHA — Latitude SAME as Declination — 20° 340° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

21° 339° LHA — Latitude SAME as Declination — 21° 339° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°36'	+60'	159°	4°40'	+60'	159°	3°44'	+60'	159°	2°48'	+60'	159°	1°52'	+60'	159°	0°56'	+60'	159°	0°00'	+60'	159°	0
1	6°36'	+60'	159°	5°40'	+60'	159°	4°44'	+60'	159°	3°48'	+60'	159°	2°52'	+60'	159°	1°56'	+60'	159°	1°00'	+60'	155°	1
2	7°36'	+60'	159°	6°40'	+60'	159°	5°44'	+60'	159°	4°48'	+60'	159°	3°52'	+60'	159°	2°56'	+60'	159°	2°00'	+60'	155°	2
3	8°36'	+60'	159°	7°40'	+60'	159°	6°44'	+60'	159°	5°48'	+60'	159°	4°52'	+60'	159°	3°56'	+60'	159°	3°00'	+60'	155°	3
4	9°36'	+60'	159°	8°40'	+60'	159°	7°44'	+60'	159°	6°48'	+60'	159°	5°52'	+60'	159°	4°56'	+60'	159°	4°00'	+60'	155°	4
5	10°36'	+60'	159°	9°40'	+60'	159°	8°44'	+60'	159°	7°48'	+60'	159°	6°52'	+60'	159°	5°56'	+60'	159°	5°00'	+60'	133°	5
6	11°36'	+60'	159°	10°40'	+60'	159°	9°44'	+60'	159°	8°48'	+60'	159°	7°52'	+60'	159°	6°56'	+60'	159°	6°00'	+60'	133°	6
7	12°36'	+60'	159°	11°40'	+60'	159°	10°44'	+60'	159°	9°48'	+60'	159°	8°52'	+60'	159°	7°56'	+60'	159°	7°00'	+60'	133°	7
8	13°36'	+60'	159°	12°40'	+60'	159°	11°44'	+60'	159°	10°48'	+60'	159°	9°52'	+60'	159°	8°56'	+60'	159°	8°00'	+60'	117°	8
9	14°36'	+60'	159°	13°40'	+60'	159°	12°44'	+60'	159°	11°48'	+60'	159°	10°52'	+60'	159°	9°56'	+60'	159°	9°00'	+60'	157°	9
10	15°36'	+60'	159°	14°40'	+60'	159°	13°44'	+60'	159°	12°48'	+60'	159°	11°52'	+60'	159°	10°56'	+60'	159°	10°00'	+60'	157°	10
11	16°36'	+60'	158°	15°40'	+60'	159°	14°44'	+60'	159°	13°48'	+60'	159°	12°52'	+60'	159°	11°56'	+60'	159°	11°00'	+60'	157°	11
12	17°35'	+60'	158°	16°40'	+60'	159°	15°44'	+60'	159°	14°48'	+60'	159°	13°52'	+60'	159°	12°56'	+60'	159°	12°00'	+60'	180°	12
13	18°35'	+60'	158°	17°40'	+60'	159°	16°44'	+60'	159°	15°48'	+60'	159°	14°52'	+60'	159°	13°56'	+60'	159°	13°00'	+60'	180°	13
14	19°35'	+60'	158°	18°40'	+60'	158°	17°44'	+60'	159°	16°48'	+60'	159°	15°52'	+60'	159°	14°56'	+60'	159°	14°00'	+60'	159°	14
15	20°35'	+60'	158°	19°40'	+60'	158°	18°44'	+60'	159°	17°48'	+60'	159°	16°52'	+60'	159°	15°56'	+60'	159°	15°00'	+60'	160°	15
16	21°35'	+60'	158°	20°40'	+60'	158°	19°44'	+60'	159°	18°48'	+60'	159°	17°52'	+60'	159°	16°56'	+60'	159°	16°00'	+60'	161°	16
17	22°35'	+60'	158°	21°39'	+60'	158°	20°44'	+60'	159°	19°48'	+60'	159°	18°52'	+60'	159°	17°56'	+60'	159°	17°00'	+60'	161°	17
18	23°35'	+60'	158°	22°39'	+60'	158°	21°44'	+60'	158°	20°48'	+60'	159°	19°52'	+60'	159°	18°56'	+60'	159°	18°00'	+60'	162°	18
19	24°35'	+60'	158°	23°39'	+60'	158°	22°44'	+60'	158°	21°48'	+60'	159°	20°52'	+60'	159°	19°56'	+60'	159°	19°00'	+60'	163°	19
20	25°35'	+60'	158°	24°39'	+60'	158°	23°44'	+60'	158°	22°48'	+60'	159°	21°52'	+60'	159°	20°56'	+60'	159°	20°00'	+60'	165°	20
21	26°35'	+60'	158°	25°39'	+60'	158°	24°44'	+60'	158°	23°48'	+60'	159°	22°52'	+60'	159°	21°56'	+60'	159°	21°00'	+60'	90°	21
22	27°35'	+60'	158°	26°39'	+60'	158°	25°44'	+60'	158°	24°48'	+60'	159°	23°52'	+60'	159°	22°56'	+60'	159°	22°00'	+60'	180°	22
23	28°35'	+60'	158°	27°39'	+60'	158°	26°44'	+60'	158°	25°48'	+60'	159°	24°52'	+60'	159°	23°56'	+60'	159°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

21° 339° LHA — Latitude SAME as Declination — 21° 339° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

22° 338° LHA — Latitude SAME as Declination — 22° 338° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°34'	+60'	158°	4°38'	+60'	158°	3°42'	+60'	158°	2°47'	+60'	158°	1°51'	+60'	158°	0°56'	+60'	158°	0°00'	+60'	158°	0
1	6°34'	+60'	158°	5°38'	+60'	158°	4°42'	+60'	158°	3°47'	+60'	158°	2°51'	+60'	158°	1°56'	+60'	158°	1°00'	+60'	155°	1
2	7°34'	+60'	158°	6°38'	+60'	158°	5°42'	+60'	158°	4°47'	+60'	158°	3°51'	+60'	158°	2°56'	+60'	158°	2°00'	+60'	155°	2
3	8°34'	+60'	158°	7°38'	+60'	158°	6°42'	+60'	158°	5°47'	+60'	158°	4°51'	+60'	158°	3°56'	+60'	158°	3°00'	+60'	155°	3
4	9°34'	+60'	158°	8°38'	+60'	158°	7°42'	+60'	158°	6°47'	+60'	158°	5°51'	+60'	158°	4°56'	+60'	158°	4°00'	+60'	155°	4
5	10°33'	+60'	158°	9°38'	+60'	158°	8°42'	+60'	158°	7°47'	+60'	158°	6°51'	+60'	158°	5°56'	+60'	158°	5°00'	+60'	133°	5
6	11°33'	+60'	158°	10°38'	+60'	158°	9°42'	+60'	158°	8°47'	+60'	158°	7°51'	+60'	158°	6°56'	+60'	158°	6°00'	+60'	133°	6
7	12°33'	+60'	158°	11°38'	+60'	158°	10°42'	+60'	158°	9°47'	+60'	158°	8°51'	+60'	158°	7°56'	+60'	158°	7°00'	+60'	133°	7
8	13°33'	+60'	158°	12°38'	+60'	158°	11°42'	+60'	158°	10°47'	+60'	158°	9°51'	+60'	158°	8°56'	+60'	158°	8°00'	+60'	117°	8
9	14°33'	+60'	158°	13°38'	+60'	158°	12°42'	+60'	158°	11°47'	+60'	158°	10°51'	+60'	158°	9°56'	+60'	158°	9°00'	+60'	157°	9
10	15°33'	+60'	157°	14°38'	+60'	158°	13°42'	+60'	158°	12°47'	+60'	158°	11°51'	+60'	158°	10°56'	+60'	158°	10°00'	+60'	157°	10
11	16°33'	+60'	157°	15°38'	+60'	158°	14°42'	+60'	158°	13°47'	+60'	158°	12°51'	+60'	158°	11°56'	+60'	158°	11°00'	+60'	157°	11
12	17°33'	+60'	157°	16°38'	+60'	158°	15°42'	+60'	158°	14°47'	+60'	158°	13°51'	+60'	158°	12°56'	+60'	158°	12°00'	+60'	180°	12
13	18°33'	+60'	157°	17°38'	+60'	157°	16°42'	+60'	158°	15°47'	+60'	158°	14°51'	+60'	158°	13°56'	+60'	158°	13°00'	+60'	180°	13
14	19°33'	+60'	157°	18°38'	+60'	157°	17°42'	+60'	158°	16°47'	+60'	158°	15°51'	+60'	158°	14°56'	+60'	158°	14°00'	+60'	159°	14
15	20°33'	+60'	157°	19°38'	+60'	157°	18°42'	+60'	158°	17°47'	+60'	158°	16°51'	+60'	158°	15°56'	+60'	158°	15°00'	+60'	160°	15
16	21°33'	+60'	157°	20°38'	+60'	157°	19°42'	+60'	158°	18°47'	+60'	158°	17°51'	+60'	158°	16°56'	+60'	158°	16°00'	+60'	161°	16
17	22°33'	+60'	157°	21°38'	+60'	157°	20°42'	+60'	157°	19°47'	+60'	158°	18°51'	+60'	158°	17°56'	+60'	158°	17°00'	+60'	161°	17
18	23°33'	+60'	157°	22°37'	+60'	157°	21°42'	+60'	157°	20°47'	+60'	158°	19°51'	+60'	158°	18°56'	+60'	158°	18°00'	+60'	162°	18
19	24°33'	+60'	157°	23°37'	+60'	157°	22°42'	+60'	157°	21°47'	+60'	158°	20°51'	+60'	158°	19°56'	+60'	158°	19°00'	+60'	163°	19
20	25°33'	+60'	157°	24°37'	+60'	157°	23°42'	+60'	157°	22°47'	+60'	158°	21°51'	+60'	158°	20°56'	+60'	158°	20°00'	+60'	165°	20
21	26°33'	+60'	157°	25°37'	+60'	157°	24°42'	+60'	157°	23°47'	+60'	158°	22°51'	+60'	158°	21°56'	+60'	158°	21°00'	+60'	90°	21
22	27°33'	+60'	157°	26°37'	+60'	157°	25°42'	+60'	157°	24°47'	+60'	158°	23°51'	+60'	158°	22°56'	+60'	158°	22°00'	+60'	180°	22
23	28°33'	+60'	157°	27°37'	+60'	157°	26°42'	+60'	157°	25°47'	+60'	157°	24°51'	+60'	158°	23°56'	+60'	158°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

22° 338° LHA — Latitude SAME as Declination — 22° 338° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

23° 337° LHA — Latitude SAME as Declination — 23° 337° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°31'	+60'	157°	4°36'	+60'	157°	3°41'	+60'	157°	2°46'	+60'	157°	1°50'	+60'	157°	0°55'	+60'	157°	0°00'	+60'	157°	0
1	6°31'	+60'	157°	5°36'	+60'	157°	4°41'	+60'	157°	3°46'	+60'	157°	2°50'	+60'	157°	1°55'	+60'	157°	1°00'	+60'	155°	1
2	7°31'	+60'	157°	6°36'	+60'	157°	5°41'	+60'	157°	4°46'	+60'	157°	3°50'	+60'	157°	2°55'	+60'	157°	2°00'	+60'	155°	2
3	8°31'	+60'	157°	7°36'	+60'	157°	6°41'	+60'	157°	5°46'	+60'	157°	4°50'	+60'	157°	3°55'	+60'	157°	3°00'	+60'	155°	3
4	9°31'	+60'	157°	8°36'	+60'	157°	7°41'	+60'	157°	6°46'	+60'	157°	5°50'	+60'	157°	4°55'	+60'	157°	4°00'	+60'	155°	4
5	10°31'	+60'	157°	9°36'	+60'	157°	8°41'	+60'	157°	7°46'	+60'	157°	6°50'	+60'	157°	5°55'	+60'	157°	5°00'	+60'	133°	5
6	11°31'	+60'	157°	10°36'	+60'	157°	9°41'	+60'	157°	8°46'	+60'	157°	7°50'	+60'	157°	6°55'	+60'	157°	6°00'	+60'	133°	6
7	12°31'	+60'	157°	11°36'	+60'	157°	10°41'	+60'	157°	9°46'	+60'	157°	8°50'	+60'	157°	7°55'	+60'	157°	7°00'	+60'	133°	7
8	13°31'	+60'	157°	12°36'	+60'	157°	11°41'	+60'	157°	10°46'	+60'	157°	9°50'	+60'	157°	8°55'	+60'	157°	8°00'	+60'	117°	8
9	14°31'	+60'	157°	13°36'	+60'	157°	12°41'	+60'	157°	11°46'	+60'	157°	10°50'	+60'	157°	9°55'	+60'	157°	9°00'	+60'	157°	9
10	15°31'	+60'	156°	14°36'	+60'	157°	13°41'	+60'	157°	12°46'	+60'	157°	11°50'	+60'	157°	10°55'	+60'	157°	10°00'	+60'	157°	10
11	16°31'	+60'	156°	15°36'	+60'	157°	14°41'	+60'	157°	13°46'	+60'	157°	12°50'	+60'	157°	11°55'	+60'	157°	11°00'	+60'	157°	11
12	17°31'	+60'	156°	16°36'	+60'	156°	15°41'	+60'	157°	14°46'	+60'	157°	13°50'	+60'	157°	12°55'	+60'	157°	12°00'	+60'	180°	12
13	18°31'	+60'	156°	17°36'	+60'	156°	16°41'	+60'	157°	15°46'	+60'	157°	14°50'	+60'	157°	13°55'	+60'	157°	13°00'	+60'	180°	13
14	19°31'	+60'	156°	18°36'	+60'	156°	17°41'	+60'	157°	16°45'	+60'	157°	15°50'	+60'	157°	14°55'	+60'	157°	14°00'	+60'	159°	14
15	20°30'	+60'	156°	19°36'	+60'	156°	18°41'	+60'	157°	17°45'	+60'	157°	16°50'	+60'	157°	15°55'	+60'	157°	15°00'	+60'	160°	15
16	21°30'	+60'	156°	20°36'	+60'	156°	19°41'	+60'	156°	18°45'	+60'	157°	17°50'	+60'	157°	16°55'	+60'	157°	16°00'	+60'	161°	16
17	22°30'	+60'	156°	21°35'	+60'	156°	20°40'	+60'	156°	19°45'	+60'	157°	18°50'	+60'	157°	17°55'	+60'	157°	17°00'	+60'	161°	17
18	23°30'	+60'	156°	22°35'	+60'	156°	21°40'	+60'	156°	20°45'	+60'	157°	19°50'	+60'	157°	18°55'	+60'	157°	18°00'	+60'	162°	18
19	24°30'	+60'	156°	23°35'	+60'	156°	22°40'	+60'	156°	21°45'	+60'	157°	20°50'	+60'	157°	19°55'	+60'	157°	19°00'	+60'	163°	19
20	25°30'	+60'	156°	24°35'	+60'	156°	23°40'	+60'	156°	22°45'	+60'	157°	21°50'	+60'	157°	20°55'	+60'	157°	20°00'	+60'	165°	20
21	26°30'	+60'	156°	25°35'	+60'	156°	24°40'	+60'	156°	23°45'	+60'	157°	22°50'	+60'	157°	21°55'	+60'	157°	21°00'	+60'	90°	21
22	27°30'	+60'	156°	26°35'	+60'	156°	25°40'	+60'	156°	24°45'	+60'	156°	23°50'	+60'	157°	22°55'	+60'	157°	22°00'	+60'	180°	22
23	28°30'	+60'	156°	27°35'	+60'	156°	26°40'	+60'	156°	25°45'	+60'	156°	24°50'	+60'	157°	23°55'	+60'	157°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

23° 337° LHA — Latitude SAME as Declination — 23° 337° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

24° 336° LHA — Latitude SAME as Declination — 24° 336° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°29'	+60'	156°	4°34'	+60'	156°	3°39'	+60'	156°	2°44'	+60'	156°	1°50'	+60'	156°	0°55'	+60'	156°	0°00'	+60'	156°	0
1	6°29'	+60'	156°	5°34'	+60'	156°	4°39'	+60'	156°	3°44'	+60'	156°	2°50'	+60'	156°	1°55'	+60'	156°	1°00'	+60'	155°	1
2	7°29'	+60'	156°	6°34'	+60'	156°	5°39'	+60'	156°	4°44'	+60'	156°	3°50'	+60'	156°	2°55'	+60'	156°	2°00'	+60'	155°	2
3	8°29'	+60'	156°	7°34'	+60'	156°	6°39'	+60'	156°	5°44'	+60'	156°	4°50'	+60'	156°	3°55'	+60'	156°	3°00'	+60'	155°	3
4	9°29'	+60'	156°	8°34'	+60'	156°	7°39'	+60'	156°	6°44'	+60'	156°	5°50'	+60'	156°	4°55'	+60'	156°	4°00'	+60'	155°	4
5	10°28'	+60'	156°	9°34'	+60'	156°	8°39'	+60'	156°	7°44'	+60'	156°	6°50'	+60'	156°	5°55'	+60'	156°	5°00'	+60'	133°	5
6	11°28'	+60'	156°	10°34'	+60'	156°	9°39'	+60'	156°	8°44'	+60'	156°	7°50'	+60'	156°	6°55'	+60'	156°	6°00'	+60'	133°	6
7	12°28'	+60'	156°	11°34'	+60'	156°	10°39'	+60'	156°	9°44'	+60'	156°	8°50'	+60'	156°	7°55'	+60'	156°	7°00'	+60'	133°	7
8	13°28'	+60'	156°	12°34'	+60'	156°	11°39'	+60'	156°	10°44'	+60'	156°	9°50'	+60'	156°	8°55'	+60'	156°	8°00'	+60'	117°	8
9	14°28'	+60'	155°	13°34'	+60'	156°	12°39'	+60'	156°	11°44'	+60'	156°	10°50'	+60'	156°	9°55'	+60'	156°	9°00'	+60'	157°	9
10	15°28'	+60'	155°	14°34'	+60'	156°	13°39'	+60'	156°	12°44'	+60'	156°	11°50'	+60'	156°	10°55'	+60'	156°	10°00'	+60'	157°	10
11	16°28'	+60'	155°	15°34'	+60'	156°	14°39'	+60'	156°	13°44'	+60'	156°	12°50'	+60'	156°	11°55'	+60'	156°	11°00'	+60'	157°	11
12	17°28'	+60'	155°	16°34'	+60'	155°	15°39'	+60'	156°	14°44'	+60'	156°	13°50'	+60'	156°	12°55'	+60'	156°	12°00'	+60'	180°	12
13	18°28'	+60'	155°	17°33'	+60'	155°	16°39'	+60'	156°	15°44'	+60'	156°	14°50'	+60'	156°	13°55'	+60'	156°	13°00'	+60'	180°	13
14	19°28'	+60'	155°	18°33'	+60'	155°	17°39'	+60'	156°	16°44'	+60'	156°	15°50'	+60'	156°	14°55'	+60'	156°	14°00'	+60'	159°	14
15	20°28'	+60'	155°	19°33'	+60'	155°	18°39'	+60'	156°	17°44'	+60'	156°	16°50'	+60'	156°	15°55'	+60'	156°	15°00'	+60'	160°	15
16	21°28'	+60'	155°	20°33'	+60'	155°	19°39'	+60'	155°	18°44'	+60'	156°	17°50'	+60'	156°	16°55'	+60'	156°	16°00'	+60'	161°	16
17	22°28'	+60'	155°	21°33'	+60'	155°	20°39'	+60'	155°	19°44'	+60'	156°	18°50'	+60'	156°	17°55'	+60'	156°	17°00'	+60'	161°	17
18	23°28'	+60'	155°	22°33'	+60'	155°	21°39'	+60'	155°	20°44'	+60'	156°	19°50'	+60'	156°	18°55'	+60'	156°	18°00'	+60'	162°	18
19	24°28'	+60'	155°	23°33'	+60'	155°	22°39'	+60'	155°	21°44'	+60'	156°	20°50'	+60'	156°	19°55'	+60'	156°	19°00'	+60'	163°	19
20	25°28'	+60'	155°	24°33'	+60'	155°	23°39'	+60'	155°	22°44'	+60'	156°	21°49'	+60'	156°	20°55'	+60'	156°	20°00'	+60'	165°	20
21	26°28'	+60'	155°	25°33'	+60'	155°	24°39'	+60'	155°	23°44'	+60'	155°	22°49'	+60'	156°	21°55'	+60'	156°	21°00'	+60'	90°	21
22	27°27'	+60'	155°	26°33'	+60'	155°	25°39'	+60'	155°	24°44'	+60'	155°	23°49'	+60'	156°	22°55'	+60'	156°	22°00'	+60'	180°	22
23	28°27'	+60'	155°	27°33'	+60'	155°	26°39'	+60'	155°	25°44'	+60'	155°	24°49'	+60'	156°	23°55'	+60'	156°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

24° 336° LHA — Latitude SAME as Declination — 24° 336° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

25° 335° LHA — Latitude SAME as Declination — 25° 335° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°26'	+60'	155°	4°32'	+60'	155°	3°37'	+60'	155°	2°43'	+60'	155°	1°49'	+60'	155°	0°54'	+60'	155°	0°00'	+60'	155°	0
1	6°26'	+60'	155°	5°32'	+60'	155°	4°37'	+60'	155°	3°43'	+60'	155°	2°49'	+60'	155°	1°54'	+60'	155°	1°00'	+60'	155°	1
2	7°26'	+60'	155°	6°32'	+60'	155°	5°37'	+60'	155°	4°43'	+60'	155°	3°49'	+60'	155°	2°54'	+60'	155°	2°00'	+60'	155°	2
3	8°26'	+60'	155°	7°32'	+60'	155°	6°37'	+60'	155°	5°43'	+60'	155°	4°49'	+60'	155°	3°54'	+60'	155°	3°00'	+60'	155°	3
4	9°26'	+60'	155°	8°32'	+60'	155°	7°37'	+60'	155°	6°43'	+60'	155°	5°49'	+60'	155°	4°54'	+60'	155°	4°00'	+60'	155°	4
5	10°26'	+60'	155°	9°32'	+60'	155°	8°37'	+60'	155°	7°43'	+60'	155°	6°49'	+60'	155°	5°54'	+60'	155°	5°00'	+60'	133°	5
6	11°26'	+60'	155°	10°32'	+60'	155°	9°37'	+60'	155°	8°43'	+60'	155°	7°49'	+60'	155°	6°54'	+60'	155°	6°00'	+60'	133°	6
7	12°26'	+60'	155°	11°32'	+60'	155°	10°37'	+60'	155°	9°43'	+60'	155°	8°49'	+60'	155°	7°54'	+60'	155°	7°00'	+60'	133°	7
8	13°26'	+60'	155°	12°31'	+60'	155°	11°37'	+60'	155°	10°43'	+60'	155°	9°49'	+60'	155°	8°54'	+60'	155°	8°00'	+60'	117°	8
9	14°26'	+60'	154°	13°31'	+60'	155°	12°37'	+60'	155°	11°43'	+60'	155°	10°49'	+60'	155°	9°54'	+60'	155°	9°00'	+60'	157°	9
10	15°26'	+60'	154°	14°31'	+60'	155°	13°37'	+60'	155°	12°43'	+60'	155°	11°49'	+60'	155°	10°54'	+60'	155°	10°00'	+60'	157°	10
11	16°25'	+60'	154°	15°31'	+60'	154°	14°37'	+60'	155°	13°43'	+60'	155°	12°49'	+60'	155°	11°54'	+60'	155°	11°00'	+60'	157°	11
12	17°25'	+60'	154°	16°31'	+60'	154°	15°37'	+60'	155°	14°43'	+60'	155°	13°49'	+60'	155°	12°54'	+60'	155°	12°00'	+60'	180°	12
13	18°25'	+60'	154°	17°31'	+60'	154°	16°37'	+60'	155°	15°43'	+60'	155°	14°49'	+60'	155°	13°54'	+60'	155°	13°00'	+60'	180°	13
14	19°25'	+60'	154°	18°31'	+60'	154°	17°37'	+60'	155°	16°43'	+60'	155°	15°49'	+60'	155°	14°54'	+60'	155°	14°00'	+60'	159°	14
15	20°25'	+60'	154°	19°31'	+60'	154°	18°37'	+60'	154°	17°43'	+60'	155°	16°49'	+60'	155°	15°54'	+60'	155°	15°00'	+60'	160°	15
16	21°25'	+60'	154°	20°31'	+60'	154°	19°37'	+60'	154°	18°43'	+60'	155°	17°49'	+60'	155°	16°54'	+60'	155°	16°00'	+60'	161°	16
17	22°25'	+60'	154°	21°31'	+60'	154°	20°37'	+60'	154°	19°43'	+60'	155°	18°49'	+60'	155°	17°54'	+60'	155°	17°00'	+60'	161°	17
18	23°25'	+60'	154°	22°31'	+60'	154°	21°37'	+60'	154°	20°43'	+60'	155°	19°49'	+60'	155°	18°54'	+60'	155°	18°00'	+60'	162°	18
19	24°25'	+60'	154°	23°31'	+60'	154°	22°37'	+60'	154°	21°43'	+60'	155°	20°49'	+60'	155°	19°54'	+60'	155°	19°00'	+60'	163°	19
20	25°25'	+60'	154°	24°31'	+60'	154°	23°37'	+60'	154°	22°43'	+60'	154°	21°49'	+60'	155°	20°54'	+60'	155°	20°00'	+60'	165°	20
21	26°25'	+60'	154°	25°31'	+60'	154°	24°37'	+60'	154°	23°43'	+60'	154°	22°49'	+60'	155°	21°54'	+60'	155°	21°00'	+60'	90°	21
22	27°25'	+60'	154°	26°31'	+60'	154°	25°37'	+60'	154°	24°43'	+60'	154°	23°49'	+60'	155°	22°54'	+60'	155°	22°00'	+60'	180°	22
23	28°25'	+60'	154°	27°31'	+60'	154°	26°37'	+60'	154°	25°43'	+60'	154°	24°49'	+60'	155°	23°54'	+60'	155°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

25° 335° LHA — Latitude SAME as Declination — 25° 335° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

26° 334° LHA — Latitude SAME as Declination — 26° 334° LHA

Dec°	84 Hc°	d'	Z°	85 Hc°	d'	Z°	86 Hc°	d'	Z°	87 Hc°	d'	Z°	88 Hc°	d'	Z°	89 Hc°	d'	Z°	90 Hc°	d'	Z°	Dec°
0	5°23'	+60'	154°	4°30'	+60'	154°	3°36'	+60'	154°	2°42'	+60'	154°	1°48'	+60'	154°	0°54'	+60'	154°	0°00'	+60'	154°	0
1	6°23'	+60'	154°	5°30'	+60'	154°	4°36'	+60'	154°	3°42'	+60'	154°	2°48'	+60'	154°	1°54'	+60'	154°	1°00'	+60'	155°	1
2	7°23'	+60'	154°	6°29'	+60'	154°	5°36'	+60'	154°	4°42'	+60'	154°	3°48'	+60'	154°	2°54'	+60'	154°	2°00'	+60'	155°	2
3	8°23'	+60'	154°	7°29'	+60'	154°	6°36'	+60'	154°	5°42'	+60'	154°	4°48'	+60'	154°	3°54'	+60'	154°	3°00'	+60'	155°	3
4	9°23'	+60'	154°	8°29'	+60'	154°	7°36'	+60'	154°	6°42'	+60'	154°	5°48'	+60'	154°	4°54'	+60'	154°	4°00'	+60'	155°	4
5	10°23'	+60'	154°	9°29'	+60'	154°	8°36'	+60'	154°	7°42'	+60'	154°	6°48'	+60'	154°	5°54'	+60'	154°	5°00'	+60'	133°	5
6	11°23'	+60'	154°	10°29'	+60'	154°	9°36'	+60'	154°	8°42'	+60'	154°	7°48'	+60'	154°	6°54'	+60'	154°	6°00'	+60'	133°	6
7	12°23'	+60'	154°	11°29'	+60'	154°	10°35'	+60'	154°	9°42'	+60'	154°	8°48'	+60'	154°	7°54'	+60'	154°	7°00'	+60'	133°	7
8	13°23'	+60'	153°	12°29'	+60'	154°	11°35'	+60'	154°	10°42'	+60'	154°	9°48'	+60'	154°	8°54'	+60'	154°	8°00'	+60'	117°	8
9	14°23'	+60'	153°	13°29'	+60'	154°	12°35'	+60'	154°	11°42'	+60'	154°	10°48'	+60'	154°	9°54'	+60'	154°	9°00'	+60'	157°	9
10	15°23'	+60'	153°	14°29'	+60'	154°	13°35'	+60'	154°	12°42'	+60'	154°	11°48'	+60'	154°	10°54'	+60'	154°	10°00'	+60'	157°	10
11	16°23'	+60'	153°	15°29'	+60'	153°	14°35'	+60'	154°	13°42'	+60'	154°	12°48'	+60'	154°	11°54'	+60'	154°	11°00'	+60'	157°	11
12	17°23'	+60'	153°	16°29'	+60'	153°	15°35'	+60'	154°	14°42'	+60'	154°	13°48'	+60'	154°	12°54'	+60'	154°	12°00'	+60'	180°	12
13	18°23'	+60'	153°	17°29'	+60'	153°	16°35'	+60'	154°	15°42'	+60'	154°	14°48'	+60'	154°	13°54'	+60'	154°	13°00'	+60'	180°	13
14	19°23'	+60'	153°	18°29'	+60'	153°	17°35'	+60'	153°	16°42'	+60'	154°	15°48'	+60'	154°	14°54'	+60'	154°	14°00'	+60'	159°	14
15	20°22'	+60'	153°	19°29'	+60'	153°	18°35'	+60'	153°	17°42'	+60'	154°	16°48'	+60'	154°	15°54'	+60'	154°	15°00'	+60'	160°	15
16	21°22'	+60'	153°	20°29'	+60'	153°	19°35'	+60'	153°	18°42'	+60'	154°	17°48'	+60'	154°	16°54'	+60'	154°	16°00'	+60'	161°	16
17	22°22'	+60'	153°	21°29'	+60'	153°	20°35'	+60'	153°	19°41'	+60'	154°	18°48'	+60'	154°	17°54'	+60'	154°	17°00'	+60'	161°	17
18	23°22'	+60'	153°	22°29'	+60'	153°	21°35'	+60'	153°	20°41'	+60'	154°	19°48'	+60'	154°	18°54'	+60'	154°	18°00'	+60'	162°	18
19	24°22'	+60'	153°	23°29'	+60'	153°	22°35'	+60'	153°	21°41'	+60'	154°	20°48'	+60'	154°	19°54'	+60'	154°	19°00'	+60'	163°	19
20	25°22'	+60'	153°	24°29'	+60'	153°	23°35'	+60'	153°	22°41'	+60'	153°	21°48'	+60'	154°	20°54'	+60'	154°	20°00'	+60'	165°	20
21	26°22'	+60'	153°	25°29'	+60'	153°	24°35'	+60'	153°	23°41'	+60'	153°	22°48'	+60'	154°	21°54'	+60'	154°	21°00'	+60'	90°	21
22	27°22'	+60'	153°	26°29'	+60'	153°	25°35'	+60'	153°	24°41'	+60'	153°	23°48'	+60'	154°	22°54'	+60'	154°	22°00'	+60'	180°	22
23	28°22'	+60'	153°	27°28'	+60'	153°	26°35'	+60'	153°	25°41'	+60'	153°	24°48'	+60'	154°	23°54'	+60'	154°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

26° 334° LHA — Latitude SAME as Declination — 26° 334° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

27° 333° LHA — Latitude SAME as Declination — 27° 333° LHA

Dec°	84 Hc°	d'	Z°	85 Hc°	d'	Z°	86 Hc°	d'	Z°	87 Hc°	d'	Z°	88 Hc°	d'	Z°	89 Hc°	d'	Z°	90 Hc°	d'	Z°	Dec°
0	5°21'	+60'	153°	4°27'	+60'	153°	3°34'	+60'	153°	2°40'	+60'	153°	1°47'	+60'	153°	0°53'	+60'	153°	0°00'	+60'	153°	0
1	6°21'	+60'	153°	5°27'	+60'	153°	4°34'	+60'	153°	3°40'	+60'	153°	2°47'	+60'	153°	1°53'	+60'	153°	1°00'	+60'	155°	1
2	7°21'	+60'	153°	6°27'	+60'	153°	5°34'	+60'	153°	4°40'	+60'	153°	3°47'	+60'	153°	2°53'	+60'	153°	2°00'	+60'	155°	2
3	8°20'	+60'	153°	7°27'	+60'	153°	6°34'	+60'	153°	5°40'	+60'	153°	4°47'	+60'	153°	3°53'	+60'	153°	3°00'	+60'	155°	3
4	9°20'	+60'	153°	8°27'	+60'	153°	7°34'	+60'	153°	6°40'	+60'	153°	5°47'	+60'	153°	4°53'	+60'	153°	4°00'	+60'	155°	4
5	10°20'	+60'	153°	9°27'	+60'	153°	8°34'	+60'	153°	7°40'	+60'	153°	6°47'	+60'	153°	5°53'	+60'	153°	5°00'	+60'	133°	5
6	11°20'	+60'	153°	10°27'	+60'	153°	9°34'	+60'	153°	8°40'	+60'	153°	7°47'	+60'	153°	6°53'	+60'	153°	6°00'	+60'	133°	6
7	12°20'	+60'	153°	11°27'	+60'	153°	10°34'	+60'	153°	9°40'	+60'	153°	8°47'	+60'	153°	7°53'	+60'	153°	7°00'	+60'	133°	7
8	13°20'	+60'	152°	12°27'	+60'	153°	11°34'	+60'	153°	10°40'	+60'	153°	9°47'	+60'	153°	8°53'	+60'	153°	8°00'	+60'	117°	8
9	14°20'	+60'	152°	13°27'	+60'	153°	12°34'	+60'	153°	11°40'	+60'	153°	10°47'	+60'	153°	9°53'	+60'	153°	9°00'	+60'	157°	9
10	15°20'	+60'	152°	14°27'	+60'	153°	13°33'	+60'	153°	12°40'	+60'	153°	11°47'	+60'	153°	10°53'	+60'	153°	10°00'	+60'	157°	10
11	16°20'	+60'	152°	15°27'	+60'	152°	14°33'	+60'	153°	13°40'	+60'	153°	12°47'	+60'	153°	11°53'	+60'	153°	11°00'	+60'	157°	11
12	17°20'	+60'	152°	16°27'	+60'	152°	15°33'	+60'	153°	14°40'	+60'	153°	13°47'	+60'	153°	12°53'	+60'	153°	12°00'	+60'	180°	12
13	18°20'	+60'	152°	17°27'	+60'	152°	16°33'	+60'	153°	15°40'	+60'	153°	14°47'	+60'	153°	13°53'	+60'	153°	13°00'	+60'	180°	13
14	19°20'	+60'	152°	18°27'	+60'	152°	17°33'	+60'	152°	16°40'	+60'	153°	15°47'	+60'	153°	14°53'	+60'	153°	14°00'	+60'	159°	14
15	20°20'	+60'	152°	19°26'	+60'	152°	18°33'	+60'	152°	17°40'	+60'	153°	16°47'	+60'	153°	15°53'	+60'	153°	15°00'	+60'	160°	15
16	21°19'	+60'	152°	20°26'	+60'	152°	19°33'	+60'	152°	18°40'	+60'	153°	17°47'	+60'	153°	16°53'	+60'	153°	16°00'	+60'	161°	16
17	22°19'	+60'	152°	21°26'	+60'	152°	20°33'	+60'	152°	19°40'	+60'	153°	18°47'	+60'	153°	17°53'	+60'	153°	17°00'	+60'	161°	17
18	23°19'	+60'	152°	22°26'	+60'	152°	21°33'	+60'	152°	20°40'	+60'	153°	19°47'	+60'	153°	18°53'	+60'	153°	18°00'	+60'	162°	18
19	24°19'	+60'	152°	23°26'	+60'	152°	22°33'	+60'	152°	21°40'	+60'	152°	20°47'	+60'	153°	19°53'	+60'	153°	19°00'	+60'	163°	19
20	25°19'	+60'	152°	24°26'	+60'	152°	23°33'	+60'	152°	22°40'	+60'	152°	21°47'	+60'	153°	20°53'	+60'	153°	20°00'	+60'	165°	20
21	26°19'	+60'	152°	25°26'	+60'	152°	24°33'	+60'	152°	23°40'	+60'	152°	22°47'	+60'	153°	21°53'	+60'	153°	21°00'	+60'	90°	21
22	27°19'	+60'	152°	26°26'	+60'	152°	25°33'	+60'	152°	24°40'	+60'	152°	23°47'	+60'	153°	22°53'	+60'	153°	22°00'	+60'	180°	22
23	28°19'	+60'	152°	27°26'	+60'	152°	26°33'	+60'	152°	25°40'	+60'	152°	24°47'	+60'	153°	23°53'	+60'	153°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

27° 333° LHA — Latitude SAME as Declination — 27° 333° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

28° 332° LHA — Latitude SAME as Declination — 28° 332° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°18'	+60'	152°	4°25'	+60'	152°	3°32'	+60'	152°	2°39'	+60'	152°	1°46'	+60'	152°	0°53'	+60'	152°	0°00'	+60'	152°	0
1	6°18'	+60'	152°	5°25'	+60'	152°	4°32'	+60'	152°	3°39'	+60'	152°	2°46'	+60'	152°	1°53'	+60'	152°	1°00'	+60'	155°	1
2	7°18'	+60'	152°	6°25'	+60'	152°	5°32'	+60'	152°	4°39'	+60'	152°	3°46'	+60'	152°	2°53'	+60'	152°	2°00'	+60'	155°	2
3	8°18'	+60'	152°	7°25'	+60'	152°	6°32'	+60'	152°	5°39'	+60'	152°	4°46'	+60'	152°	3°53'	+60'	152°	3°00'	+60'	155°	3
4	9°17'	+60'	152°	8°25'	+60'	152°	7°32'	+60'	152°	6°39'	+60'	152°	5°46'	+60'	152°	4°53'	+60'	152°	4°00'	+60'	155°	4
5	10°17'	+60'	152°	9°25'	+60'	152°	8°32'	+60'	152°	7°39'	+60'	152°	6°46'	+60'	152°	5°53'	+60'	152°	5°00'	+60'	133°	5
6	11°17'	+60'	152°	10°25'	+60'	152°	9°32'	+60'	152°	8°39'	+60'	152°	7°46'	+60'	152°	6°53'	+60'	152°	6°00'	+60'	133°	6
7	12°17'	+60'	152°	11°24'	+60'	152°	10°32'	+60'	152°	9°39'	+60'	152°	8°46'	+60'	152°	7°53'	+60'	152°	7°00'	+60'	133°	7
8	13°17'	+60'	151°	12°24'	+60'	152°	11°32'	+60'	152°	10°39'	+60'	152°	9°46'	+60'	152°	8°53'	+60'	152°	8°00'	+60'	117°	8
9	14°17'	+60'	151°	13°24'	+60'	152°	12°32'	+60'	152°	11°39'	+60'	152°	10°46'	+60'	152°	9°53'	+60'	152°	9°00'	+60'	157°	9
10	15°17'	+60'	151°	14°24'	+60'	151°	13°32'	+60'	152°	12°39'	+60'	152°	11°46'	+60'	152°	10°53'	+60'	152°	10°00'	+60'	157°	10
11	16°17'	+60'	151°	15°24'	+60'	151°	14°32'	+60'	152°	13°39'	+60'	152°	12°46'	+60'	152°	11°53'	+60'	152°	11°00'	+60'	157°	11
12	17°17'	+60'	151°	16°24'	+60'	151°	15°31'	+60'	152°	14°39'	+60'	152°	13°46'	+60'	152°	12°53'	+60'	152°	12°00'	+60'	180°	12
13	18°17'	+60'	151°	17°24'	+60'	151°	16°31'	+60'	152°	15°39'	+60'	152°	14°46'	+60'	152°	13°53'	+60'	152°	13°00'	+60'	180°	13
14	19°17'	+60'	151°	18°24'	+60'	151°	17°31'	+60'	151°	16°39'	+60'	152°	15°46'	+60'	152°	14°53'	+60'	152°	14°00'	+60'	159°	14
15	20°17'	+60'	151°	19°24'	+60'	151°	18°31'	+60'	151°	17°39'	+60'	152°	16°46'	+60'	152°	15°53'	+60'	152°	15°00'	+60'	160°	15
16	21°17'	+60'	151°	20°24'	+60'	151°	19°31'	+60'	151°	18°39'	+60'	152°	17°46'	+60'	152°	16°53'	+60'	152°	16°00'	+60'	161°	16
17	22°16'	+60'	151°	21°24'	+60'	151°	20°31'	+60'	151°	19°39'	+60'	152°	18°46'	+60'	152°	17°53'	+60'	152°	17°00'	+60'	161°	17
18	23°16'	+60'	151°	22°24'	+60'	151°	21°31'	+60'	151°	20°39'	+60'	152°	19°46'	+60'	152°	18°53'	+60'	152°	18°00'	+60'	162°	18
19	24°16'	+60'	151°	23°24'	+60'	151°	22°31'	+60'	151°	21°39'	+60'	151°	20°46'	+60'	152°	19°53'	+60'	152°	19°00'	+60'	163°	19
20	25°16'	+60'	151°	24°24'	+60'	151°	23°31'	+60'	151°	22°39'	+60'	151°	21°46'	+60'	152°	20°53'	+60'	152°	20°00'	+60'	165°	20
21	26°16'	+60'	151°	25°24'	+60'	151°	24°31'	+60'	151°	23°39'	+60'	151°	22°46'	+60'	152°	21°53'	+60'	152°	21°00'	+60'	90°	21
22	27°16'	+60'	151°	26°24'	+60'	151°	25°31'	+60'	151°	24°38'	+60'	151°	23°46'	+60'	152°	22°53'	+60'	152°	22°00'	+60'	180°	22
23	28°16'	+60'	151°	27°24'	+60'	151°	26°31'	+60'	151°	25°38'	+60'	151°	24°46'	+60'	152°	23°53'	+60'	152°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

28° 332° LHA — Latitude SAME as Declination — 28° 332° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

29° 331° LHA — Latitude SAME as Declination — 29° 331° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°15'	+60'	151°	4°22'	+60'	151°	3°30'	+60'	151°	2°37'	+60'	151°	1°45'	+60'	151°	0°52'	+60'	151°	0°00'	+60'	151°	0
1	6°15'	+60'	151°	5°22'	+60'	151°	4°30'	+60'	151°	3°37'	+60'	151°	2°45'	+60'	151°	1°52'	+60'	151°	1°00'	+60'	148°	1
2	7°15'	+60'	151°	6°22'	+60'	151°	5°30'	+60'	151°	4°37'	+60'	151°	3°45'	+60'	151°	2°52'	+60'	151°	2°00'	+60'	155°	2
3	8°14'	+60'	151°	7°22'	+60'	151°	6°30'	+60'	151°	5°37'	+60'	151°	4°45'	+60'	151°	3°52'	+60'	151°	3°00'	+60'	155°	3
4	9°14'	+60'	151°	8°22'	+60'	151°	7°30'	+60'	151°	6°37'	+60'	151°	5°45'	+60'	151°	4°52'	+60'	151°	4°00'	+60'	155°	4
5	10°14'	+60'	151°	9°22'	+60'	151°	8°30'	+60'	151°	7°37'	+60'	151°	6°45'	+60'	151°	5°52'	+60'	151°	5°00'	+60'	133°	5
6	11°14'	+60'	151°	10°22'	+60'	151°	9°30'	+60'	151°	8°37'	+60'	151°	7°45'	+60'	151°	6°52'	+60'	151°	6°00'	+60'	133°	6
7	12°14'	+60'	151°	11°22'	+60'	151°	10°30'	+60'	151°	9°37'	+60'	151°	8°45'	+60'	151°	7°52'	+60'	151°	7°00'	+60'	133°	7
8	13°14'	+60'	150°	12°22'	+60'	151°	11°30'	+60'	151°	10°37'	+60'	151°	9°45'	+60'	151°	8°52'	+60'	151°	8°00'	+60'	117°	8
9	14°14'	+60'	150°	13°22'	+60'	151°	12°30'	+60'	151°	11°37'	+60'	151°	10°45'	+60'	151°	9°52'	+60'	151°	9°00'	+60'	157°	9
10	15°14'	+60'	150°	14°22'	+60'	150°	13°30'	+60'	151°	12°37'	+60'	151°	11°45'	+60'	151°	10°52'	+60'	151°	10°00'	+60'	157°	10
11	16°14'	+60'	150°	15°22'	+60'	150°	14°29'	+60'	151°	13°37'	+60'	151°	12°45'	+60'	151°	11°52'	+60'	151°	11°00'	+60'	157°	11
12	17°14'	+60'	150°	16°22'	+60'	150°	15°29'	+60'	151°	14°37'	+60'	151°	13°45'	+60'	151°	12°52'	+60'	151°	12°00'	+60'	180°	12
13	18°14'	+60'	150°	17°22'	+60'	150°	16°29'	+60'	150°	15°37'	+60'	151°	14°45'	+60'	151°	13°52'	+60'	151°	13°00'	+60'	180°	13
14	19°14'	+60'	150°	18°22'	+60'	150°	17°29'	+60'	150°	16°37'	+60'	151°	15°45'	+60'	151°	14°52'	+60'	151°	14°00'	+60'	159°	14
15	20°14'	+60'	150°	19°21'	+60'	150°	18°29'	+60'	150°	17°37'	+60'	151°	16°45'	+60'	151°	15°52'	+60'	151°	15°00'	+60'	160°	15
16	21°13'	+60'	150°	20°21'	+60'	150°	19°29'	+60'	150°	18°37'	+60'	151°	17°45'	+60'	151°	16°52'	+60'	151°	16°00'	+60'	161°	16
17	22°13'	+60'	150°	21°21'	+60'	150°	20°29'	+60'	150°	19°37'	+60'	151°	18°45'	+60'	151°	17°52'	+60'	151°	17°00'	+60'	161°	17
18	23°13'	+60'	150°	22°21'	+60'	150°	21°29'	+60'	150°	20°37'	+60'	150°	19°45'	+60'	151°	18°52'	+60'	151°	18°00'	+60'	162°	18
19	24°13'	+60'	150°	23°21'	+60'	150°	22°29'	+60'	150°	21°37'	+60'	150°	20°45'	+60'	151°	19°52'	+60'	151°	19°00'	+60'	163°	19
20	25°13'	+60'	150°	24°21'	+60'	150°	23°29'	+60'	150°	22°37'	+60'	150°	21°45'	+60'	151°	20°52'	+60'	151°	20°00'	+60'	165°	20
21	26°13'	+60'	150°	25°21'	+60'	150°	24°29'	+60'	150°	23°37'	+60'	150°	22°45'	+60'	151°	21°52'	+60'	151°	21°00'	+60'	90°	21
22	27°13'	+60'	150°	26°21'	+60'	150°	25°29'	+60'	150°	24°37'	+60'	150°	23°45'	+60'	151°	22°52'	+60'	151°	22°00'	+60'	180°	22
23	28°13'	+60'	150°	27°21'	+60'	150°	26°29'	+60'	150°	25°37'	+60'	150°	24°45'	+60'	151°	23°52'	+60'	151°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

29° 331° LHA — Latitude SAME as Declination — 29° 331° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

30° 330° LHA — Latitude SAME as Declination — 30° 330° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°12'	+60'	150°	4°20'	+60'	150°	3°28'	+60'	150°	2°36'	+60'	150°	1°44'	+60'	150°	0°52'	+60'	150°	0°00'	+60'	150°	0
1	6°12'	+60'	150°	5°20'	+60'	150°	4°28'	+60'	150°	3°36'	+60'	150°	2°44'	+60'	150°	1°52'	+60'	150°	1°00'	+60'	148°	1
2	7°11'	+60'	150°	6°20'	+60'	150°	5°28'	+60'	150°	4°36'	+60'	150°	3°44'	+60'	150°	2°52'	+60'	150°	2°00'	+60'	155°	2
3	8°11'	+60'	150°	7°20'	+60'	150°	6°28'	+60'	150°	5°36'	+60'	150°	4°44'	+60'	150°	3°52'	+60'	150°	3°00'	+60'	155°	3
4	9°11'	+60'	150°	8°19'	+60'	150°	7°28'	+60'	150°	6°36'	+60'	150°	5°44'	+60'	150°	4°52'	+60'	150°	4°00'	+60'	155°	4
5	10°11'	+60'	150°	9°19'	+60'	150°	8°28'	+60'	150°	7°36'	+60'	150°	6°44'	+60'	150°	5°52'	+60'	150°	5°00'	+60'	133°	5
6	11°11'	+60'	150°	10°19'	+60'	150°	9°28'	+60'	150°	8°36'	+60'	150°	7°44'	+60'	150°	6°52'	+60'	150°	6°00'	+60'	133°	6
7	12°11'	+60'	149°	11°19'	+60'	150°	10°28'	+60'	150°	9°36'	+60'	150°	8°44'	+60'	150°	7°52'	+60'	150°	7°00'	+60'	133°	7
8	13°11'	+60'	149°	12°19'	+60'	150°	11°28'	+60'	150°	10°36'	+60'	150°	9°44'	+60'	150°	8°52'	+60'	150°	8°00'	+60'	117°	8
9	14°11'	+60'	149°	13°19'	+60'	150°	12°27'	+60'	150°	11°36'	+60'	150°	10°44'	+60'	150°	9°52'	+60'	150°	9°00'	+60'	157°	9
10	15°11'	+60'	149°	14°19'	+60'	149°	13°27'	+60'	150°	12°36'	+60'	150°	11°44'	+60'	150°	10°52'	+60'	150°	10°00'	+60'	157°	10
11	16°11'	+60'	149°	15°19'	+60'	149°	14°27'	+60'	150°	13°36'	+60'	150°	12°44'	+60'	150°	11°52'	+60'	150°	11°00'	+60'	157°	11
12	17°11'	+60'	149°	16°19'	+60'	149°	15°27'	+60'	150°	14°36'	+60'	150°	13°44'	+60'	150°	12°52'	+60'	150°	12°00'	+60'	180°	12
13	18°11'	+60'	149°	17°19'	+60'	149°	16°27'	+60'	149°	15°36'	+60'	150°	14°44'	+60'	150°	13°52'	+60'	150°	13°00'	+60'	180°	13
14	19°10'	+60'	149°	18°19'	+60'	149°	17°27'	+60'	149°	16°36'	+60'	150°	15°44'	+60'	150°	14°52'	+60'	150°	14°00'	+60'	159°	14
15	20°10'	+60'	149°	19°19'	+60'	149°	18°27'	+60'	149°	17°36'	+60'	150°	16°44'	+60'	150°	15°52'	+60'	150°	15°00'	+60'	160°	15
16	21°10'	+60'	149°	20°19'	+60'	149°	19°27'	+60'	149°	18°36'	+60'	150°	17°44'	+60'	150°	16°52'	+60'	150°	16°00'	+60'	161°	16
17	22°10'	+60'	149°	21°19'	+60'	149°	20°27'	+60'	149°	19°36'	+60'	150°	18°44'	+60'	150°	17°52'	+60'	150°	17°00'	+60'	161°	17
18	23°10'	+60'	149°	22°19'	+60'	149°	21°27'	+60'	149°	20°35'	+60'	149°	19°44'	+60'	150°	18°52'	+60'	150°	18°00'	+60'	162°	18
19	24°10'	+60'	149°	23°19'	+60'	149°	22°27'	+60'	149°	21°35'	+60'	149°	20°44'	+60'	150°	19°52'	+60'	150°	19°00'	+60'	163°	19
20	25°10'	+60'	149°	24°18'	+60'	149°	23°27'	+60'	149°	22°35'	+60'	149°	21°44'	+60'	150°	20°52'	+60'	150°	20°00'	+60'	165°	20
21	26°10'	+60'	149°	25°18'	+60'	149°	24°27'	+60'	149°	23°35'	+60'	149°	22°44'	+60'	150°	21°52'	+60'	150°	21°00'	+60'	90°	21
22	27°10'	+60'	149°	26°18'	+60'	149°	25°27'	+60'	149°	24°35'	+60'	149°	23°44'	+60'	150°	22°52'	+60'	150°	22°00'	+60'	180°	22
23	28°10'	+60'	149°	27°18'	+60'	149°	26°27'	+60'	149°	25°35'	+60'	149°	24°44'	+60'	150°	23°52'	+60'	150°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

30° 330° LHA — Latitude SAME as Declination — 30° 330° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

31° 329° LHA — Latitude SAME as Declination — 31° 329° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°08'	+60'	149°	4°17'	+60'	149°	3°26'	+60'	149°	2°34'	+60'	149°	1°43'	+60'	149°	0°51'	+60'	149°	0°00'	+60'	149°	0
1	6°08'	+60'	149°	5°17'	+60'	149°	4°26'	+60'	149°	3°34'	+60'	149°	2°43'	+60'	149°	1°51'	+60'	149°	1°00'	+60'	148°	1
2	7°08'	+60'	149°	6°17'	+60'	149°	5°26'	+60'	149°	4°34'	+60'	149°	3°43'	+60'	149°	2°51'	+60'	149°	2°00'	+60'	155°	2
3	8°08'	+60'	149°	7°17'	+60'	149°	6°26'	+60'	149°	5°34'	+60'	149°	4°43'	+60'	149°	3°51'	+60'	149°	3°00'	+60'	155°	3
4	9°08'	+60'	149°	8°17'	+60'	149°	7°26'	+60'	149°	6°34'	+60'	149°	5°43'	+60'	149°	4°51'	+60'	149°	4°00'	+60'	155°	4
5	10°08'	+60'	149°	9°17'	+60'	149°	8°25'	+60'	149°	7°34'	+60'	149°	6°43'	+60'	149°	5°51'	+60'	149°	5°00'	+60'	133°	5
6	11°08'	+60'	149°	10°17'	+60'	149°	9°25'	+60'	149°	8°34'	+60'	149°	7°43'	+60'	149°	6°51'	+60'	149°	6°00'	+60'	133°	6
7	12°08'	+60'	148°	11°17'	+60'	149°	10°25'	+60'	149°	9°34'	+60'	149°	8°43'	+60'	149°	7°51'	+60'	149°	7°00'	+60'	133°	7
8	13°08'	+60'	148°	12°17'	+60'	149°	11°25'	+60'	149°	10°34'	+60'	149°	9°43'	+60'	149°	8°51'	+60'	149°	8°00'	+60'	117°	8
9	14°08'	+60'	148°	13°17'	+60'	148°	12°25'	+60'	149°	11°34'	+60'	149°	10°43'	+60'	149°	9°51'	+60'	149°	9°00'	+60'	157°	9
10	15°08'	+60'	148°	14°16'	+60'	148°	13°25'	+60'	149°	12°34'	+60'	149°	11°43'	+60'	149°	10°51'	+60'	149°	10°00'	+60'	157°	10
11	16°07'	+60'	148°	15°16'	+60'	148°	14°25'	+60'	149°	13°34'	+60'	149°	12°43'	+60'	149°	11°51'	+60'	149°	11°00'	+60'	157°	11
12	17°07'	+60'	148°	16°16'	+60'	148°	15°25'	+60'	148°	14°34'	+60'	149°	13°43'	+60'	149°	12°51'	+60'	149°	12°00'	+60'	180°	12
13	18°07'	+60'	148°	17°16'	+60'	148°	16°25'	+60'	148°	15°34'	+60'	149°	14°43'	+60'	149°	13°51'	+60'	149°	13°00'	+60'	180°	13
14	19°07'	+60'	148°	18°16'	+60'	148°	17°25'	+60'	148°	16°34'	+60'	149°	15°43'	+60'	149°	14°51'	+60'	149°	14°00'	+60'	159°	14
15	20°07'	+60'	148°	19°16'	+60'	148°	18°25'	+60'	148°	17°34'	+60'	149°	16°43'	+60'	149°	15°51'	+60'	149°	15°00'	+60'	160°	15
16	21°07'	+60'	148°	20°16'	+60'	148°	19°25'	+60'	148°	18°34'	+60'	149°	17°43'	+60'	149°	16°51'	+60'	149°	16°00'	+60'	161°	16
17	22°07'	+60'	148°	21°16'	+60'	148°	20°25'	+60'	148°	19°34'	+60'	148°	18°43'	+60'	149°	17°51'	+60'	149°	17°00'	+60'	161°	17
18	23°07'	+60'	148°	22°16'	+60'	148°	21°25'	+60'	148°	20°34'	+60'	148°	19°43'	+60'	149°	18°51'	+60'	149°	18°00'	+60'	162°	18
19	24°07'	+60'	148°	23°16'	+60'	148°	22°25'	+60'	148°	21°34'	+60'	148°	20°43'	+60'	149°	19°51'	+60'	149°	19°00'	+60'	163°	19
20	25°07'	+60'	148°	24°16'	+60'	148°	23°25'	+60'	148°	22°34'	+60'	148°	21°43'	+60'	149°	20°51'	+60'	149°	20°00'	+60'	165°	20
21	26°06'	+60'	148°	25°16'	+60'	148°	24°25'	+60'	148°	23°34'	+60'	148°	22°43'	+60'	149°	21°51'	+60'	149°	21°00'	+60'	90°	21
22	27°06'	+60'	148°	26°16'	+60'	148°	25°25'	+60'	148°	24°34'	+60'	148°	23°43'	+60'	149°	22°51'	+60'	149°	22°00'	+60'	180°	22
23	28°06'	+60'	147°	27°16'	+60'	148°	26°25'	+60'	148°	25°34'	+60'	148°	24°43'	+60'	149°	23°51'	+60'	149°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

31° 329° LHA — Latitude SAME as Declination — 31° 329° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

32° 328° LHA — Latitude SAME as Declination — 32° 328° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°05'	+60'	148°	4°14'	+60'	148°	3°23'	+60'	148°	2°33'	+60'	148°	1°42'	+60'	148°	0°51'	+60'	148°	0°00'	+60'	148°	0
1	6°05'	+60'	148°	5°14'	+60'	148°	4°23'	+60'	148°	3°33'	+60'	148°	2°42'	+60'	148°	1°51'	+60'	148°	1°00'	+60'	148°	1
2	7°05'	+60'	148°	6°14'	+60'	148°	5°23'	+60'	148°	4°33'	+60'	148°	3°42'	+60'	148°	2°51'	+60'	148°	2°00'	+60'	143°	2
3	8°05'	+60'	148°	7°14'	+60'	148°	6°23'	+60'	148°	5°33'	+60'	148°	4°42'	+60'	148°	3°51'	+60'	148°	3°00'	+60'	143°	3
4	9°05'	+60'	148°	8°14'	+60'	148°	7°23'	+60'	148°	6°33'	+60'	148°	5°42'	+60'	148°	4°51'	+60'	148°	4°00'	+60'	155°	4
5	10°05'	+60'	148°	9°14'	+60'	148°	8°23'	+60'	148°	7°33'	+60'	148°	6°42'	+60'	148°	5°51'	+60'	148°	5°00'	+60'	133°	5
6	11°05'	+60'	148°	10°14'	+60'	148°	9°23'	+60'	148°	8°32'	+60'	148°	7°42'	+60'	148°	6°51'	+60'	148°	6°00'	+60'	133°	6
7	12°04'	+60'	147°	11°14'	+60'	148°	10°23'	+60'	148°	9°32'	+60'	148°	8°42'	+60'	148°	7°51'	+60'	148°	7°00'	+60'	133°	7
8	13°04'	+60'	147°	12°14'	+60'	148°	11°23'	+60'	148°	10°32'	+60'	148°	9°42'	+60'	148°	8°51'	+60'	148°	8°00'	+60'	117°	8
9	14°04'	+60'	147°	13°14'	+60'	147°	12°23'	+60'	148°	11°32'	+60'	148°	10°42'	+60'	148°	9°51'	+60'	148°	9°00'	+60'	157°	9
10	15°04'	+60'	147°	14°14'	+60'	147°	13°23'	+60'	148°	12°32'	+60'	148°	11°42'	+60'	148°	10°51'	+60'	148°	10°00'	+60'	157°	10
11	16°04'	+60'	147°	15°14'	+60'	147°	14°23'	+60'	148°	13°32'	+60'	148°	12°42'	+60'	148°	11°51'	+60'	148°	11°00'	+60'	157°	11
12	17°04'	+60'	147°	16°14'	+60'	147°	15°23'	+60'	147°	14°32'	+60'	148°	13°42'	+60'	148°	12°51'	+60'	148°	12°00'	+60'	180°	12
13	18°04'	+60'	147°	17°13'	+60'	147°	16°23'	+60'	147°	15°32'	+60'	148°	14°42'	+60'	148°	13°51'	+60'	148°	13°00'	+60'	180°	13
14	19°04'	+60'	147°	18°13'	+60'	147°	17°23'	+60'	147°	16°32'	+60'	148°	15°42'	+60'	148°	14°51'	+60'	148°	14°00'	+60'	159°	14
15	20°04'	+60'	147°	19°13'	+60'	147°	18°23'	+60'	147°	17°32'	+60'	148°	16°42'	+60'	148°	15°51'	+60'	148°	15°00'	+60'	160°	15
16	21°04'	+60'	147°	20°13'	+60'	147°	19°23'	+60'	147°	18°32'	+60'	148°	17°42'	+60'	148°	16°51'	+60'	148°	16°00'	+60'	161°	16
17	22°03'	+60'	147°	21°13'	+60'	147°	20°23'	+60'	147°	19°32'	+60'	147°	18°42'	+60'	148°	17°51'	+60'	148°	17°00'	+60'	161°	17
18	23°03'	+60'	147°	22°13'	+60'	147°	21°23'	+60'	147°	20°32'	+60'	147°	19°42'	+60'	148°	18°51'	+60'	148°	18°00'	+60'	162°	18
19	24°03'	+60'	147°	23°13'	+60'	147°	22°23'	+60'	147°	21°32'	+60'	147°	20°42'	+60'	148°	19°51'	+60'	148°	19°00'	+60'	163°	19
20	25°03'	+60'	147°	24°13'	+60'	147°	23°23'	+60'	147°	22°32'	+60'	147°	21°42'	+60'	148°	20°51'	+60'	148°	20°00'	+60'	165°	20
21	26°03'	+60'	147°	25°13'	+60'	147°	24°23'	+60'	147°	23°32'	+60'	147°	22°42'	+60'	148°	21°51'	+60'	148°	21°00'	+60'	90°	21
22	27°03'	+60'	147°	26°13'	+60'	147°	25°23'	+60'	147°	24°32'	+60'	147°	23°42'	+60'	148°	22°51'	+60'	148°	22°00'	+60'	180°	22
23	28°03'	+60'	146°	27°13'	+60'	147°	26°22'	+60'	147°	25°32'	+60'	147°	24°42'	+60'	148°	23°51'	+60'	148°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

32° 328° LHA — Latitude SAME as Declination — 32° 328° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

33° 327° LHA — Latitude SAME as Declination — 33° 327° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°02'	+60'	147°	4°12'	+60'	147°	3°21'	+60'	147°	2°31'	+60'	147°	1°41'	+60'	147°	0°50'	+60'	147°	0°00'	+60'	147°	0
1	6°02'	+60'	147°	5°11'	+60'	147°	4°21'	+60'	147°	3°31'	+60'	147°	2°41'	+60'	147°	1°50'	+60'	147°	1°00'	+60'	148°	1
2	7°02'	+60'	147°	6°11'	+60'	147°	5°21'	+60'	147°	4°31'	+60'	147°	3°41'	+60'	147°	2°50'	+60'	147°	2°00'	+60'	143°	2
3	8°01'	+60'	147°	7°11'	+60'	147°	6°21'	+60'	147°	5°31'	+60'	147°	4°41'	+60'	147°	3°50'	+60'	147°	3°00'	+60'	143°	3
4	9°01'	+60'	147°	8°11'	+60'	147°	7°21'	+60'	147°	6°31'	+60'	147°	5°41'	+60'	147°	4°50'	+60'	147°	4°00'	+60'	155°	4
5	10°01'	+60'	147°	9°11'	+60'	147°	8°21'	+60'	147°	7°31'	+60'	147°	6°41'	+60'	147°	5°50'	+60'	147°	5°00'	+60'	133°	5
6	11°01'	+60'	147°	10°11'	+60'	147°	9°21'	+60'	147°	8°31'	+60'	147°	7°41'	+60'	147°	6°50'	+60'	147°	6°00'	+60'	133°	6
7	12°01'	+60'	146°	11°11'	+60'	147°	10°21'	+60'	147°	9°31'	+60'	147°	8°41'	+60'	147°	7°50'	+60'	147°	7°00'	+60'	133°	7
8	13°01'	+60'	146°	12°11'	+60'	147°	11°21'	+60'	147°	10°31'	+60'	147°	9°41'	+60'	147°	8°50'	+60'	147°	8°00'	+60'	117°	8
9	14°01'	+60'	146°	13°11'	+60'	146°	12°21'	+60'	147°	11°31'	+60'	147°	10°41'	+60'	147°	9°50'	+60'	147°	9°00'	+60'	157°	9
10	15°01'	+60'	146°	14°11'	+60'	146°	13°21'	+60'	147°	12°31'	+60'	147°	11°41'	+60'	147°	10°50'	+60'	147°	10°00'	+60'	157°	10
11	16°01'	+60'	146°	15°11'	+60'	146°	14°21'	+60'	147°	13°31'	+60'	147°	12°41'	+60'	147°	11°50'	+60'	147°	11°00'	+60'	157°	11
12	17°01'	+60'	146°	16°11'	+60'	146°	15°21'	+60'	146°	14°31'	+60'	147°	13°41'	+60'	147°	12°50'	+60'	147°	12°00'	+60'	180°	12
13	18°00'	+60'	146°	17°11'	+60'	146°	16°21'	+60'	146°	15°31'	+60'	147°	14°40'	+60'	147°	13°50'	+60'	147°	13°00'	+60'	180°	13
14	19°00'	+60'	146°	18°11'	+60'	146°	17°21'	+60'	146°	16°31'	+60'	147°	15°40'	+60'	147°	14°50'	+60'	147°	14°00'	+60'	159°	14
15	20°00'	+60'	146°	19°10'	+60'	146°	18°21'	+60'	146°	17°31'	+60'	147°	16°40'	+60'	147°	15°50'	+60'	147°	15°00'	+60'	160°	15
16	21°00'	+60'	146°	20°10'	+60'	146°	19°21'	+60'	146°	18°31'	+60'	146°	17°40'	+60'	147°	16°50'	+60'	147°	16°00'	+60'	161°	16
17	22°00'	+60'	146°	21°10'	+60'	146°	20°20'	+60'	146°	19°31'	+60'	146°	18°40'	+60'	147°	17°50'	+60'	147°	17°00'	+60'	161°	17
18	23°00'	+60'	146°	22°10'	+60'	146°	21°20'	+60'	146°	20°30'	+60'	146°	19°40'	+60'	147°	18°50'	+60'	147°	18°00'	+60'	162°	18
19	24°00'	+60'	146°	23°10'	+60'	146°	22°20'	+60'	146°	21°30'	+60'	146°	20°40'	+60'	147°	19°50'	+60'	147°	19°00'	+60'	163°	19
20	25°00'	+60'	146°	24°10'	+60'	146°	23°20'	+60'	146°	22°30'	+60'	146°	21°40'	+60'	147°	20°50'	+60'	147°	20°00'	+60'	165°	20
21	26°00'	+60'	146°	25°10'	+60'	146°	24°20'	+60'	146°	23°30'	+60'	146°	22°40'	+60'	147°	21°50'	+60'	147°	21°00'	+60'	90°	21
22	26°59'	+60'	145°	26°10'	+60'	146°	25°20'	+60'	146°	24°30'	+60'	146°	23°40'	+60'	147°	22°50'	+60'	147°	22°00'	+60'	180°	22
23	27°59'	+60'	145°	27°10'	+60'	146°	26°20'	+60'	146°	25°30'	+60'	146°	24°40'	+60'	147°	23°50'	+60'	147°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

33° 327° LHA — Latitude SAME as Declination — 33° 327° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

34° 326° LHA — Latitude SAME as Declination — 34° 326° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°58'	+60'	146°	4°09'	+60'	146°	3°19'	+60'	146°	2°29'	+60'	146°	1°39'	+60'	146°	0°50'	+60'	146°	0°00'	+60'	146°	0
1	5°58'	+60'	146°	5°09'	+60'	146°	4°19'	+60'	146°	3°29'	+60'	146°	2°39'	+60'	146°	1°50'	+60'	146°	1°00'	+60'	148°	1
2	6°58'	+60'	146°	6°08'	+60'	146°	5°19'	+60'	146°	4°29'	+60'	146°	3°39'	+60'	146°	2°50'	+60'	146°	2°00'	+60'	143°	2
3	7°58'	+60'	146°	7°08'	+60'	146°	6°19'	+60'	146°	5°29'	+60'	146°	4°39'	+60'	146°	3°50'	+60'	146°	3°00'	+60'	143°	3
4	8°58'	+60'	146°	8°08'	+60'	146°	7°19'	+60'	146°	6°29'	+60'	146°	5°39'	+60'	146°	4°50'	+60'	146°	4°00'	+60'	155°	4
5	9°58'	+60'	146°	9°08'	+60'	146°	8°19'	+60'	146°	7°29'	+60'	146°	6°39'	+60'	146°	5°50'	+60'	146°	5°00'	+60'	133°	5
6	10°58'	+60'	145°	10°08'	+60'	146°	9°19'	+60'	146°	8°29'	+60'	146°	7°39'	+60'	146°	6°50'	+60'	146°	6°00'	+60'	133°	6
7	11°58'	+60'	145°	11°08'	+60'	146°	10°19'	+60'	146°	9°29'	+60'	146°	8°39'	+60'	146°	7°50'	+60'	146°	7°00'	+60'	133°	7
8	12°57'	+60'	145°	12°08'	+60'	146°	11°19'	+60'	146°	10°29'	+60'	146°	9°39'	+60'	146°	8°50'	+60'	146°	8°00'	+60'	117°	8
9	13°57'	+60'	145°	13°08'	+60'	145°	12°18'	+60'	146°	11°29'	+60'	146°	10°39'	+60'	146°	9°50'	+60'	146°	9°00'	+60'	157°	9
10	14°57'	+60'	145°	14°08'	+60'	145°	13°18'	+60'	146°	12°29'	+60'	146°	11°39'	+60'	146°	10°50'	+60'	146°	10°00'	+60'	157°	10
11	15°57'	+60'	145°	15°08'	+60'	145°	14°18'	+60'	145°	13°29'	+60'	146°	12°39'	+60'	146°	11°50'	+60'	146°	11°00'	+60'	157°	11
12	16°57'	+60'	145°	16°08'	+60'	145°	15°18'	+60'	145°	14°29'	+60'	146°	13°39'	+60'	146°	12°50'	+60'	146°	12°00'	+60'	180°	12
13	17°57'	+60'	145°	17°08'	+60'	145°	16°18'	+60'	145°	15°29'	+60'	146°	14°39'	+60'	146°	13°50'	+60'	146°	13°00'	+60'	180°	13
14	18°57'	+60'	145°	18°08'	+60'	145°	17°18'	+60'	145°	16°29'	+60'	146°	15°39'	+60'	146°	14°50'	+60'	146°	14°00'	+60'	159°	14
15	19°57'	+60'	145°	19°07'	+60'	145°	18°18'	+60'	145°	17°29'	+60'	146°	16°39'	+60'	146°	15°50'	+60'	146°	15°00'	+60'	160°	15
16	20°57'	+60'	145°	20°07'	+60'	145°	19°18'	+60'	145°	18°29'	+60'	145°	17°39'	+60'	146°	16°50'	+60'	146°	16°00'	+60'	161°	16
17	21°56'	+60'	145°	21°07'	+60'	145°	20°18'	+60'	145°	19°29'	+60'	145°	18°39'	+60'	146°	17°50'	+60'	146°	17°00'	+60'	161°	17
18	22°56'	+60'	145°	22°07'	+60'	145°	21°18'	+60'	145°	20°29'	+60'	145°	19°39'	+60'	146°	18°50'	+60'	146°	18°00'	+60'	162°	18
19	23°56'	+60'	145°	23°07'	+60'	145°	22°18'	+60'	145°	21°29'	+60'	145°	20°39'	+60'	146°	19°50'	+60'	146°	19°00'	+60'	163°	19
20	24°56'	+60'	145°	24°07'	+60'	145°	23°18'	+60'	145°	22°29'	+60'	145°	21°39'	+60'	146°	20°50'	+60'	146°	20°00'	+60'	165°	20
21	25°56'	+60'	145°	25°07'	+60'	145°	24°18'	+60'	145°	23°29'	+60'	145°	22°39'	+60'	146°	21°50'	+60'	146°	21°00'	+60'	90°	21
22	26°56'	+60'	144°	26°07'	+60'	145°	25°18'	+60'	145°	24°29'	+60'	145°	23°39'	+60'	146°	22°50'	+60'	146°	22°00'	+60'	180°	22
23	27°56'	+60'	144°	27°07'	+60'	145°	26°18'	+60'	145°	25°29'	+60'	145°	24°39'	+60'	146°	23°50'	+60'	146°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

34° 326° LHA — Latitude SAME as Declination — 34° 326° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

35° 325° LHA — Latitude SAME as Declination — 35° 325° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°55'	+60'	145°	4°06'	+60'	145°	3°17'	+60'	145°	2°27'	+60'	145°	1°38'	+60'	145°	0°49'	+60'	145°	0°00'	+60'	145°	0
1	5°55'	+60'	145°	5°06'	+60'	145°	4°16'	+60'	145°	3°27'	+60'	145°	2°38'	+60'	145°	1°49'	+60'	145°	1°00'	+60'	142°	1
2	6°54'	+60'	145°	6°05'	+60'	145°	5°16'	+60'	145°	4°27'	+60'	145°	3°38'	+60'	145°	2°49'	+60'	145°	2°00'	+60'	143°	2
3	7°54'	+60'	145°	7°05'	+60'	145°	6°16'	+60'	145°	5°27'	+60'	145°	4°38'	+60'	145°	3°49'	+60'	145°	3°00'	+60'	143°	3
4	8°54'	+60'	145°	8°05'	+60'	145°	7°16'	+60'	145°	6°27'	+60'	145°	5°38'	+60'	145°	4°49'	+60'	145°	4°00'	+60'	155°	4
5	9°54'	+60'	145°	9°05'	+60'	145°	8°16'	+60'	145°	7°27'	+60'	145°	6°38'	+60'	145°	5°49'	+60'	145°	5°00'	+60'	133°	5
6	10°54'	+60'	144°	10°05'	+60'	145°	9°16'	+60'	145°	8°27'	+60'	145°	7°38'	+60'	145°	6°49'	+60'	145°	6°00'	+60'	133°	6
7	11°54'	+60'	144°	11°05'	+60'	145°	10°16'	+60'	145°	9°27'	+60'	145°	8°38'	+60'	145°	7°49'	+60'	145°	7°00'	+60'	133°	7
8	12°54'	+60'	144°	12°05'	+60'	144°	11°16'	+60'	145°	10°27'	+60'	145°	9°38'	+60'	145°	8°49'	+60'	145°	8°00'	+60'	117°	8
9	13°54'	+60'	144°	13°05'	+60'	144°	12°16'	+60'	145°	11°27'	+60'	145°	10°38'	+60'	145°	9°49'	+60'	145°	9°00'	+60'	157°	9
10	14°54'	+60'	144°	14°05'	+60'	144°	13°16'	+60'	145°	12°27'	+60'	145°	11°38'	+60'	145°	10°49'	+60'	145°	10°00'	+60'	157°	10
11	15°53'	+60'	144°	15°05'	+60'	144°	14°16'	+60'	144°	13°27'	+60'	145°	12°38'	+60'	145°	11°49'	+60'	145°	11°00'	+60'	157°	11
12	16°53'	+60'	144°	16°05'	+60'	144°	15°16'	+60'	144°	14°27'	+60'	145°	13°38'	+60'	145°	12°49'	+60'	145°	12°00'	+60'	180°	12
13	17°53'	+60'	144°	17°05'	+60'	144°	16°16'	+60'	144°	15°27'	+60'	145°	14°38'	+60'	145°	13°49'	+60'	145°	13°00'	+60'	180°	13
14	18°53'	+60'	144°	18°05'	+60'	144°	17°16'	+60'	144°	16°27'	+60'	145°	15°38'	+60'	145°	14°49'	+60'	145°	14°00'	+60'	159°	14
15	19°53'	+60'	144°	19°04'	+60'	144°	18°16'	+60'	144°	17°27'	+60'	144°	16°38'	+60'	145°	15°49'	+60'	145°	15°00'	+60'	160°	15
16	20°53'	+60'	144°	20°04'	+60'	144°	19°16'	+60'	144°	18°27'	+60'	144°	17°38'	+60'	145°	16°49'	+60'	145°	16°00'	+60'	161°	16
17	21°53'	+60'	144°	21°04'	+60'	144°	20°16'	+60'	144°	19°27'	+60'	144°	18°38'	+60'	145°	17°49'	+60'	145°	17°00'	+60'	161°	17
18	22°53'	+60'	144°	22°04'	+60'	144°	21°16'	+60'	144°	20°27'	+60'	144°	19°38'	+60'	145°	18°49'	+60'	145°	18°00'	+60'	162°	18
19	23°53'	+60'	144°	23°04'	+60'	144°	22°16'	+60'	144°	21°27'	+60'	144°	20°38'	+60'	145°	19°49'	+60'	145°	19°00'	+60'	163°	19
20	24°52'	+60'	144°	24°04'	+60'	144°	23°16'	+60'	144°	22°27'	+60'	144°	21°38'	+60'	145°	20°49'	+60'	145°	20°00'	+60'	165°	20
21	25°52'	+60'	143°	25°04'	+60'	144°	24°15'	+60'	144°	23°27'	+60'	144°	22°38'	+60'	145°	21°49'	+60'	145°	21°00'	+60'	90°	21
22	26°52'	+60'	143°	26°04'	+60'	144°	25°15'	+60'	144°	24°27'	+60'	144°	23°38'	+60'	145°	22°49'	+60'	145°	22°00'	+60'	180°	22
23	27°52'	+60'	143°	27°04'	+60'	144°	26°15'	+60'	144°	25°27'	+60'	144°	24°38'	+60'	144°	23°49'	+60'	145°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

35° 325° LHA — Latitude SAME as Declination — 35° 325° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

36° 324° LHA — Latitude SAME as Declination — 36° 324° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°51'	+60'	144°	4°03'	+60'	144°	3°14'	+60'	144°	2°26'	+60'	144°	1°37'	+60'	144°	0°49'	+60'	144°	0°00'	+60'	144°	0
1	5°51'	+60'	144°	5°03'	+60'	144°	4°14'	+60'	144°	3°26'	+60'	144°	2°37'	+60'	144°	1°49'	+60'	144°	1°00'	+60'	142°	1
2	6°51'	+60'	144°	6°02'	+60'	144°	5°14'	+60'	144°	4°26'	+60'	144°	3°37'	+60'	144°	2°49'	+60'	144°	2°00'	+60'	143°	2
3	7°51'	+60'	144°	7°02'	+60'	144°	6°14'	+60'	144°	5°26'	+60'	144°	4°37'	+60'	144°	3°49'	+60'	144°	3°00'	+60'	143°	3
4	8°51'	+60'	144°	8°02'	+60'	144°	7°14'	+60'	144°	6°25'	+60'	144°	5°37'	+60'	144°	4°49'	+60'	144°	4°00'	+60'	155°	4
5	9°50'	+60'	144°	9°02'	+60'	144°	8°14'	+60'	144°	7°25'	+60'	144°	6°37'	+60'	144°	5°49'	+60'	144°	5°00'	+60'	133°	5
6	10°50'	+60'	143°	10°02'	+60'	144°	9°14'	+60'	144°	8°25'	+60'	144°	7°37'	+60'	144°	6°49'	+60'	144°	6°00'	+60'	133°	6
7	11°50'	+60'	143°	11°02'	+60'	144°	10°14'	+60'	144°	9°25'	+60'	144°	8°37'	+60'	144°	7°49'	+60'	144°	7°00'	+60'	133°	7
8	12°50'	+60'	143°	12°02'	+60'	143°	11°14'	+60'	144°	10°25'	+60'	144°	9°37'	+60'	144°	8°49'	+60'	144°	8°00'	+60'	117°	8
9	13°50'	+60'	143°	13°02'	+60'	143°	12°14'	+60'	144°	11°25'	+60'	144°	10°37'	+60'	144°	9°49'	+60'	144°	9°00'	+60'	157°	9
10	14°50'	+60'	143°	14°02'	+60'	143°	13°14'	+60'	144°	12°25'	+60'	144°	11°37'	+60'	144°	10°49'	+60'	144°	10°00'	+60'	157°	10
11	15°50'	+60'	143°	15°02'	+60'	143°	14°14'	+60'	143°	13°25'	+60'	144°	12°37'	+60'	144°	11°49'	+60'	144°	11°00'	+60'	157°	11
12	16°50'	+60'	143°	16°02'	+60'	143°	15°13'	+60'	143°	14°25'	+60'	144°	13°37'	+60'	144°	12°49'	+60'	144°	12°00'	+60'	180°	12
13	17°50'	+60'	143°	17°02'	+60'	143°	16°13'	+60'	143°	15°25'	+60'	144°	14°37'	+60'	144°	13°48'	+60'	144°	13°00'	+60'	180°	13
14	18°49'	+60'	143°	18°01'	+60'	143°	17°13'	+60'	143°	16°25'	+60'	144°	15°37'	+60'	144°	14°48'	+60'	144°	14°00'	+60'	159°	14
15	19°49'	+60'	143°	19°01'	+60'	143°	18°13'	+60'	143°	17°25'	+60'	143°	16°37'	+60'	144°	15°48'	+60'	144°	15°00'	+60'	160°	15
16	20°49'	+60'	143°	20°01'	+60'	143°	19°13'	+60'	143°	18°25'	+60'	143°	17°37'	+60'	144°	16°48'	+60'	144°	16°00'	+60'	161°	16
17	21°49'	+60'	143°	21°01'	+60'	143°	20°13'	+60'	143°	19°25'	+60'	143°	18°37'	+60'	144°	17°48'	+60'	144°	17°00'	+60'	161°	17
18	22°49'	+60'	143°	22°01'	+60'	143°	21°13'	+60'	143°	20°25'	+60'	143°	19°37'	+60'	144°	18°48'	+60'	144°	18°00'	+60'	162°	18
19	23°49'	+60'	143°	23°01'	+60'	143°	22°13'	+60'	143°	21°25'	+60'	143°	20°37'	+60'	144°	19°48'	+60'	144°	19°00'	+60'	163°	19
20	24°49'	+60'	143°	24°01'	+60'	143°	23°13'	+60'	143°	22°25'	+60'	143°	21°37'	+60'	144°	20°48'	+60'	144°	20°00'	+60'	165°	20
21	25°48'	+60'	142°	25°01'	+60'	143°	24°13'	+60'	143°	23°25'	+60'	143°	22°37'	+60'	144°	21°48'	+60'	144°	21°00'	+60'	90°	21
22	26°48'	+60'	142°	26°01'	+60'	143°	25°13'	+60'	143°	24°25'	+60'	143°	23°37'	+60'	144°	22°48'	+60'	144°	22°00'	+60'	180°	22
23	27°48'	+60'	142°	27°01'	+60'	143°	26°13'	+60'	143°	25°25'	+60'	143°	24°37'	+60'	143°	23°48'	+60'	144°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

36° 324° LHA — Latitude SAME as Declination — 36° 324° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

37° 323° LHA — Latitude SAME as Declination — 37° 323° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°47'	+60'	143°	3°59'	+60'	143°	3°12'	+60'	143°	2°24'	+60'	143°	1°36'	+60'	143°	0°48'	+60'	143°	0°00'	+60'	143°	0
1	5°47'	+60'	143°	4°59'	+60'	143°	4°12'	+60'	143°	3°24'	+60'	143°	2°36'	+60'	143°	1°48'	+60'	143°	1°00'	+60'	142°	1
2	6°47'	+60'	143°	5°59'	+60'	143°	5°12'	+60'	143°	4°24'	+60'	143°	3°36'	+60'	143°	2°48'	+60'	143°	2°00'	+60'	143°	2
3	7°47'	+60'	143°	6°59'	+60'	143°	6°11'	+60'	143°	5°24'	+60'	143°	4°36'	+60'	143°	3°48'	+60'	143°	3°00'	+60'	143°	3
4	8°47'	+60'	143°	7°59'	+60'	143°	7°11'	+60'	143°	6°24'	+60'	143°	5°36'	+60'	143°	4°48'	+60'	143°	4°00'	+60'	155°	4
5	9°47'	+60'	143°	8°59'	+60'	143°	8°11'	+60'	143°	7°24'	+60'	143°	6°36'	+60'	143°	5°48'	+60'	143°	5°00'	+60'	133°	5
6	10°47'	+60'	142°	9°59'	+60'	143°	9°11'	+60'	143°	8°24'	+60'	143°	7°36'	+60'	143°	6°48'	+60'	143°	6°00'	+60'	133°	6
7	11°46'	+60'	142°	10°59'	+60'	143°	10°11'	+60'	143°	9°24'	+60'	143°	8°36'	+60'	143°	7°48'	+60'	143°	7°00'	+60'	117°	7
8	12°46'	+60'	142°	11°59'	+60'	142°	11°11'	+60'	143°	10°23'	+60'	143°	9°36'	+60'	143°	8°48'	+60'	143°	8°00'	+60'	117°	8
9	13°46'	+60'	142°	12°59'	+60'	142°	12°11'	+60'	143°	11°23'	+60'	143°	10°36'	+60'	143°	9°48'	+60'	143°	9°00'	+60'	157°	9
10	14°46'	+60'	142°	13°59'	+60'	142°	13°11'	+60'	143°	12°23'	+60'	143°	11°36'	+60'	143°	10°48'	+60'	143°	10°00'	+60'	157°	10
11	15°46'	+60'	142°	14°59'	+60'	142°	14°11'	+60'	142°	13°23'	+60'	143°	12°36'	+60'	143°	11°48'	+60'	143°	11°00'	+60'	157°	11
12	16°46'	+60'	142°	15°58'	+60'	142°	15°11'	+60'	142°	14°23'	+60'	143°	13°36'	+60'	143°	12°48'	+60'	143°	12°00'	+60'	180°	12
13	17°46'	+60'	142°	16°58'	+60'	142°	16°11'	+60'	142°	15°23'	+60'	143°	14°36'	+60'	143°	13°48'	+60'	143°	13°00'	+60'	180°	13
14	18°46'	+60'	142°	17°58'	+60'	142°	17°11'	+60'	142°	16°23'	+60'	143°	15°36'	+60'	143°	14°48'	+60'	143°	14°00'	+60'	159°	14
15	19°45'	+60'	142°	18°58'	+60'	142°	18°11'	+60'	142°	17°23'	+60'	142°	16°36'	+60'	143°	15°48'	+60'	143°	15°00'	+60'	160°	15
16	20°45'	+60'	142°	19°58'	+60'	142°	19°11'	+60'	142°	18°23'	+60'	142°	17°36'	+60'	143°	16°48'	+60'	143°	16°00'	+60'	161°	16
17	21°45'	+60'	142°	20°58'	+60'	142°	20°11'	+60'	142°	19°23'	+60'	142°	18°36'	+60'	143°	17°48'	+60'	143°	17°00'	+60'	161°	17
18	22°45'	+60'	142°	21°58'	+60'	142°	21°11'	+60'	142°	20°23'	+60'	142°	19°36'	+60'	143°	18°48'	+60'	143°	18°00'	+60'	162°	18
19	23°45'	+60'	142°	22°58'	+60'	142°	22°11'	+60'	142°	21°23'	+60'	142°	20°36'	+60'	143°	19°48'	+60'	143°	19°00'	+60'	163°	19
20	24°45'	+60'	141°	23°58'	+60'	142°	23°10'	+60'	142°	22°23'	+60'	142°	21°36'	+60'	143°	20°48'	+60'	143°	20°00'	+60'	165°	20
21	25°45'	+60'	141°	24°58'	+60'	142°	24°10'	+60'	142°	23°23'	+60'	142°	22°36'	+60'	143°	21°48'	+60'	143°	21°00'	+60'	90°	21
22	26°44'	+60'	141°	25°58'	+60'	142°	25°10'	+60'	142°	24°23'	+60'	142°	23°36'	+60'	142°	22°48'	+60'	143°	22°00'	+60'	180°	22
23	27°44'	+60'	141°	26°57'	+60'	142°	26°10'	+60'	142°	25°23'	+60'	142°	24°36'	+60'	142°	23°48'	+60'	143°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

37° 323° LHA — Latitude SAME as Declination — 37° 323° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

38° 322° LHA — Latitude SAME as Declination — 38° 322° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°43'	+60'	142°	3°56'	+60'	142°	3°09'	+60'	142°	2°22'	+60'	142°	1°35'	+60'	142°	0°47'	+60'	142°	0°00'	+60'	142°	0
1	5°43'	+60'	142°	4°56'	+60'	142°	4°09'	+60'	142°	3°22'	+60'	142°	2°35'	+60'	142°	1°47'	+60'	142°	1°00'	+60'	142°	1
2	6°43'	+60'	142°	5°56'	+60'	142°	5°09'	+60'	142°	4°22'	+60'	142°	3°35'	+60'	142°	2°47'	+60'	142°	2°00'	+60'	143°	2
3	7°43'	+60'	142°	6°56'	+60'	142°	6°09'	+60'	142°	5°22'	+60'	142°	4°35'	+60'	142°	3°47'	+60'	142°	3°00'	+60'	143°	3
4	8°43'	+60'	142°	7°56'	+60'	142°	7°09'	+60'	142°	6°22'	+60'	142°	5°34'	+60'	142°	4°47'	+60'	142°	4°00'	+60'	133°	4
5	9°43'	+60'	142°	8°56'	+60'	142°	8°09'	+60'	142°	7°22'	+60'	142°	6°34'	+60'	142°	5°47'	+60'	142°	5°00'	+60'	117°	5
6	10°43'	+60'	141°	9°56'	+60'	142°	9°09'	+60'	142°	8°22'	+60'	142°	7°34'	+60'	142°	6°47'	+60'	142°	6°00'	+60'	117°	6
7	11°43'	+60'	141°	10°56'	+60'	142°	10°09'	+60'	142°	9°22'	+60'	142°	8°34'	+60'	142°	7°47'	+60'	142°	7°00'	+60'	117°	7
8	12°42'	+60'	141°	11°56'	+60'	141°	11°09'	+60'	142°	10°22'	+60'	142°	9°34'	+60'	142°	8°47'	+60'	142°	8°00'	+60'	117°	8
9	13°42'	+60'	141°	12°55'	+60'	141°	12°09'	+60'	142°	11°22'	+60'	142°	10°34'	+60'	142°	9°47'	+60'	142°	9°00'	+60'	157°	9
10	14°42'	+60'	141°	13°55'	+60'	141°	13°08'	+60'	141°	12°21'	+60'	142°	11°34'	+60'	142°	10°47'	+60'	142°	10°00'	+60'	157°	10
11	15°42'	+60'	141°	14°55'	+60'	141°	14°08'	+60'	141°	13°21'	+60'	142°	12°34'	+60'	142°	11°47'	+60'	142°	11°00'	+60'	157°	11
12	16°42'	+60'	141°	15°55'	+60'	141°	15°08'	+60'	141°	14°21'	+60'	142°	13°34'	+60'	142°	12°47'	+60'	142°	12°00'	+60'	180°	12
13	17°42'	+60'	141°	16°55'	+60'	141°	16°08'	+60'	141°	15°21'	+60'	142°	14°34'	+60'	142°	13°47'	+60'	142°	13°00'	+60'	180°	13
14	18°42'	+60'	141°	17°55'	+60'	141°	17°08'	+60'	141°	16°21'	+60'	141°	15°34'	+60'	142°	14°47'	+60'	142°	14°00'	+60'	159°	14
15	19°42'	+60'	141°	18°55'	+60'	141°	18°08'	+60'	141°	17°21'	+60'	141°	16°34'	+60'	142°	15°47'	+60'	142°	15°00'	+60'	160°	15
16	20°41'	+60'	141°	19°55'	+60'	141°	19°08'	+60'	141°	18°21'	+60'	141°	17°34'	+60'	142°	16°47'	+60'	142°	16°00'	+60'	161°	16
17	21°41'	+60'	141°	20°55'	+60'	141°	20°08'	+60'	141°	19°21'	+60'	141°	18°34'	+60'	142°	17°47'	+60'	142°	17°00'	+60'	161°	17
18	22°41'	+60'	141°	21°55'	+60'	141°	21°08'	+60'	141°	20°21'	+60'	141°	19°34'	+60'	142°	18°47'	+60'	142°	18°00'	+60'	162°	18
19	23°41'	+60'	141°	22°55'	+60'	141°	22°08'	+60'	141°	21°21'	+60'	141°	20°34'	+60'	142°	19°47'	+60'	142°	19°00'	+60'	163°	19
20	24°41'	+60'	140°	23°54'	+60'	141°	23°08'	+60'	141°	22°21'	+60'	141°	21°34'	+60'	142°	20°47'	+60'	142°	20°00'	+60'	165°	20
21	25°41'	+60'	140°	24°54'	+60'	141°	24°08'	+60'	141°	23°21'	+60'	141°	22°34'	+60'	142°	21°47'	+60'	142°	21°00'	+60'	90°	21
22	26°40'	+60'	140°	25°54'	+60'	141°	25°08'	+60'	141°	24°21'	+60'	141°	23°34'	+60'	141°	22°47'	+60'	142°	22°00'	+60'	180°	22
23	27°40'	+60'	140°	26°54'	+60'	141°	26°08'	+60'	141°	25°21'	+60'	141°	24°34'	+60'	141°	23°47'	+60'	142°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

38° 322° LHA — Latitude SAME as Declination — 38° 322° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

39° 321° LHA — Latitude SAME as Declination — 39° 321° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°40'	+60'	141°	3°53'	+60'	141°	3°06'	+60'	141°	2°20'	+60'	141°	1°33'	+60'	141°	0°47'	+60'	141°	0°00'	+60'	141°	0
1	5°39'	+60'	141°	4°53'	+60'	141°	4°06'	+60'	141°	3°20'	+60'	141°	2°33'	+60'	141°	1°47'	+60'	141°	1°00'	+60'	142°	1
2	6°39'	+60'	141°	5°53'	+60'	141°	5°06'	+60'	141°	4°20'	+60'	141°	3°33'	+60'	141°	2°47'	+60'	141°	2°00'	+60'	143°	2
3	7°39'	+60'	141°	6°53'	+60'	141°	6°06'	+60'	141°	5°20'	+60'	141°	4°33'	+60'	141°	3°47'	+60'	141°	3°00'	+60'	143°	3
4	8°39'	+60'	141°	7°53'	+60'	141°	7°06'	+60'	141°	6°20'	+60'	141°	5°33'	+60'	141°	4°47'	+60'	141°	4°00'	+60'	133°	4
5	9°39'	+60'	141°	8°53'	+60'	141°	8°06'	+60'	141°	7°20'	+60'	141°	6°33'	+60'	141°	5°47'	+60'	141°	5°00'	+60'	117°	5
6	10°39'	+60'	140°	9°52'	+60'	141°	9°06'	+60'	141°	8°20'	+60'	141°	7°33'	+60'	141°	6°47'	+60'	141°	6°00'	+60'	117°	6
7	11°39'	+60'	140°	10°52'	+60'	141°	10°06'	+60'	141°	9°20'	+60'	141°	8°33'	+60'	141°	7°47'	+60'	141°	7°00'	+60'	117°	7
8	12°39'	+60'	140°	11°52'	+60'	140°	11°06'	+60'	141°	10°20'	+60'	141°	9°33'	+60'	141°	8°47'	+60'	141°	8°00'	+60'	117°	8
9	13°38'	+60'	140°	12°52'	+60'	140°	12°06'	+60'	141°	11°20'	+60'	141°	10°33'	+60'	141°	9°47'	+60'	141°	9°00'	+60'	157°	9
10	14°38'	+60'	140°	13°52'	+60'	140°	13°06'	+60'	140°	12°20'	+60'	141°	11°33'	+60'	141°	10°47'	+60'	141°	10°00'	+60'	157°	10
11	15°38'	+60'	140°	14°52'	+60'	140°	14°06'	+60'	140°	13°19'	+60'	141°	12°33'	+60'	141°	11°47'	+60'	141°	11°00'	+60'	157°	11
12	16°38'	+60'	140°	15°52'	+60'	140°	15°06'	+60'	140°	14°19'	+60'	141°	13°33'	+60'	141°	12°47'	+60'	141°	12°00'	+60'	180°	12
13	17°38'	+60'	140°	16°52'	+60'	140°	16°06'	+60'	140°	15°19'	+60'	141°	14°33'	+60'	141°	13°47'	+60'	141°	13°00'	+60'	180°	13
14	18°38'	+60'	140°	17°52'	+60'	140°	17°06'	+60'	140°	16°19'	+60'	140°	15°33'	+60'	141°	14°47'	+60'	141°	14°00'	+60'	159°	14
15	19°38'	+60'	140°	18°52'	+60'	140°	18°06'	+60'	140°	17°19'	+60'	140°	16°33'	+60'	141°	15°47'	+60'	141°	15°00'	+60'	160°	15
16	20°37'	+60'	140°	19°52'	+60'	140°	19°05'	+60'	140°	18°19'	+60'	140°	17°33'	+60'	141°	16°47'	+60'	141°	16°00'	+60'	161°	16
17	21°37'	+60'	140°	20°51'	+60'	140°	20°05'	+60'	140°	19°19'	+60'	140°	18°33'	+60'	141°	17°47'	+60'	141°	17°00'	+60'	161°	17
18	22°37'	+60'	140°	21°51'	+60'	140°	21°05'	+60'	140°	20°19'	+60'	140°	19°33'	+60'	141°	18°47'	+60'	141°	18°00'	+60'	162°	18
19	23°37'	+60'	140°	22°51'	+60'	140°	22°05'	+60'	140°	21°19'	+60'	140°	20°33'	+60'	141°	19°47'	+60'	141°	19°00'	+60'	163°	19
20	24°37'	+60'	139°	23°51'	+60'	140°	23°05'	+60'	140°	22°19'	+60'	140°	21°33'	+60'	141°	20°47'	+60'	141°	20°00'	+60'	165°	20
21	25°37'	+60'	139°	24°51'	+60'	140°	24°05'	+60'	140°	23°19'	+60'	140°	22°33'	+60'	140°	21°47'	+60'	141°	21°00'	+60'	90°	21
22	26°36'	+60'	139°	25°51'	+60'	140°	25°05'	+60'	140°	24°19'	+60'	140°	23°33'	+60'	140°	22°47'	+60'	141°	22°00'	+60'	180°	22
23	27°36'	+60'	139°	26°51'	+60'	140°	26°05'	+60'	140°	25°19'	+60'	140°	24°33'	+60'	140°	23°47'	+60'	141°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

39° 321° LHA — Latitude SAME as Declination — 39° 321° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

40° 320° LHA — Latitude SAME as Declination — 40° 320° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°36'	+60'	140°	3°50'	+60'	140°	3°04'	+60'	140°	2°18'	+60'	140°	1°32'	+60'	140°	0°46'	+60'	140°	0°00'	+60'	140°	0
1	5°35'	+60'	140°	4°50'	+60'	140°	4°04'	+60'	140°	3°18'	+60'	140°	2°32'	+60'	140°	1°46'	+60'	140°	1°00'	+60'	142°	1
2	6°35'	+60'	140°	5°50'	+60'	140°	5°04'	+60'	140°	4°18'	+60'	140°	3°32'	+60'	140°	2°46'	+60'	140°	2°00'	+60'	143°	2
3	7°35'	+60'	140°	6°49'	+60'	140°	6°04'	+60'	140°	5°18'	+60'	140°	4°32'	+60'	140°	3°46'	+60'	140°	3°00'	+60'	143°	3
4	8°35'	+60'	140°	7°49'	+60'	140°	7°04'	+60'	140°	6°18'	+60'	140°	5°32'	+60'	140°	4°46'	+60'	140°	4°00'	+60'	133°	4
5	9°35'	+60'	140°	8°49'	+60'	140°	8°03'	+60'	140°	7°18'	+60'	140°	6°32'	+60'	140°	5°46'	+60'	140°	5°00'	+60'	117°	5
6	10°35'	+60'	139°	9°49'	+60'	140°	9°03'	+60'	140°	8°18'	+60'	140°	7°32'	+60'	140°	6°46'	+60'	140°	6°00'	+60'	117°	6
7	11°35'	+60'	139°	10°49'	+60'	139°	10°03'	+60'	140°	9°18'	+60'	140°	8°32'	+60'	140°	7°46'	+60'	140°	7°00'	+60'	117°	7
8	12°34'	+60'	139°	11°49'	+60'	139°	11°03'	+60'	140°	10°18'	+60'	140°	9°32'	+60'	140°	8°46'	+60'	140°	8°00'	+60'	117°	8
9	13°34'	+60'	139°	12°49'	+60'	139°	12°03'	+60'	140°	11°18'	+60'	140°	10°32'	+60'	140°	9°46'	+60'	140°	9°00'	+60'	157°	9
10	14°34'	+60'	139°	13°49'	+60'	139°	13°03'	+60'	139°	12°18'	+60'	140°	11°32'	+60'	140°	10°46'	+60'	140°	10°00'	+60'	157°	10
11	15°34'	+60'	139°	14°49'	+60'	139°	14°03'	+60'	139°	13°17'	+60'	140°	12°32'	+60'	140°	11°46'	+60'	140°	11°00'	+60'	157°	11
12	16°34'	+60'	139°	15°49'	+60'	139°	15°03'	+60'	139°	14°17'	+60'	140°	13°32'	+60'	140°	12°46'	+60'	140°	12°00'	+60'	180°	12
13	17°34'	+60'	139°	16°48'	+60'	139°	16°03'	+60'	139°	15°17'	+60'	140°	14°32'	+60'	140°	13°46'	+60'	140°	13°00'	+60'	180°	13
14	18°34'	+60'	139°	17°48'	+60'	139°	17°03'	+60'	139°	16°17'	+60'	139°	15°32'	+60'	140°	14°46'	+60'	140°	14°00'	+60'	159°	14
15	19°33'	+60'	139°	18°48'	+60'	139°	18°03'	+60'	139°	17°17'	+60'	139°	16°32'	+60'	140°	15°46'	+60'	140°	15°00'	+60'	160°	15
16	20°33'	+60'	139°	19°48'	+60'	139°	19°03'	+60'	139°	18°17'	+60'	139°	17°32'	+60'	140°	16°46'	+60'	140°	16°00'	+60'	161°	16
17	21°33'	+60'	139°	20°48'	+60'	139°	20°03'	+60'	139°	19°17'	+60'	139°	18°32'	+60'	140°	17°46'	+60'	140°	17°00'	+60'	161°	17
18	22°33'	+60'	139°	21°48'	+60'	139°	21°03'	+60'	139°	20°17'	+60'	139°	19°32'	+60'	140°	18°46'	+60'	140°	18°00'	+60'	162°	18
19	23°33'	+60'	138°	22°48'	+60'	139°	22°03'	+60'	139°	21°17'	+60'	139°	20°32'	+60'	140°	19°46'	+60'	140°	19°00'	+60'	163°	19
20	24°33'	+60'	138°	23°48'	+60'	139°	23°03'	+60'	139°	22°17'	+60'	139°	21°32'	+60'	140°	20°46'	+60'	140°	20°00'	+60'	165°	20
21	25°32'	+60'	138°	24°48'	+60'	139°	24°02'	+60'	139°	23°17'	+60'	139°	22°32'	+60'	139°	21°46'	+60'	140°	21°00'	+60'	90°	21
22	26°32'	+60'	138°	25°47'	+60'	139°	25°02'	+60'	139°	24°17'	+60'	139°	23°32'	+60'	139°	22°46'	+60'	140°	22°00'	+60'	180°	22
23	27°32'	+60'	138°	26°47'	+60'	138°	26°02'	+60'	139°	25°17'	+60'	139°	24°32'	+60'	139°	23°46'	+60'	140°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

40° 320° LHA — Latitude SAME as Declination — 40° 320° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

41° 319° LHA — Latitude SAME as Declination — 41° 319° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°31'	+60'	139°	3°46'	+60'	139°	3°01'	+60'	139°	2°16'	+60'	139°	1°31'	+60'	139°	0°45'	+60'	139°	0°00'	+60'	139°	0
1	5°31'	+60'	139°	4°46'	+60'	139°	4°01'	+60'	139°	3°16'	+60'	139°	2°31'	+60'	139°	1°45'	+60'	139°	1°00'	+60'	137°	1
2	6°31'	+60'	139°	5°46'	+60'	139°	5°01'	+60'	139°	4°16'	+60'	139°	3°31'	+60'	139°	2°45'	+60'	139°	2°00'	+60'	143°	2
3	7°31'	+60'	139°	6°46'	+60'	139°	6°01'	+60'	139°	5°16'	+60'	139°	4°31'	+60'	139°	3°45'	+60'	139°	3°00'	+60'	143°	3
4	8°31'	+60'	139°	7°46'	+60'	139°	7°01'	+60'	139°	6°16'	+60'	139°	5°30'	+60'	139°	4°45'	+60'	139°	4°00'	+60'	133°	4
5	9°31'	+60'	138°	8°46'	+60'	139°	8°01'	+60'	139°	7°16'	+60'	139°	6°30'	+60'	139°	5°45'	+60'	139°	5°00'	+60'	117°	5
6	10°31'	+60'	138°	9°46'	+60'	139°	9°01'	+60'	139°	8°16'	+60'	139°	7°30'	+60'	139°	6°45'	+60'	139°	6°00'	+60'	117°	6
7	11°30'	+60'	138°	10°46'	+60'	138°	10°01'	+60'	139°	9°16'	+60'	139°	8°30'	+60'	139°	7°45'	+60'	139°	7°00'	+60'	117°	7
8	12°30'	+60'	138°	11°45'	+60'	138°	11°01'	+60'	139°	10°16'	+60'	139°	9°30'	+60'	139°	8°45'	+60'	139°	8°00'	+60'	117°	8
9	13°30'	+60'	138°	12°45'	+60'	138°	12°00'	+60'	139°	11°15'	+60'	139°	10°30'	+60'	139°	9°45'	+60'	139°	9°00'	+60'	157°	9
10	14°30'	+60'	138°	13°45'	+60'	138°	13°00'	+60'	138°	12°15'	+60'	139°	11°30'	+60'	139°	10°45'	+60'	139°	10°00'	+60'	157°	10
11	15°30'	+60'	138°	14°45'	+60'	138°	14°00'	+60'	138°	13°15'	+60'	139°	12°30'	+60'	139°	11°45'	+60'	139°	11°00'	+60'	157°	11
12	16°30'	+60'	138°	15°45'	+60'	138°	15°00'	+60'	138°	14°15'	+60'	139°	13°30'	+60'	139°	12°45'	+60'	139°	12°00'	+60'	180°	12
13	17°30'	+60'	138°	16°45'	+60'	138°	16°00'	+60'	138°	15°15'	+60'	139°	14°30'	+60'	139°	13°45'	+60'	139°	13°00'	+60'	180°	13
14	18°29'	+60'	138°	17°45'	+60'	138°	17°00'	+60'	138°	16°15'	+60'	138°	15°30'	+60'	139°	14°45'	+60'	139°	14°00'	+60'	159°	14
15	19°29'	+60'	138°	18°45'	+60'	138°	18°00'	+60'	138°	17°15'	+60'	138°	16°30'	+60'	139°	15°45'	+60'	139°	15°00'	+60'	160°	15
16	20°29'	+60'	138°	19°45'	+60'	138°	19°00'	+60'	138°	18°15'	+60'	138°	17°30'	+60'	139°	16°45'	+60'	139°	16°00'	+60'	161°	16
17	21°29'	+60'	138°	20°45'	+60'	138°	20°00'	+60'	138°	19°15'	+60'	138°	18°30'	+60'	139°	17°45'	+60'	139°	17°00'	+60'	161°	17
18	22°29'	+60'	138°	21°44'	+60'	138°	21°00'	+60'	138°	20°15'	+60'	138°	19°30'	+60'	139°	18°45'	+60'	139°	18°00'	+60'	162°	18
19	23°29'	+60'	137°	22°44'	+60'	138°	22°00'	+60'	138°	21°15'	+60'	138°	20°30'	+60'	139°	19°45'	+60'	139°	19°00'	+60'	163°	19
20	24°28'	+60'	137°	23°44'	+60'	138°	23°00'	+60'	138°	22°15'	+60'	138°	21°30'	+60'	139°	20°45'	+60'	139°	20°00'	+60'	165°	20
21	25°28'	+60'	137°	24°44'	+60'	138°	24°00'	+60'	138°	23°15'	+60'	138°	22°30'	+60'	138°	21°45'	+60'	139°	21°00'	+60'	90°	21
22	26°28'	+60'	137°	25°44'	+60'	138°	25°00'	+60'	138°	24°15'	+60'	138°	23°30'	+60'	138°	22°45'	+60'	139°	22°00'	+60'	180°	22
23	27°28'	+60'	137°	26°44'	+60'	137°	25°59'	+60'	138°	25°15'	+60'	138°	24°30'	+60'	138°	23°45'	+60'	139°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

41° 319° LHA — Latitude SAME as Declination — 41° 319° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

42° 318° LHA — Latitude SAME as Declination — 42° 318° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°27'	+60'	138°	3°43'	+60'	138°	2°58'	+60'	138°	2°14'	+60'	138°	1°29'	+60'	138°	0°45'	+60'	138°	0°00'	+60'	138°	0
1	5°27'	+60'	138°	4°43'	+60'	138°	3°58'	+60'	138°	3°14'	+60'	138°	2°29'	+60'	138°	1°45'	+60'	138°	1°00'	+60'	137°	1
2	6°27'	+60'	138°	5°43'	+60'	138°	4°58'	+60'	138°	4°14'	+60'	138°	3°29'	+60'	138°	2°45'	+60'	138°	2°00'	+60'	143°	2
3	7°27'	+60'	138°	6°43'	+60'	138°	5°58'	+60'	138°	5°14'	+60'	138°	4°29'	+60'	138°	3°45'	+60'	138°	3°00'	+60'	143°	3
4	8°27'	+60'	138°	7°42'	+60'	138°	6°58'	+60'	138°	6°14'	+60'	138°	5°29'	+60'	138°	4°45'	+60'	138°	4°00'	+60'	133°	4
5	9°27'	+60'	137°	8°42'	+60'	138°	7°58'	+60'	138°	7°14'	+60'	138°	6°29'	+60'	138°	5°45'	+60'	138°	5°00'	+60'	117°	5
6	10°26'	+60'	137°	9°42'	+60'	138°	8°58'	+60'	138°	8°14'	+60'	138°	7°29'	+60'	138°	6°45'	+60'	138°	6°00'	+60'	117°	6
7	11°26'	+60'	137°	10°42'	+60'	137°	9°58'	+60'	138°	9°13'	+60'	138°	8°29'	+60'	138°	7°45'	+60'	138°	7°00'	+60'	117°	7
8	12°26'	+60'	137°	11°42'	+60'	137°	10°58'	+60'	138°	10°13'	+60'	138°	9°29'	+60'	138°	8°45'	+60'	138°	8°00'	+60'	117°	8
9	13°26'	+60'	137°	12°42'	+60'	137°	11°58'	+60'	138°	11°13'	+60'	138°	10°29'	+60'	138°	9°45'	+60'	138°	9°00'	+60'	157°	9
10	14°26'	+60'	137°	13°42'	+60'	137°	12°58'	+60'	137°	12°13'	+60'	138°	11°29'	+60'	138°	10°45'	+60'	138°	10°00'	+60'	157°	10
11	15°26'	+60'	137°	14°42'	+60'	137°	13°58'	+60'	137°	13°13'	+60'	138°	12°29'	+60'	138°	11°45'	+60'	138°	11°00'	+60'	157°	11
12	16°25'	+60'	137°	15°42'	+60'	137°	14°57'	+60'	137°	14°13'	+60'	138°	13°29'	+60'	138°	12°45'	+60'	138°	12°00'	+60'	180°	12
13	17°25'	+60'	137°	16°41'	+60'	137°	15°57'	+60'	137°	15°13'	+60'	137°	14°29'	+60'	138°	13°45'	+60'	138°	13°00'	+60'	180°	13
14	18°25'	+60'	137°	17°41'	+60'	137°	16°57'	+60'	137°	16°13'	+60'	137°	15°29'	+60'	138°	14°45'	+60'	138°	14°00'	+60'	159°	14
15	19°25'	+60'	137°	18°41'	+60'	137°	17°57'	+60'	137°	17°13'	+60'	137°	16°29'	+60'	138°	15°45'	+60'	138°	15°00'	+60'	160°	15
16	20°25'	+60'	137°	19°41'	+60'	137°	18°57'	+60'	137°	18°13'	+60'	137°	17°29'	+60'	138°	16°45'	+60'	138°	16°00'	+60'	161°	16
17	21°25'	+60'	137°	20°41'	+60'	137°	19°57'	+60'	137°	19°13'	+60'	137°	18°29'	+60'	138°	17°45'	+60'	138°	17°00'	+60'	161°	17
18	22°24'	+60'	136°	21°41'	+60'	137°	20°57'	+60'	137°	20°13'	+60'	137°	19°29'	+60'	138°	18°45'	+60'	138°	18°00'	+60'	162°	18
19	23°24'	+60'	136°	22°41'	+60'	137°	21°57'	+60'	137°	21°13'	+60'	137°	20°29'	+60'	138°	19°45'	+60'	138°	19°00'	+60'	163°	19
20	24°24'	+60'	136°	23°41'	+60'	137°	22°57'	+60'	137°	22°13'	+60'	137°	21°29'	+60'	137°	20°45'	+60'	138°	20°00'	+60'	165°	20
21	25°24'	+60'	136°	24°41'	+60'	137°	23°57'	+60'	137°	23°13'	+60'	137°	22°29'	+60'	137°	21°44'	+60'	138°	21°00'	+60'	90°	21
22	26°24'	+60'	136°	25°40'	+60'	136°	24°57'	+60'	137°	24°13'	+60'	137°	23°29'	+60'	137°	22°44'	+60'	138°	22°00'	+60'	180°	22
23	27°24'	+60'	136°	26°40'	+60'	136°	25°57'	+60'	137°	25°13'	+60'	137°	24°29'	+60'	137°	23°44'	+60'	138°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

42° 318° LHA — Latitude SAME as Declination — 42° 318° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

43° 317° LHA — Latitude SAME as Declination — 43° 317° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°23'	+60'	137°	3°39'	+60'	137°	2°55'	+60'	137°	2°12'	+60'	137°	1°28'	+60'	137°	0°44'	+60'	137°	0°00'	+60'	137°	0
1	5°23'	+60'	137°	4°39'	+60'	137°	3°55'	+60'	137°	3°12'	+60'	137°	2°28'	+60'	137°	1°44'	+60'	137°	1°00'	+60'	137°	1
2	6°23'	+60'	137°	5°39'	+60'	137°	4°55'	+60'	137°	4°12'	+60'	137°	3°28'	+60'	137°	2°44'	+60'	137°	2°00'	+60'	133°	2
3	7°23'	+60'	137°	6°39'	+60'	137°	5°55'	+60'	137°	5°12'	+60'	137°	4°28'	+60'	137°	3°44'	+60'	137°	3°00'	+60'	133°	3
4	8°22'	+60'	137°	7°39'	+60'	137°	6°55'	+60'	137°	6°11'	+60'	137°	5°28'	+60'	137°	4°44'	+60'	137°	4°00'	+60'	133°	4
5	9°22'	+60'	136°	8°39'	+60'	137°	7°55'	+60'	137°	7°11'	+60'	137°	6°28'	+60'	137°	5°44'	+60'	137°	5°00'	+60'	117°	5
6	10°22'	+60'	136°	9°39'	+60'	137°	8°55'	+60'	137°	8°11'	+60'	137°	7°28'	+60'	137°	6°44'	+60'	137°	6°00'	+60'	117°	6
7	11°22'	+60'	136°	10°39'	+60'	136°	9°55'	+60'	137°	9°11'	+60'	137°	8°28'	+60'	137°	7°44'	+60'	137°	7°00'	+60'	117°	7
8	12°22'	+60'	136°	11°38'	+60'	136°	10°55'	+60'	137°	10°11'	+60'	137°	9°28'	+60'	137°	8°44'	+60'	137°	8°00'	+60'	117°	8
9	13°22'	+60'	136°	12°38'	+60'	136°	11°55'	+60'	136°	11°11'	+60'	137°	10°28'	+60'	137°	9°44'	+60'	137°	9°00'	+60'	157°	9
10	14°21'	+60'	136°	13°38'	+60'	136°	12°55'	+60'	136°	12°11'	+60'	137°	11°28'	+60'	137°	10°44'	+60'	137°	10°00'	+60'	157°	10
11	15°21'	+60'	136°	14°38'	+60'	136°	13°55'	+60'	136°	13°11'	+60'	137°	12°28'	+60'	137°	11°44'	+60'	137°	11°00'	+60'	157°	11
12	16°21'	+60'	136°	15°38'	+60'	136°	14°55'	+60'	136°	14°11'	+60'	137°	13°28'	+60'	137°	12°44'	+60'	137°	12°00'	+60'	180°	12
13	17°21'	+60'	136°	16°38'	+60'	136°	15°55'	+60'	136°	15°11'	+60'	136°	14°28'	+60'	137°	13°44'	+60'	137°	13°00'	+60'	180°	13
14	18°21'	+60'	136°	17°38'	+60'	136°	16°54'	+60'	136°	16°11'	+60'	136°	15°28'	+60'	137°	14°44'	+60'	137°	14°00'	+60'	159°	14
15	19°21'	+60'	136°	18°38'	+60'	136°	17°54'	+60'	136°	17°11'	+60'	136°	16°27'	+60'	137°	15°44'	+60'	137°	15°00'	+60'	160°	15
16	20°20'	+60'	136°	19°37'	+60'	136°	18°54'	+60'	136°	18°11'	+60'	136°	17°27'	+60'	137°	16°44'	+60'	137°	16°00'	+60'	161°	16
17	21°20'	+60'	136°	20°37'	+60'	136°	19°54'	+60'	136°	19°11'	+60'	136°	18°27'	+60'	137°	17°44'	+60'	137°	17°00'	+60'	161°	17
18	22°20'	+60'	135°	21°37'	+60'	136°	20°54'	+60'	136°	20°11'	+60'	136°	19°27'	+60'	137°	18°44'	+60'	137°	18°00'	+60'	162°	18
19	23°20'	+60'	135°	22°37'	+60'	136°	21°54'	+60'	136°	21°11'	+60'	136°	20°27'	+60'	137°	19°44'	+60'	137°	19°00'	+60'	163°	19
20	24°20'	+60'	135°	23°37'	+60'	136°	22°54'	+60'	136°	22°11'	+60'	136°	21°27'	+60'	136°	20°44'	+60'	137°	20°00'	+60'	165°	20
21	25°20'	+60'	135°	24°37'	+60'	136°	23°54'	+60'	136°	23°11'	+60'	136°	22°27'	+60'	136°	21°44'	+60'	137°	21°00'	+60'	90°	21
22	26°19'	+60'	135°	25°37'	+60'	135°	24°54'	+60'	136°	24°11'	+60'	136°	23°27'	+60'	136°	22°44'	+60'	137°	22°00'	+60'	180°	22
23	27°19'	+60'	135°	26°37'	+60'	135°	25°54'	+60'	136°	25°11'	+60'	136°	24°27'	+60'	136°	23°44'	+60'	137°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

43° 317° LHA — Latitude SAME as Declination — 43° 317° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

44° 316° LHA — Latitude SAME as Declination — 44° 316° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°19'	+60'	136°	3°36'	+60'	136°	2°53'	+60'	136°	2°09'	+60'	136°	1°26'	+60'	136°	0°43'	+60'	136°	0°00'	+60'	136°	0
1	5°19'	+60'	136°	4°36'	+60'	136°	3°53'	+60'	136°	3°09'	+60'	136°	2°26'	+60'	136°	1°43'	+60'	136°	1°00'	+60'	137°	1
2	6°18'	+60'	136°	5°35'	+60'	136°	4°52'	+60'	136°	4°09'	+60'	136°	3°26'	+60'	136°	2°43'	+60'	136°	2°00'	+60'	133°	2
3	7°18'	+60'	136°	6°35'	+60'	136°	5°52'	+60'	136°	5°09'	+60'	136°	4°26'	+60'	136°	3°43'	+60'	136°	3°00'	+60'	133°	3
4	8°18'	+60'	136°	7°35'	+60'	136°	6°52'	+60'	136°	6°09'	+60'	136°	5°26'	+60'	136°	4°43'	+60'	136°	4°00'	+60'	133°	4
5	9°18'	+60'	135°	8°35'	+60'	136°	7°52'	+60'	136°	7°09'	+60'	136°	6°26'	+60'	136°	5°43'	+60'	136°	5°00'	+60'	117°	5
6	10°18'	+60'	135°	9°35'	+60'	136°	8°52'	+60'	136°	8°09'	+60'	136°	7°26'	+60'	136°	6°43'	+60'	136°	6°00'	+60'	117°	6
7	11°18'	+60'	135°	10°35'	+60'	135°	9°52'	+60'	136°	9°09'	+60'	136°	8°26'	+60'	136°	7°43'	+60'	136°	7°00'	+60'	117°	7
8	12°17'	+60'	135°	11°35'	+60'	135°	10°52'	+60'	136°	10°09'	+60'	136°	9°26'	+60'	136°	8°43'	+60'	136°	8°00'	+60'	117°	8
9	13°17'	+60'	135°	12°35'	+60'	135°	11°52'	+60'	135°	11°09'	+60'	136°	10°26'	+60'	136°	9°43'	+60'	136°	9°00'	+60'	157°	9
10	14°17'	+60'	135°	13°35'	+60'	135°	12°52'	+60'	135°	12°09'	+60'	136°	11°26'	+60'	136°	10°43'	+60'	136°	10°00'	+60'	157°	10
11	15°17'	+60'	135°	14°34'	+60'	135°	13°52'	+60'	135°	13°09'	+60'	136°	12°26'	+60'	136°	11°43'	+60'	136°	11°00'	+60'	157°	11
12	16°17'	+60'	135°	15°34'	+60'	135°	14°52'	+60'	135°	14°09'	+60'	136°	13°26'	+60'	136°	12°43'	+60'	136°	12°00'	+60'	180°	12
13	17°17'	+60'	135°	16°34'	+60'	135°	15°52'	+60'	135°	15°09'	+60'	135°	14°26'	+60'	136°	13°43'	+60'	136°	13°00'	+60'	180°	13
14	18°16'	+60'	135°	17°34'	+60'	135°	16°52'	+60'	135°	16°09'	+60'	135°	15°26'	+60'	136°	14°43'	+60'	136°	14°00'	+60'	159°	14
15	19°16'	+60'	135°	18°34'	+60'	135°	17°51'	+60'	135°	17°09'	+60'	135°	16°26'	+60'	136°	15°43'	+60'	136°	15°00'	+60'	160°	15
16	20°16'	+60'	135°	19°34'	+60'	135°	18°51'	+60'	135°	18°09'	+60'	135°	17°26'	+60'	136°	16°43'	+60'	136°	16°00'	+60'	161°	16
17	21°16'	+60'	135°	20°34'	+60'	135°	19°51'	+60'	135°	19°09'	+60'	135°	18°26'	+60'	136°	17°43'	+60'	136°	17°00'	+60'	161°	17
18	22°16'	+60'	134°	21°34'	+60'	135°	20°51'	+60'	135°	20°09'	+60'	135°	19°26'	+60'	136°	18°43'	+60'	136°	18°00'	+60'	162°	18
19	23°16'	+60'	134°	22°33'	+60'	135°	21°51'	+60'	135°	21°09'	+60'	135°	20°26'	+60'	135°	19°43'	+60'	136°	19°00'	+60'	163°	19
20	24°15'	+60'	134°	23°33'	+60'	135°	22°51'	+60'	135°	22°09'	+60'	135°	21°26'	+60'	135°	20°43'	+60'	136°	20°00'	+60'	165°	20
21	25°15'	+60'	134°	24°33'	+60'	135°	23°51'	+60'	135°	23°09'	+60'	135°	22°26'	+60'	135°	21°43'	+60'	136°	21°00'	+60'	90°	21
22	26°15'	+60'	134°	25°33'	+60'	134°	24°51'	+60'	135°	24°09'	+60'	135°	23°26'	+60'	135°	22°43'	+60'	136°	22°00'	+60'	180°	22
23	27°15'	+60'	134°	26°33'	+60'	134°	25°51'	+60'	135°	25°08'	+60'	135°	24°26'	+60'	135°	23°43'	+60'	136°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

44° 316° LHA — Latitude SAME as Declination — 44° 316° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

45° 315° LHA — Latitude SAME as Declination — 45° 315° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°14'	+60'	135°	3°32'	+60'	135°	2°50'	+60'	135°	2°07'	+60'	135°	1°25'	+60'	135°	0°42'	+60'	135°	0°00'	+60'	135°	0
1	5°14'	+60'	135°	4°32'	+60'	135°	3°50'	+60'	135°	3°07'	+60'	135°	2°25'	+60'	135°	1°42'	+60'	135°	1°00'	+60'	133°	1
2	6°14'	+60'	135°	5°32'	+60'	135°	4°49'	+60'	135°	4°07'	+60'	135°	3°25'	+60'	135°	2°42'	+60'	135°	2°00'	+60'	133°	2
3	7°14'	+60'	135°	6°32'	+60'	135°	5°49'	+60'	135°	5°07'	+60'	135°	4°25'	+60'	135°	3°42'	+60'	135°	3°00'	+60'	133°	3
4	8°14'	+60'	135°	7°32'	+60'	135°	6°49'	+60'	135°	6°07'	+60'	135°	5°25'	+60'	135°	4°42'	+60'	135°	4°00'	+60'	133°	4
5	9°13'	+60'	134°	8°31'	+60'	135°	7°49'	+60'	135°	7°07'	+60'	135°	6°25'	+60'	135°	5°42'	+60'	135°	5°00'	+60'	117°	5
6	10°13'	+60'	134°	9°31'	+60'	135°	8°49'	+60'	135°	8°07'	+60'	135°	7°25'	+60'	135°	6°42'	+60'	135°	6°00'	+60'	117°	6
7	11°13'	+60'	134°	10°31'	+60'	134°	9°49'	+60'	135°	9°07'	+60'	135°	8°25'	+60'	135°	7°42'	+60'	135°	7°00'	+60'	117°	7
8	12°13'	+60'	134°	11°31'	+60'	134°	10°49'	+60'	135°	10°07'	+60'	135°	9°25'	+60'	135°	8°42'	+60'	135°	8°00'	+60'	117°	8
9	13°13'	+60'	134°	12°31'	+60'	134°	11°49'	+60'	134°	11°07'	+60'	135°	10°25'	+60'	135°	9°42'	+60'	135°	9°00'	+60'	157°	9
10	14°13'	+60'	134°	13°31'	+60'	134°	12°49'	+60'	134°	12°07'	+60'	135°	11°25'	+60'	135°	10°42'	+60'	135°	10°00'	+60'	157°	10
11	15°12'	+60'	134°	14°31'	+60'	134°	13°49'	+60'	134°	13°07'	+60'	135°	12°25'	+60'	135°	11°42'	+60'	135°	11°00'	+60'	157°	11
12	16°12'	+60'	134°	15°31'	+60'	134°	14°49'	+60'	134°	14°07'	+60'	135°	13°25'	+60'	135°	12°42'	+60'	135°	12°00'	+60'	180°	12
13	17°12'	+60'	134°	16°30'	+60'	134°	15°49'	+60'	134°	15°07'	+60'	134°	14°25'	+60'	135°	13°42'	+60'	135°	13°00'	+60'	180°	13
14	18°12'	+60'	134°	17°30'	+60'	134°	16°49'	+60'	134°	16°07'	+60'	134°	15°25'	+60'	135°	14°42'	+60'	135°	14°00'	+60'	159°	14
15	19°12'	+60'	134°	18°30'	+60'	134°	17°48'	+60'	134°	17°07'	+60'	134°	16°25'	+60'	135°	15°42'	+60'	135°	15°00'	+60'	160°	15
16	20°12'	+60'	134°	19°30'	+60'	134°	18°48'	+60'	134°	18°07'	+60'	134°	17°25'	+60'	135°	16°42'	+60'	135°	16°00'	+60'	161°	16
17	21°11'	+60'	134°	20°30'	+60'	134°	19°48'	+60'	134°	19°07'	+60'	134°	18°25'	+60'	135°	17°42'	+60'	135°	17°00'	+60'	161°	17
18	22°11'	+60'	133°	21°30'	+60'	134°	20°48'	+60'	134°	20°06'	+60'	134°	19°25'	+60'	135°	18°42'	+60'	135°	18°00'	+60'	162°	18
19	23°11'	+60'	133°	22°30'	+60'	134°	21°48'	+60'	134°	21°06'	+60'	134°	20°24'	+60'	134°	19°42'	+60'	135°	19°00'	+60'	163°	19
20	24°11'	+60'	133°	23°30'	+60'	134°	22°48'	+60'	134°	22°06'	+60'	134°	21°24'	+60'	134°	20°42'	+60'	135°	20°00'	+60'	165°	20
21	25°11'	+60'	133°	24°29'	+60'	133°	23°48'	+60'	134°	23°06'	+60'	134°	22°24'	+60'	134°	21°42'	+60'	135°	21°00'	+60'	90°	21
22	26°10'	+60'	133°	25°29'	+60'	133°	24°48'	+60'	134°	24°06'	+60'	134°	23°24'	+60'	134°	22°42'	+60'	135°	22°00'	+60'	180°	22
23	27°10'	+60'	133°	26°29'	+60'	133°	25°48'	+60'	134°	25°06'	+60'	134°	24°24'	+60'	134°	23°42'	+60'	135°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

45° 315° LHA — Latitude SAME as Declination — 45° 315° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

46° 314° LHA — Latitude SAME as Declination — 46° 314° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°10'	+60'	134°	3°28'	+60'	134°	2°47'	+60'	134°	2°05'	+60'	134°	1°23'	+60'	134°	0°42'	+60'	134°	0°00'	+60'	134°	0
1	5°10'	+60'	134°	4°28'	+60'	134°	3°47'	+60'	134°	3°05'	+60'	134°	2°23'	+60'	134°	1°42'	+60'	134°	1°00'	+60'	133°	1
2	6°09'	+60'	134°	5°28'	+60'	134°	4°46'	+60'	134°	4°05'	+60'	134°	3°23'	+60'	134°	2°42'	+60'	134°	2°00'	+60'	133°	2
3	7°09'	+60'	134°	6°28'	+60'	134°	5°46'	+60'	134°	5°05'	+60'	134°	4°23'	+60'	134°	3°42'	+60'	134°	3°00'	+60'	133°	3
4	8°09'	+60'	134°	7°28'	+60'	134°	6°46'	+60'	134°	6°05'	+60'	134°	5°23'	+60'	134°	4°42'	+60'	134°	4°00'	+60'	133°	4
5	9°09'	+60'	133°	8°28'	+60'	134°	7°46'	+60'	134°	7°05'	+60'	134°	6°23'	+60'	134°	5°42'	+60'	134°	5°00'	+60'	117°	5
6	10°09'	+60'	133°	9°28'	+60'	134°	8°46'	+60'	134°	8°05'	+60'	134°	7°23'	+60'	134°	6°42'	+60'	134°	6°00'	+60'	117°	6
7	11°09'	+60'	133°	10°27'	+60'	133°	9°46'	+60'	134°	9°05'	+60'	134°	8°23'	+60'	134°	7°42'	+60'	134°	7°00'	+60'	117°	7
8	12°08'	+60'	133°	11°27'	+60'	133°	10°46'	+60'	134°	10°05'	+60'	134°	9°23'	+60'	134°	8°42'	+60'	134°	8°00'	+60'	117°	8
9	13°08'	+60'	133°	12°27'	+60'	133°	11°46'	+60'	133°	11°05'	+60'	134°	10°23'	+60'	134°	9°42'	+60'	134°	9°00'	+60'	157°	9
10	14°08'	+60'	133°	13°27'	+60'	133°	12°46'	+60'	133°	12°05'	+60'	134°	11°23'	+60'	134°	10°42'	+60'	134°	10°00'	+60'	157°	10
11	15°08'	+60'	133°	14°27'	+60'	133°	13°46'	+60'	133°	13°05'	+60'	134°	12°23'	+60'	134°	11°42'	+60'	134°	11°00'	+60'	157°	11
12	16°08'	+60'	133°	15°27'	+60'	133°	14°46'	+60'	133°	14°04'	+60'	133°	13°23'	+60'	134°	12°42'	+60'	134°	12°00'	+60'	158°	12
13	17°08'	+60'	133°	16°27'	+60'	133°	15°46'	+60'	133°	15°04'	+60'	133°	14°23'	+60'	134°	13°42'	+60'	134°	13°00'	+60'	158°	13
14	18°07'	+60'	133°	17°27'	+60'	133°	16°46'	+60'	133°	16°04'	+60'	133°	15°23'	+60'	134°	14°42'	+60'	134°	14°00'	+60'	159°	14
15	19°07'	+60'	133°	18°26'	+60'	133°	17°45'	+60'	133°	17°04'	+60'	133°	16°23'	+60'	134°	15°42'	+60'	134°	15°00'	+60'	160°	15
16	20°07'	+60'	133°	19°26'	+60'	133°	18°45'	+60'	133°	18°04'	+60'	133°	17°23'	+60'	134°	16°42'	+60'	134°	16°00'	+60'	161°	16
17	21°07'	+60'	132°	20°26'	+60'	133°	19°45'	+60'	133°	19°04'	+60'	133°	18°23'	+60'	134°	17°42'	+60'	134°	17°00'	+60'	161°	17
18	22°07'	+60'	132°	21°26'	+60'	133°	20°45'	+60'	133°	20°04'	+60'	133°	19°23'	+60'	134°	18°42'	+60'	134°	18°00'	+60'	162°	18
19	23°06'	+60'	132°	22°26'	+60'	133°	21°45'	+60'	133°	21°04'	+60'	133°	20°23'	+60'	133°	19°42'	+60'	134°	19°00'	+60'	163°	19
20	24°06'	+60'	132°	23°26'	+60'	133°	22°45'	+60'	133°	22°04'	+60'	133°	21°23'	+60'	133°	20°42'	+60'	134°	20°00'	+60'	165°	20
21	25°06'	+60'	132°	24°26'	+60'	132°	23°45'	+60'	133°	23°04'	+60'	133°	22°23'	+60'	133°	21°42'	+60'	134°	21°00'	+60'	90°	21
22	26°06'	+60'	132°	25°25'	+60'	132°	24°45'	+60'	133°	24°04'	+60'	133°	23°23'	+60'	133°	22°42'	+60'	134°	22°00'	+60'	180°	22
23	27°06'	+60'	132°	26°25'	+60'	132°	25°45'	+60'	133°	25°04'	+60'	133°	24°23'	+60'	133°	23°42'	+60'	134°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

46° 314° LHA — Latitude SAME as Declination — 46° 314° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

47° 313° LHA — Latitude SAME as Declination — 47° 313° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°05'	+60'	133°	3°24'	+60'	133°	2°44'	+60'	133°	2°03'	+60'	133°	1°22'	+60'	133°	0°41'	+60'	133°	0°00'	+60'	133°	0
1	5°05'	+60'	133°	4°24'	+60'	133°	3°44'	+60'	133°	3°03'	+60'	133°	2°22'	+60'	133°	1°41'	+60'	133°	1°00'	+60'	133°	1
2	6°05'	+60'	133°	5°24'	+60'	133°	4°43'	+60'	133°	4°03'	+60'	133°	3°22'	+60'	133°	2°41'	+60'	133°	2°00'	+60'	133°	2
3	7°05'	+60'	133°	6°24'	+60'	133°	5°43'	+60'	133°	5°03'	+60'	133°	4°22'	+60'	133°	3°41'	+60'	133°	3°00'	+60'	133°	3
4	8°05'	+60'	133°	7°24'	+60'	133°	6°43'	+60'	133°	6°03'	+60'	133°	5°22'	+60'	133°	4°41'	+60'	133°	4°00'	+60'	133°	4
5	9°04'	+60'	132°	8°24'	+60'	133°	7°43'	+60'	133°	7°03'	+60'	133°	6°22'	+60'	133°	5°41'	+60'	133°	5°00'	+60'	117°	5
6	10°04'	+60'	132°	9°24'	+60'	133°	8°43'	+60'	133°	8°02'	+60'	133°	7°22'	+60'	133°	6°41'	+60'	133°	6°00'	+60'	117°	6
7	11°04'	+60'	132°	10°24'	+60'	132°	9°43'	+60'	133°	9°02'	+60'	133°	8°22'	+60'	133°	7°41'	+60'	133°	7°00'	+60'	117°	7
8	12°04'	+60'	132°	11°23'	+60'	132°	10°43'	+60'	133°	10°02'	+60'	133°	9°22'	+60'	133°	8°41'	+60'	133°	8°00'	+60'	90°	8
9	13°04'	+60'	132°	12°23'	+60'	132°	11°43'	+60'	132°	11°02'	+60'	133°	10°22'	+60'	133°	9°41'	+60'	133°	9°00'	+60'	117°	9
10	14°03'	+60'	132°	13°23'	+60'	132°	12°43'	+60'	132°	12°02'	+60'	133°	11°22'	+60'	133°	10°41'	+60'	133°	10°00'	+60'	117°	10
11	15°03'	+60'	132°	14°23'	+60'	132°	13°43'	+60'	132°	13°02'	+60'	133°	12°22'	+60'	133°	11°41'	+60'	133°	11°00'	+60'	117°	11
12	16°03'	+60'	132°	15°23'	+60'	132°	14°43'	+60'	132°	14°02'	+60'	132°	13°22'	+60'	133°	12°41'	+60'	133°	12°00'	+60'	158°	12
13	17°03'	+60'	132°	16°23'	+60'	132°	15°43'	+60'	132°	15°02'	+60'	132°	14°22'	+60'	133°	13°41'	+60'	133°	13°00'	+60'	158°	13
14	18°03'	+60'	132°	17°23'	+60'	132°	16°42'	+60'	132°	16°02'	+60'	132°	15°22'	+60'	133°	14°41'	+60'	133°	14°00'	+60'	159°	14
15	19°03'	+60'	132°	18°23'	+60'	132°	17°42'	+60'	132°	17°02'	+60'	132°	16°22'	+60'	133°	15°41'	+60'	133°	15°00'	+60'	160°	15
16	20°02'	+60'	132°	19°22'	+60'	132°	18°42'	+60'	132°	18°02'	+60'	132°	17°22'	+60'	133°	16°41'	+60'	133°	16°00'	+60'	161°	16
17	21°02'	+60'	131°	20°22'	+60'	132°	19°42'	+60'	132°	19°02'	+60'	132°	18°21'	+60'	133°	17°41'	+60'	133°	17°00'	+60'	161°	17
18	22°02'	+60'	131°	21°22'	+60'	132°	20°42'	+60'	132°	20°02'	+60'	132°	19°21'	+60'	133°	18°41'	+60'	133°	18°00'	+60'	162°	18
19	23°02'	+60'	131°	22°22'	+60'	132°	21°42'	+60'	132°	21°02'	+60'	132°	20°21'	+60'	132°	19°41'	+60'	133°	19°00'	+60'	163°	19
20	24°02'	+60'	131°	23°22'	+60'	132°	22°42'	+60'	132°	22°02'	+60'	132°	21°21'	+60'	132°	20°41'	+60'	133°	20°00'	+60'	165°	20
21	25°01'	+60'	131°	24°22'	+60'	131°	23°42'	+60'	132°	23°02'	+60'	132°	22°21'	+60'	132°	21°41'	+60'	133°	21°00'	+60'	90°	21
22	26°01'	+60'	131°	25°22'	+60'	131°	24°42'	+60'	132°	24°02'	+60'	132°	23°21'	+60'	132°	22°41'	+60'	133°	22°00'	+60'	180°	22
23	27°01'	+60'	131°	26°21'	+60'	131°	25°42'	+60'	132°	25°02'	+60'	132°	24°21'	+60'	132°	23°41'	+60'	133°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

47° 313° LHA — Latitude SAME as Declination — 47° 313° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

48° 312° LHA — Latitude SAME as Declination — 48° 312° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°01'	+60'	132°	3°21'	+60'	132°	2°41'	+60'	132°	2°00'	+60'	132°	1°20'	+60'	132°	0°40'	+60'	132°	0°00'	+60'	132°	0
1	5°00'	+60'	132°	4°20'	+60'	132°	3°40'	+60'	132°	3°00'	+60'	132°	2°20'	+60'	132°	1°40'	+60'	132°	1°00'	+60'	133°	1
2	6°00'	+60'	132°	5°20'	+60'	132°	4°40'	+60'	132°	4°00'	+60'	132°	3°20'	+60'	132°	2°40'	+60'	132°	2°00'	+60'	133°	2
3	7°00'	+60'	132°	6°20'	+60'	132°	5°40'	+60'	132°	5°00'	+60'	132°	4°20'	+60'	132°	3°40'	+60'	132°	3°00'	+60'	133°	3
4	8°00'	+60'	132°	7°20'	+60'	132°	6°40'	+60'	132°	6°00'	+60'	132°	5°20'	+60'	132°	4°40'	+60'	132°	4°00'	+60'	133°	4
5	9°00'	+60'	131°	8°20'	+60'	132°	7°40'	+60'	132°	7°00'	+60'	132°	6°20'	+60'	132°	5°40'	+60'	132°	5°00'	+60'	117°	5
6	10°00'	+60'	131°	9°20'	+60'	131°	8°40'	+60'	132°	8°00'	+60'	132°	7°20'	+60'	132°	6°40'	+60'	132°	6°00'	+60'	117°	6
7	10°59'	+60'	131°	10°20'	+60'	131°	9°40'	+60'	132°	9°00'	+60'	132°	8°20'	+60'	132°	7°40'	+60'	132°	7°00'	+60'	117°	7
8	11°59'	+60'	131°	11°20'	+60'	131°	10°40'	+60'	132°	10°00'	+60'	132°	9°20'	+60'	132°	8°40'	+60'	132°	8°00'	+60'	90°	8
9	12°59'	+60'	131°	12°19'	+60'	131°	11°40'	+60'	131°	11°00'	+60'	132°	10°20'	+60'	132°	9°40'	+60'	132°	9°00'	+60'	117°	9
10	13°59'	+60'	131°	13°19'	+60'	131°	12°40'	+60'	131°	12°00'	+60'	132°	11°20'	+60'	132°	10°40'	+60'	132°	10°00'	+60'	117°	10
11	14°59'	+60'	131°	14°19'	+60'	131°	13°40'	+60'	131°	13°00'	+60'	132°	12°20'	+60'	132°	11°40'	+60'	132°	11°00'	+60'	117°	11
12	15°58'	+60'	131°	15°19'	+60'	131°	14°40'	+60'	131°	14°00'	+60'	131°	13°20'	+60'	132°	12°40'	+60'	132°	12°00'	+60'	158°	12
13	16°58'	+60'	131°	16°19'	+60'	131°	15°39'	+60'	131°	15°00'	+60'	131°	14°20'	+60'	132°	13°40'	+60'	132°	13°00'	+60'	158°	13
14	17°58'	+60'	131°	17°19'	+60'	131°	16°39'	+60'	131°	16°00'	+60'	131°	15°20'	+60'	132°	14°40'	+60'	132°	14°00'	+60'	159°	14
15	18°58'	+60'	131°	18°19'	+60'	131°	17°39'	+60'	131°	17°00'	+60'	131°	16°20'	+60'	132°	15°40'	+60'	132°	15°00'	+60'	160°	15
16	19°58'	+60'	131°	19°18'	+60'	131°	18°39'	+60'	131°	18°00'	+60'	131°	17°20'	+60'	132°	16°40'	+60'	132°	16°00'	+60'	161°	16
17	20°57'	+60'	130°	20°18'	+60'	131°	19°39'	+60'	131°	19°00'	+60'	131°	18°20'	+60'	132°	17°40'	+60'	132°	17°00'	+60'	161°	17
18	21°57'	+60'	130°	21°18'	+60'	131°	20°39'	+60'	131°	20°00'	+60'	131°	19°20'	+60'	131°	18°40'	+60'	132°	18°00'	+60'	162°	18
19	22°57'	+60'	130°	22°18'	+60'	131°	21°39'	+60'	131°	21°00'	+60'	131°	20°20'	+60'	131°	19°40'	+60'	132°	19°00'	+60'	163°	19
20	23°57'	+60'	130°	23°18'	+60'	131°	22°39'	+60'	131°	21°59'	+60'	131°	21°20'	+60'	131°	20°40'	+60'	132°	20°00'	+60'	165°	20
21	24°57'	+60'	130°	24°18'	+60'	130°	23°39'	+60'	131°	22°59'	+60'	131°	22°20'	+60'	131°	21°40'	+60'	132°	21°00'	+60'	90°	21
22	25°56'	+60'	130°	25°18'	+60'	130°	24°39'	+60'	131°	23°59'	+60'	131°	23°20'	+60'	131°	22°40'	+60'	132°	22°00'	+60'	180°	22
23	26°56'	+60'	130°	26°17'	+60'	130°	25°39'	+60'	131°	24°59'	+60'	131°	24°20'	+60'	131°	23°40'	+60'	132°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

48° 312° LHA — Latitude SAME as Declination — 48° 312° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

49° 311° LHA — Latitude SAME as Declination — 49° 311° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°56'	+60'	131°	3°17'	+60'	131°	2°37'	+60'	131°	1°58'	+60'	131°	1°19'	+60'	131°	0°39'	+60'	131°	0°00'	+60'	131°	0
1	4°56'	+60'	131°	4°17'	+60'	131°	3°37'	+60'	131°	2°58'	+60'	131°	2°19'	+60'	131°	1°39'	+60'	131°	1°00'	+60'	133°	1
2	5°56'	+60'	131°	5°16'	+60'	131°	4°37'	+60'	131°	3°58'	+60'	131°	3°19'	+60'	131°	2°39'	+60'	131°	2°00'	+60'	133°	2
3	6°55'	+60'	131°	6°16'	+60'	131°	5°37'	+60'	131°	4°58'	+60'	131°	4°19'	+60'	131°	3°39'	+60'	131°	3°00'	+60'	133°	3
4	7°55'	+60'	131°	7°16'	+60'	131°	6°37'	+60'	131°	5°58'	+60'	131°	5°19'	+60'	131°	4°39'	+60'	131°	4°00'	+60'	133°	4
5	8°55'	+60'	130°	8°16'	+60'	131°	7°37'	+60'	131°	6°58'	+60'	131°	6°19'	+60'	131°	5°39'	+60'	131°	5°00'	+60'	117°	5
6	9°55'	+60'	130°	9°16'	+60'	130°	8°37'	+60'	131°	7°58'	+60'	131°	7°19'	+60'	131°	6°39'	+60'	131°	6°00'	+60'	117°	6
7	10°55'	+60'	130°	10°16'	+60'	130°	9°37'	+60'	131°	8°58'	+60'	131°	8°19'	+60'	131°	7°39'	+60'	131°	7°00'	+60'	117°	7
8	11°54'	+60'	130°	11°16'	+60'	130°	10°37'	+60'	131°	9°58'	+60'	131°	9°19'	+60'	131°	8°39'	+60'	131°	8°00'	+60'	90°	8
9	12°54'	+60'	130°	12°15'	+60'	130°	11°37'	+60'	130°	10°58'	+60'	131°	10°19'	+60'	131°	9°39'	+60'	131°	9°00'	+60'	117°	9
10	13°54'	+60'	130°	13°15'	+60'	130°	12°37'	+60'	130°	11°58'	+60'	131°	11°19'	+60'	131°	10°39'	+60'	131°	10°00'	+60'	117°	10
11	14°54'	+60'	130°	14°15'	+60'	130°	13°36'	+60'	130°	12°58'	+60'	131°	12°18'	+60'	131°	11°39'	+60'	131°	11°00'	+60'	117°	11
12	15°54'	+60'	130°	15°15'	+60'	130°	14°36'	+60'	130°	13°57'	+60'	130°	13°18'	+60'	131°	12°39'	+60'	131°	12°00'	+60'	158°	12
13	16°53'	+60'	130°	16°15'	+60'	130°	15°36'	+60'	130°	14°57'	+60'	130°	14°18'	+60'	131°	13°39'	+60'	131°	13°00'	+60'	158°	13
14	17°53'	+60'	130°	17°15'	+60'	130°	16°36'	+60'	130°	15°57'	+60'	130°	15°18'	+60'	131°	14°39'	+60'	131°	14°00'	+60'	159°	14
15	18°53'	+60'	130°	18°15'	+60'	130°	17°36'	+60'	130°	16°57'	+60'	130°	16°18'	+60'	131°	15°39'	+60'	131°	15°00'	+60'	160°	15
16	19°53'	+60'	130°	19°14'	+60'	130°	18°36'	+60'	130°	17°57'	+60'	130°	17°18'	+60'	131°	16°39'	+60'	131°	16°00'	+60'	161°	16
17	20°53'	+60'	129°	20°14'	+60'	130°	19°36'	+60'	130°	18°57'	+60'	130°	18°18'	+60'	131°	17°39'	+60'	131°	17°00'	+60'	161°	17
18	21°52'	+60'	129°	21°14'	+60'	130°	20°36'	+60'	130°	19°57'	+60'	130°	19°18'	+60'	130°	18°39'	+60'	131°	18°00'	+60'	162°	18
19	22°52'	+60'	129°	22°14'	+60'	130°	21°36'	+60'	130°	20°57'	+60'	130°	20°18'	+60'	130°	19°39'	+60'	131°	19°00'	+60'	163°	19
20	23°52'	+60'	129°	23°14'	+60'	129°	22°36'	+60'	130°	21°57'	+60'	130°	21°18'	+60'	130°	20°39'	+60'	131°	20°00'	+60'	165°	20
21	24°52'	+60'	129°	24°14'	+60'	129°	23°36'	+60'	130°	22°57'	+60'	130°	22°18'	+60'	130°	21°39'	+60'	131°	21°00'	+60'	90°	21
22	25°51'	+60'	129°	25°14'	+60'	129°	24°35'	+60'	130°	23°57'	+60'	130°	23°18'	+60'	130°	22°39'	+60'	131°	22°00'	+60'	180°	22
23	26°51'	+60'	129°	26°13'	+60'	129°	25°35'	+60'	130°	24°57'	+60'	130°	24°18'	+60'	130°	23°39'	+60'	131°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

49° 311° LHA — Latitude SAME as Declination — 49° 311° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

50° 310° LHA — Latitude SAME as Declination — 50° 310° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°51'	+60'	130°	3°13'	+60'	130°	2°34'	+60'	130°	1°56'	+60'	130°	1°17'	+60'	130°	0°39'	+60'	130°	0°00'	+60'	130°	0
1	4°51'	+60'	130°	4°13'	+60'	130°	3°34'	+60'	130°	2°56'	+60'	130°	2°17'	+60'	130°	1°39'	+60'	130°	1°00'	+60'	129°	1
2	5°51'	+60'	130°	5°12'	+60'	130°	4°34'	+60'	130°	3°56'	+60'	130°	3°17'	+60'	130°	2°39'	+60'	130°	2°00'	+60'	133°	2
3	6°51'	+60'	130°	6°12'	+60'	130°	5°34'	+60'	130°	4°56'	+60'	130°	4°17'	+60'	130°	3°39'	+60'	130°	3°00'	+60'	133°	3
4	7°50'	+60'	130°	7°12'	+60'	130°	6°34'	+60'	130°	5°55'	+60'	130°	5°17'	+60'	130°	4°39'	+60'	130°	4°00'	+60'	133°	4
5	8°50'	+60'	129°	8°12'	+60'	130°	7°34'	+60'	130°	6°55'	+60'	130°	6°17'	+60'	130°	5°39'	+60'	130°	5°00'	+60'	117°	5
6	9°50'	+60'	129°	9°12'	+60'	129°	8°34'	+60'	130°	7°55'	+60'	130°	7°17'	+60'	130°	6°39'	+60'	130°	6°00'	+60'	117°	6
7	10°50'	+60'	129°	10°12'	+60'	129°	9°34'	+60'	130°	8°55'	+60'	130°	8°17'	+60'	130°	7°39'	+60'	130°	7°00'	+60'	117°	7
8	11°50'	+60'	129°	11°12'	+60'	129°	10°33'	+60'	129°	9°55'	+60'	130°	9°17'	+60'	130°	8°39'	+60'	130°	8°00'	+60'	90°	8
9	12°49'	+60'	129°	12°11'	+60'	129°	11°33'	+60'	129°	10°55'	+60'	130°	10°17'	+60'	130°	9°39'	+60'	130°	9°00'	+60'	117°	9
10	13°49'	+60'	129°	13°11'	+60'	129°	12°33'	+60'	129°	11°55'	+60'	130°	11°17'	+60'	130°	10°39'	+60'	130°	10°00'	+60'	117°	10
11	14°49'	+60'	129°	14°11'	+60'	129°	13°33'	+60'	129°	12°55'	+60'	130°	12°17'	+60'	130°	11°39'	+60'	130°	11°00'	+60'	117°	11
12	15°49'	+60'	129°	15°11'	+60'	129°	14°33'	+60'	129°	13°55'	+60'	129°	13°17'	+60'	130°	12°39'	+60'	130°	12°00'	+60'	158°	12
13	16°49'	+60'	129°	16°11'	+60'	129°	15°33'	+60'	129°	14°55'	+60'	129°	14°17'	+60'	130°	13°38'	+60'	130°	13°00'	+60'	158°	13
14	17°48'	+60'	129°	17°11'	+60'	129°	16°33'	+60'	129°	15°55'	+60'	129°	15°17'	+60'	130°	14°38'	+60'	130°	14°00'	+60'	159°	14
15	18°48'	+60'	129°	18°11'	+60'	129°	17°33'	+60'	129°	16°55'	+60'	129°	16°17'	+60'	130°	15°38'	+60'	130°	15°00'	+60'	160°	15
16	19°48'	+60'	128°	19°10'	+60'	129°	18°33'	+60'	129°	17°55'	+60'	129°	17°17'	+60'	130°	16°38'	+60'	130°	16°00'	+60'	161°	16
17	20°48'	+60'	128°	20°10'	+60'	129°	19°33'	+60'	129°	18°55'	+60'	129°	18°17'	+60'	130°	17°38'	+60'	130°	17°00'	+60'	161°	17
18	21°47'	+60'	128°	21°10'	+60'	129°	20°33'	+60'	129°	19°55'	+60'	129°	19°17'	+60'	129°	18°38'	+60'	130°	18°00'	+60'	162°	18
19	22°47'	+60'	128°	22°10'	+60'	129°	21°32'	+60'	129°	20°55'	+60'	129°	20°17'	+60'	129°	19°38'	+60'	130°	19°00'	+60'	163°	19
20	23°47'	+60'	128°	23°10'	+60'	128°	22°32'	+60'	129°	21°55'	+60'	129°	21°17'	+60'	129°	20°38'	+60'	130°	20°00'	+60'	165°	20
21	24°47'	+60'	128°	24°10'	+60'	128°	23°32'	+60'	129°	22°55'	+60'	129°	22°17'	+60'	129°	21°38'	+60'	130°	21°00'	+60'	90°	21
22	25°47'	+60'	128°	25°10'	+60'	128°	24°32'	+60'	129°	23°55'	+60'	129°	23°17'	+60'	129°	22°38'	+60'	130°	22°00'	+60'	180°	22
23	26°46'	+60'	128°	26°09'	+60'	128°	25°32'	+60'	129°	24°54'	+60'	129°	24°17'	+60'	129°	23°38'	+60'	130°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

50° 310° LHA — Latitude SAME as Declination — 50° 310° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

51° 309° LHA — Latitude SAME as Declination — 51° 309° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°46'	+60'	129°	3°09'	+60'	129°	2°31'	+60'	129°	1°53'	+60'	129°	1°16'	+60'	129°	0°38'	+60'	129°	0°00'	+60'	129°	0
1	4°46'	+60'	129°	4°09'	+60'	129°	3°31'	+60'	129°	2°53'	+60'	129°	2°15'	+60'	129°	1°38'	+60'	129°	1°00'	+60'	129°	1
2	5°46'	+60'	129°	5°08'	+60'	129°	4°31'	+60'	129°	3°53'	+60'	129°	3°15'	+60'	129°	2°38'	+60'	129°	2°00'	+60'	133°	2
3	6°46'	+60'	129°	6°08'	+60'	129°	5°31'	+60'	129°	4°53'	+60'	129°	4°15'	+60'	129°	3°38'	+60'	129°	3°00'	+60'	133°	3
4	7°46'	+60'	129°	7°08'	+60'	129°	6°31'	+60'	129°	5°53'	+60'	129°	5°15'	+60'	129°	4°38'	+60'	129°	4°00'	+60'	133°	4
5	8°45'	+60'	128°	8°08'	+60'	129°	7°31'	+60'	129°	6°53'	+60'	129°	6°15'	+60'	129°	5°38'	+60'	129°	5°00'	+60'	117°	5
6	9°45'	+60'	128°	9°08'	+60'	128°	8°30'	+60'	129°	7°53'	+60'	129°	7°15'	+60'	129°	6°38'	+60'	129°	6°00'	+60'	117°	6
7	10°45'	+60'	128°	10°08'	+60'	128°	9°30'	+60'	129°	8°53'	+60'	129°	8°15'	+60'	129°	7°38'	+60'	129°	7°00'	+60'	117°	7
8	11°45'	+60'	128°	11°08'	+60'	128°	10°30'	+60'	128°	9°53'	+60'	129°	9°15'	+60'	129°	8°38'	+60'	129°	8°00'	+60'	90°	8
9	12°44'	+60'	128°	12°07'	+60'	128°	11°30'	+60'	128°	10°53'	+60'	129°	10°15'	+60'	129°	9°38'	+60'	129°	9°00'	+60'	117°	9
10	13°44'	+60'	128°	13°07'	+60'	128°	12°30'	+60'	128°	11°53'	+60'	129°	11°15'	+60'	129°	10°38'	+60'	129°	10°00'	+60'	117°	10
11	14°44'	+60'	128°	14°07'	+60'	128°	13°30'	+60'	128°	12°53'	+60'	129°	12°15'	+60'	129°	11°38'	+60'	129°	11°00'	+60'	117°	11
12	15°44'	+60'	128°	15°07'	+60'	128°	14°30'	+60'	128°	13°53'	+60'	128°	13°15'	+60'	129°	12°38'	+60'	129°	12°00'	+60'	158°	12
13	16°44'	+60'	128°	16°07'	+60'	128°	15°30'	+60'	128°	14°53'	+60'	128°	14°15'	+60'	129°	13°38'	+60'	129°	13°00'	+60'	158°	13
14	17°43'	+60'	128°	17°07'	+60'	128°	16°30'	+60'	128°	15°53'	+60'	128°	15°15'	+60'	129°	14°38'	+60'	129°	14°00'	+60'	159°	14
15	18°43'	+60'	128°	18°06'	+60'	128°	17°30'	+60'	128°	16°52'	+60'	128°	16°15'	+60'	129°	15°38'	+60'	129°	15°00'	+60'	160°	15
16	19°43'	+60'	127°	19°06'	+60'	128°	18°29'	+60'	128°	17°52'	+60'	128°	17°15'	+60'	129°	16°38'	+60'	129°	16°00'	+60'	161°	16
17	20°43'	+60'	127°	20°06'	+60'	128°	19°29'	+60'	128°	18°52'	+60'	128°	18°15'	+60'	129°	17°38'	+60'	129°	17°00'	+60'	161°	17
18	21°43'	+60'	127°	21°06'	+60'	128°	20°29'	+60'	128°	19°52'	+60'	128°	19°15'	+60'	128°	18°38'	+60'	129°	18°00'	+60'	162°	18
19	22°42'	+60'	127°	22°06'	+60'	128°	21°29'	+60'	128°	20°52'	+60'	128°	20°15'	+60'	128°	19°38'	+60'	129°	19°00'	+60'	163°	19
20	23°42'	+60'	127°	23°06'	+60'	127°	22°29'	+60'	128°	21°52'	+60'	128°	21°15'	+60'	128°	20°38'	+60'	129°	20°00'	+60'	165°	20
21	24°42'	+60'	127°	24°06'	+60'	127°	23°29'	+60'	128°	22°52'	+60'	128°	22°15'	+60'	128°	21°38'	+60'	129°	21°00'	+60'	90°	21
22	25°42'	+60'	127°	25°05'	+60'	127°	24°29'	+60'	128°	23°52'	+60'	128°	23°15'	+60'	128°	22°38'	+60'	129°	22°00'	+60'	180°	22
23	26°41'	+60'	127°	26°05'	+60'	127°	25°29'	+60'	128°	24°52'	+60'	128°	24°15'	+60'	128°	23°38'	+60'	129°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

51° 309° LHA — Latitude SAME as Declination — 51° 309° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

52° 308° LHA — Latitude SAME as Declination — 52° 308° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°41'	+60'	128°	3°05'	+60'	128°	2°28'	+60'	128°	1°51'	+60'	128°	1°14'	+60'	128°	0°37'	+60'	128°	0°00'	+60'	128°	0
1	4°41'	+60'	128°	4°04'	+60'	128°	3°28'	+60'	128°	2°51'	+60'	128°	2°14'	+60'	128°	1°37'	+60'	128°	1°00'	+60'	129°	1
2	5°41'	+60'	128°	5°04'	+60'	128°	4°28'	+60'	128°	3°51'	+60'	128°	3°14'	+60'	128°	2°37'	+60'	128°	2°00'	+60'	125°	2
3	6°41'	+60'	128°	6°04'	+60'	128°	5°27'	+60'	128°	4°51'	+60'	128°	4°14'	+60'	128°	3°37'	+60'	128°	3°00'	+60'	125°	3
4	7°41'	+60'	128°	7°04'	+60'	128°	6°27'	+60'	128°	5°51'	+60'	128°	5°14'	+60'	128°	4°37'	+60'	128°	4°00'	+60'	133°	4
5	8°40'	+60'	127°	8°04'	+60'	128°	7°27'	+60'	128°	6°51'	+60'	128°	6°14'	+60'	128°	5°37'	+60'	128°	5°00'	+60'	117°	5
6	9°40'	+60'	127°	9°04'	+60'	127°	8°27'	+60'	128°	7°50'	+60'	128°	7°14'	+60'	128°	6°37'	+60'	128°	6°00'	+60'	117°	6
7	10°40'	+60'	127°	10°04'	+60'	127°	9°27'	+60'	128°	8°50'	+60'	128°	8°14'	+60'	128°	7°37'	+60'	128°	7°00'	+60'	117°	7
8	11°40'	+60'	127°	11°03'	+60'	127°	10°27'	+60'	127°	9°50'	+60'	128°	9°14'	+60'	128°	8°37'	+60'	128°	8°00'	+60'	90°	8
9	12°40'	+60'	127°	12°03'	+60'	127°	11°27'	+60'	127°	10°50'	+60'	128°	10°14'	+60'	128°	9°37'	+60'	128°	9°00'	+60'	117°	9
10	13°39'	+60'	127°	13°03'	+60'	127°	12°27'	+60'	127°	11°50'	+60'	128°	11°14'	+60'	128°	10°37'	+60'	128°	10°00'	+60'	117°	10
11	14°39'	+60'	127°	14°03'	+60'	127°	13°27'	+60'	127°	12°50'	+60'	127°	12°14'	+60'	128°	11°37'	+60'	128°	11°00'	+60'	117°	11
12	15°39'	+60'	127°	15°03'	+60'	127°	14°27'	+60'	127°	13°50'	+60'	127°	13°14'	+60'	128°	12°37'	+60'	128°	12°00'	+60'	158°	12
13	16°39'	+60'	127°	16°03'	+60'	127°	15°26'	+60'	127°	14°50'	+60'	127°	14°14'	+60'	128°	13°37'	+60'	128°	13°00'	+60'	158°	13
14	17°38'	+60'	127°	17°02'	+60'	127°	16°26'	+60'	127°	15°50'	+60'	127°	15°14'	+60'	128°	14°37'	+60'	128°	14°00'	+60'	159°	14
15	18°38'	+60'	127°	18°02'	+60'	127°	17°26'	+60'	127°	16°50'	+60'	127°	16°14'	+60'	128°	15°37'	+60'	128°	15°00'	+60'	160°	15
16	19°38'	+60'	126°	19°02'	+60'	127°	18°26'	+60'	127°	17°50'	+60'	127°	17°13'	+60'	128°	16°37'	+60'	128°	16°00'	+60'	161°	16
17	20°38'	+60'	126°	20°02'	+60'	127°	19°26'	+60'	127°	18°50'	+60'	127°	18°13'	+60'	127°	17°37'	+60'	128°	17°00'	+60'	161°	17
18	21°37'	+60'	126°	21°02'	+60'	127°	20°26'	+60'	127°	19°50'	+60'	127°	19°13'	+60'	127°	18°37'	+60'	128°	18°00'	+60'	162°	18
19	22°37'	+60'	126°	22°02'	+60'	127°	21°26'	+60'	127°	20°50'	+60'	127°	20°13'	+60'	127°	19°37'	+60'	128°	19°00'	+60'	163°	19
20	23°37'	+60'	126°	23°02'	+60'	126°	22°26'	+60'	127°	21°50'	+60'	127°	21°13'	+60'	127°	20°37'	+60'	128°	20°00'	+60'	165°	20
21	24°37'	+60'	126°	24°01'	+60'	126°	23°26'	+60'	127°	22°50'	+60'	127°	22°13'	+60'	127°	21°37'	+60'	128°	21°00'	+60'	90°	21
22	25°37'	+60'	126°	25°01'	+60'	126°	24°26'	+60'	127°	23°50'	+60'	127°	23°13'	+60'	127°	22°37'	+60'	128°	22°00'	+60'	180°	22
23	26°36'	+60'	126°	26°01'	+60'	126°	25°25'	+60'	127°	24°50'	+60'	127°	24°13'	+60'	127°	23°37'	+60'	128°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

52° 308° LHA — Latitude SAME as Declination — 52° 308° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

53° 307° LHA — Latitude SAME as Declination — 53° 307° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°36'	+60'	127°	3°00'	+60'	127°	2°24'	+60'	127°	1°48'	+60'	127°	1°12'	+60'	127°	0°36'	+60'	127°	0°00'	+60'	127°	0
1	4°36'	+60'	127°	4°00'	+60'	127°	3°24'	+60'	127°	2°48'	+60'	127°	2°12'	+60'	127°	1°36'	+60'	127°	1°00'	+60'	129°	1
2	5°36'	+60'	127°	5°00'	+60'	127°	4°24'	+60'	127°	3°48'	+60'	127°	3°12'	+60'	127°	2°36'	+60'	127°	2°00'	+60'	125°	2
3	6°36'	+60'	127°	6°00'	+60'	127°	5°24'	+60'	127°	4°48'	+60'	127°	4°12'	+60'	127°	3°36'	+60'	127°	3°00'	+60'	125°	3
4	7°36'	+60'	127°	7°00'	+60'	127°	6°24'	+60'	127°	5°48'	+60'	127°	5°12'	+60'	127°	4°36'	+60'	127°	4°00'	+60'	133°	4
5	8°35'	+60'	126°	8°00'	+60'	127°	7°24'	+60'	127°	6°48'	+60'	127°	6°12'	+60'	127°	5°36'	+60'	127°	5°00'	+60'	117°	5
6	9°35'	+60'	126°	9°00'	+60'	126°	8°24'	+60'	127°	7°48'	+60'	127°	7°12'	+60'	127°	6°36'	+60'	127°	6°00'	+60'	117°	6
7	10°35'	+60'	126°	9°59'	+60'	126°	9°24'	+60'	127°	8°48'	+60'	127°	8°12'	+60'	127°	7°36'	+60'	127°	7°00'	+60'	117°	7
8	11°35'	+60'	126°	10°59'	+60'	126°	10°24'	+60'	126°	9°48'	+60'	127°	9°12'	+60'	127°	8°36'	+60'	127°	8°00'	+60'	90°	8
9	12°34'	+60'	126°	11°59'	+60'	126°	11°24'	+60'	126°	10°48'	+60'	127°	10°12'	+60'	127°	9°36'	+60'	127°	9°00'	+60'	117°	9
10	13°34'	+60'	126°	12°59'	+60'	126°	12°23'	+60'	126°	11°48'	+60'	127°	11°12'	+60'	127°	10°36'	+60'	127°	10°00'	+60'	117°	10
11	14°34'	+60'	126°	13°59'	+60'	126°	13°23'	+60'	126°	12°48'	+60'	126°	12°12'	+60'	127°	11°36'	+60'	127°	11°00'	+60'	117°	11
12	15°34'	+60'	126°	14°59'	+60'	126°	14°23'	+60'	126°	13°48'	+60'	126°	13°12'	+60'	127°	12°36'	+60'	127°	12°00'	+60'	158°	12
13	16°34'	+60'	126°	15°58'	+60'	126°	15°23'	+60'	126°	14°48'	+60'	126°	14°12'	+60'	127°	13°36'	+60'	127°	13°00'	+60'	158°	13
14	17°33'	+60'	126°	16°58'	+60'	126°	16°23'	+60'	126°	15°48'	+60'	126°	15°12'	+60'	127°	14°36'	+60'	127°	14°00'	+60'	159°	14
15	18°33'	+60'	126°	17°58'	+60'	126°	17°23'	+60'	126°	16°47'	+60'	126°	16°12'	+60'	127°	15°36'	+60'	127°	15°00'	+60'	160°	15
16	19°33'	+60'	125°	18°58'	+60'	126°	18°23'	+60'	126°	17°47'	+60'	126°	17°12'	+60'	127°	16°36'	+60'	127°	16°00'	+60'	161°	16
17	20°33'	+60'	125°	19°58'	+60'	126°	19°23'	+60'	126°	18°47'	+60'	126°	18°12'	+60'	126°	17°36'	+60'	127°	17°00'	+60'	161°	17
18	21°32'	+60'	125°	20°58'	+60'	126°	20°23'	+60'	126°	19°47'	+60'	126°	19°12'	+60'	126°	18°36'	+60'	127°	18°00'	+60'	162°	18
19	22°32'	+60'	125°	21°57'	+60'	125°	21°22'	+60'	126°	20°47'	+60'	126°	20°12'	+60'	126°	19°36'	+60'	127°	19°00'	+60'	163°	19
20	23°32'	+60'	125°	22°57'	+60'	125°	22°22'	+60'	126°	21°47'	+60'	126°	21°12'	+60'	126°	20°36'	+60'	127°	20°00'	+60'	165°	20
21	24°32'	+60'	125°	23°57'	+60'	125°	23°22'	+60'	126°	22°47'	+60'	126°	22°12'	+60'	126°	21°36'	+60'	127°	21°00'	+60'	90°	21
22	25°31'	+60'	125°	24°57'	+60'	125°	24°22'	+60'	126°	23°47'	+60'	126°	23°12'	+60'	126°	22°36'	+60'	127°	22°00'	+60'	180°	22
23	26°31'	+60'	125°	25°57'	+60'	125°	25°22'	+60'	126°	24°47'	+60'	126°	24°12'	+60'	126°	23°36'	+60'	127°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

53° 307° LHA — Latitude SAME as Declination — 53° 307° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

54° 306° LHA — Latitude SAME as Declination — 54° 306° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°31'	+60'	126°	2°56'	+60'	126°	2°21'	+60'	126°	1°46'	+60'	126°	1°11'	+60'	126°	0°35'	+60'	126°	0°00'	+60'	126°	0
1	4°31'	+60'	126°	3°56'	+60'	126°	3°21'	+60'	126°	2°46'	+60'	126°	2°11'	+60'	126°	1°35'	+60'	126°	1°00'	+60'	125°	1
2	5°31'	+60'	126°	4°56'	+60'	126°	4°21'	+60'	126°	3°46'	+60'	126°	3°10'	+60'	126°	2°35'	+60'	126°	2°00'	+60'	125°	2
3	6°31'	+60'	126°	5°56'	+60'	126°	5°21'	+60'	126°	4°46'	+60'	126°	4°10'	+60'	126°	3°35'	+60'	126°	3°00'	+60'	125°	3
4	7°30'	+60'	126°	6°56'	+60'	126°	6°21'	+60'	126°	5°46'	+60'	126°	5°10'	+60'	126°	4°35'	+60'	126°	4°00'	+60'	133°	4
5	8°30'	+60'	125°	7°55'	+60'	126°	7°21'	+60'	126°	6°45'	+60'	126°	6°10'	+60'	126°	5°35'	+60'	126°	5°00'	+60'	117°	5
6	9°30'	+60'	125°	8°55'	+60'	125°	8°20'	+60'	126°	7°45'	+60'	126°	7°10'	+60'	126°	6°35'	+60'	126°	6°00'	+60'	117°	6
7	10°30'	+60'	125°	9°55'	+60'	125°	9°20'	+60'	126°	8°45'	+60'	126°	8°10'	+60'	126°	7°35'	+60'	126°	7°00'	+60'	117°	7
8	11°30'	+60'	125°	10°55'	+60'	125°	10°20'	+60'	125°	9°45'	+60'	126°	9°10'	+60'	126°	8°35'	+60'	126°	8°00'	+60'	90°	8
9	12°29'	+60'	125°	11°55'	+60'	125°	11°20'	+60'	125°	10°45'	+60'	126°	10°10'	+60'	126°	9°35'	+60'	126°	9°00'	+60'	117°	9
10	13°29'	+60'	125°	12°55'	+60'	125°	12°20'	+60'	125°	11°45'	+60'	126°	11°10'	+60'	126°	10°35'	+60'	126°	10°00'	+60'	117°	10
11	14°29'	+60'	125°	13°55'	+60'	125°	13°20'	+60'	125°	12°45'	+60'	125°	12°10'	+60'	126°	11°35'	+60'	126°	11°00'	+60'	117°	11
12	15°29'	+60'	125°	14°54'	+60'	125°	14°20'	+60'	125°	13°45'	+60'	125°	13°10'	+60'	126°	12°35'	+60'	126°	12°00'	+60'	158°	12
13	16°28'	+60'	125°	15°54'	+60'	125°	15°20'	+60'	125°	14°45'	+60'	125°	14°10'	+60'	126°	13°35'	+60'	126°	13°00'	+60'	158°	13
14	17°28'	+60'	125°	16°54'	+60'	125°	16°20'	+60'	125°	15°45'	+60'	125°	15°10'	+60'	126°	14°35'	+60'	126°	14°00'	+60'	159°	14
15	18°28'	+60'	125°	17°54'	+60'	125°	17°20'	+60'	125°	16°45'	+60'	125°	16°10'	+60'	126°	15°35'	+60'	126°	15°00'	+60'	160°	15
16	19°28'	+60'	124°	18°54'	+60'	125°	18°19'	+60'	125°	17°45'	+60'	125°	17°10'	+60'	126°	16°35'	+60'	126°	16°00'	+60'	161°	16
17	20°27'	+60'	124°	19°54'	+60'	125°	19°19'	+60'	125°	18°45'	+60'	125°	18°10'	+60'	125°	17°35'	+60'	126°	17°00'	+60'	161°	17
18	21°27'	+60'	124°	20°53'	+60'	125°	20°19'	+60'	125°	19°45'	+60'	125°	19°10'	+60'	125°	18°35'	+60'	126°	18°00'	+60'	162°	18
19	22°27'	+60'	124°	21°53'	+60'	124°	21°19'	+60'	125°	20°45'	+60'	125°	20°10'	+60'	125°	19°35'	+60'	126°	19°00'	+60'	163°	19
20	23°27'	+60'	124°	22°53'	+60'	124°	22°19'	+60'	125°	21°45'	+60'	125°	21°10'	+60'	125°	20°35'	+60'	126°	20°00'	+60'	165°	20
21	24°26'	+60'	124°	23°53'	+60'	124°	23°19'	+60'	125°	22°45'	+60'	125°	22°10'	+60'	125°	21°35'	+60'	126°	21°00'	+60'	90°	21
22	25°26'	+60'	124°	24°53'	+60'	124°	24°19'	+60'	125°	23°45'	+60'	125°	23°10'	+60'	125°	22°35'	+60'	126°	22°00'	+60'	180°	22
23	26°26'	+60'	124°	25°52'	+60'	124°	25°19'	+60'	125°	24°44'	+60'	125°	24°10'	+60'	125°	23°35'	+60'	126°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

54° 306° LHA — Latitude SAME as Declination — 54° 306° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

55° 305° LHA — Latitude SAME as Declination — 55° 305° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°26'	+60'	125°	2°52'	+60'	125°	2°18'	+60'	125°	1°43'	+60'	125°	1°09'	+60'	125°	0°34'	+60'	125°	0°00'	+60'	125°	0
1	4°26'	+60'	125°	3°52'	+60'	125°	3°17'	+60'	125°	2°43'	+60'	125°	2°09'	+60'	125°	1°34'	+60'	125°	1°00'	+60'	125°	1
2	5°26'	+60'	125°	4°52'	+60'	125°	4°17'	+60'	125°	3°43'	+60'	125°	3°09'	+60'	125°	2°34'	+60'	125°	2°00'	+60'	125°	2
3	6°26'	+60'	125°	5°51'	+60'	125°	5°17'	+60'	125°	4°43'	+60'	125°	4°09'	+60'	125°	3°34'	+60'	125°	3°00'	+60'	125°	3
4	7°25'	+60'	125°	6°51'	+60'	125°	6°17'	+60'	125°	5°43'	+60'	125°	5°09'	+60'	125°	4°34'	+60'	125°	4°00'	+60'	133°	4
5	8°25'	+60'	124°	7°51'	+60'	125°	7°17'	+60'	125°	6°43'	+60'	125°	6°09'	+60'	125°	5°34'	+60'	125°	5°00'	+60'	117°	5
6	9°25'	+60'	124°	8°51'	+60'	124°	8°17'	+60'	125°	7°43'	+60'	125°	7°09'	+60'	125°	6°34'	+60'	125°	6°00'	+60'	117°	6
7	10°25'	+60'	124°	9°51'	+60'	124°	9°17'	+60'	125°	8°43'	+60'	125°	8°09'	+60'	125°	7°34'	+60'	125°	7°00'	+60'	117°	7
8	11°24'	+60'	124°	10°51'	+60'	124°	10°17'	+60'	124°	9°43'	+60'	125°	9°09'	+60'	125°	8°34'	+60'	125°	8°00'	+60'	90°	8
9	12°24'	+60'	124°	11°51'	+60'	124°	11°17'	+60'	124°	10°43'	+60'	125°	10°09'	+60'	125°	9°34'	+60'	125°	9°00'	+60'	117°	9
10	13°24'	+60'	124°	12°50'	+60'	124°	12°17'	+60'	124°	11°43'	+60'	125°	11°09'	+60'	125°	10°34'	+60'	125°	10°00'	+60'	117°	10
11	14°24'	+60'	124°	13°50'	+60'	124°	13°16'	+60'	124°	12°43'	+60'	124°	12°09'	+60'	125°	11°34'	+60'	125°	11°00'	+60'	117°	11
12	15°24'	+60'	124°	14°50'	+60'	124°	14°16'	+60'	124°	13°43'	+60'	124°	13°09'	+60'	125°	12°34'	+60'	125°	12°00'	+60'	158°	12
13	16°23'	+60'	124°	15°50'	+60'	124°	15°16'	+60'	124°	14°42'	+60'	124°	14°08'	+60'	125°	13°34'	+60'	125°	13°00'	+60'	158°	13
14	17°23'	+60'	124°	16°50'	+60'	124°	16°16'	+60'	124°	15°42'	+60'	124°	15°08'	+60'	125°	14°34'	+60'	125°	14°00'	+60'	159°	14
15	18°23'	+60'	124°	17°50'	+60'	124°	17°16'	+60'	124°	16°42'	+60'	124°	16°08'	+60'	125°	15°34'	+60'	125°	15°00'	+60'	160°	15
16	19°23'	+60'	123°	18°49'	+60'	124°	18°16'	+60'	124°	17°42'	+60'	124°	17°08'	+60'	125°	16°34'	+60'	125°	16°00'	+60'	161°	16
17	20°22'	+60'	123°	19°49'	+60'	124°	19°16'	+60'	124°	18°42'	+60'	124°	18°08'	+60'	124°	17°34'	+60'	125°	17°00'	+60'	161°	17
18	21°22'	+60'	123°	20°49'	+60'	124°	20°16'	+60'	124°	19°42'	+60'	124°	19°08'	+60'	124°	18°34'	+60'	125°	18°00'	+60'	162°	18
19	22°22'	+60'	123°	21°49'	+60'	123°	21°16'	+60'	124°	20°42'	+60'	124°	20°08'	+60'	124°	19°34'	+60'	125°	19°00'	+60'	163°	19
20	23°22'	+60'	123°	22°49'	+60'	123°	22°16'	+60'	124°	21°42'	+60'	124°	21°08'	+60'	124°	20°34'	+60'	125°	20°00'	+60'	165°	20
21	24°21'	+60'	123°	23°48'	+60'	123°	23°15'	+60'	124°	22°42'	+60'	124°	22°08'	+60'	124°	21°34'	+60'	125°	21°00'	+60'	90°	21
22	25°21'	+60'	123°	24°48'	+60'	123°	24°15'	+60'	124°	23°42'	+60'	124°	23°08'	+60'	124°	22°34'	+60'	125°	22°00'	+60'	180°	22
23	26°21'	+60'	123°	25°48'	+60'	123°	25°15'	+60'	124°	24°42'	+60'	124°	24°08'	+60'	124°	23°34'	+60'	125°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

55° 305° LHA — Latitude SAME as Declination — 55° 305° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

56° 304° LHA — Latitude SAME as Declination — 56° 304° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°21'	+60'	124°	2°48'	+60'	124°	2°14'	+60'	124°	1°41'	+60'	124°	1°07'	+60'	124°	0°34'	+60'	124°	0°00'	+60'	124°	0
1	4°21'	+60'	124°	3°47'	+60'	124°	3°14'	+60'	124°	2°41'	+60'	124°	2°07'	+60'	124°	1°34'	+60'	124°	1°00'	+60'	125°	1
2	5°21'	+60'	124°	4°47'	+60'	124°	4°14'	+60'	124°	3°41'	+60'	124°	3°07'	+60'	124°	2°34'	+60'	124°	2°00'	+60'	125°	2
3	6°20'	+60'	124°	5°47'	+60'	124°	5°14'	+60'	124°	4°40'	+60'	124°	4°07'	+60'	124°	3°34'	+60'	124°	3°00'	+60'	125°	3
4	7°20'	+60'	124°	6°47'	+60'	124°	6°14'	+60'	124°	5°40'	+60'	124°	5°07'	+60'	124°	4°34'	+60'	124°	4°00'	+60'	117°	4
5	8°20'	+60'	123°	7°47'	+60'	124°	7°14'	+60'	124°	6°40'	+60'	124°	6°07'	+60'	124°	5°34'	+60'	124°	5°00'	+60'	103°	5
6	9°20'	+60'	123°	8°47'	+60'	123°	8°14'	+60'	124°	7°40'	+60'	124°	7°07'	+60'	124°	6°34'	+60'	124°	6°00'	+60'	103°	6
7	10°19'	+60'	123°	9°46'	+60'	123°	9°13'	+60'	124°	8°40'	+60'	124°	8°07'	+60'	124°	7°34'	+60'	124°	7°00'	+60'	103°	7
8	11°19'	+60'	123°	10°46'	+60'	123°	10°13'	+60'	123°	9°40'	+60'	124°	9°07'	+60'	124°	8°33'	+60'	124°	8°00'	+60'	90°	8
9	12°19'	+60'	123°	11°46'	+60'	123°	11°13'	+60'	123°	10°40'	+60'	124°	10°07'	+60'	124°	9°33'	+60'	124°	9°00'	+60'	117°	9
10	13°19'	+60'	123°	12°46'	+60'	123°	12°13'	+60'	123°	11°40'	+60'	124°	11°07'	+60'	124°	10°33'	+60'	124°	10°00'	+60'	117°	10
11	14°19'	+60'	123°	13°46'	+60'	123°	13°13'	+60'	123°	12°40'	+60'	123°	12°07'	+60'	124°	11°33'	+60'	124°	11°00'	+60'	117°	11
12	15°18'	+60'	123°	14°46'	+60'	123°	14°13'	+60'	123°	13°40'	+60'	123°	13°07'	+60'	124°	12°33'	+60'	124°	12°00'	+60'	158°	12
13	16°18'	+60'	123°	15°46'	+60'	123°	15°13'	+60'	123°	14°40'	+60'	123°	14°07'	+60'	124°	13°33'	+60'	124°	13°00'	+60'	158°	13
14	17°18'	+60'	123°	16°45'	+60'	123°	16°13'	+60'	123°	15°40'	+60'	123°	15°07'	+60'	124°	14°33'	+60'	124°	14°00'	+60'	159°	14
15	18°18'	+60'	122°	17°45'	+60'	123°	17°13'	+60'	123°	16°40'	+60'	123°	16°07'	+60'	124°	15°33'	+60'	124°	15°00'	+60'	160°	15
16	19°17'	+60'	122°	18°45'	+60'	123°	18°12'	+60'	123°	17°40'	+60'	123°	17°07'	+60'	124°	16°33'	+60'	124°	16°00'	+60'	161°	16
17	20°17'	+60'	122°	19°45'	+60'	123°	19°12'	+60'	123°	18°40'	+60'	123°	18°07'	+60'	123°	17°33'	+60'	124°	17°00'	+60'	161°	17
18	21°17'	+60'	122°	20°45'	+60'	123°	20°12'	+60'	123°	19°40'	+60'	123°	19°07'	+60'	123°	18°33'	+60'	124°	18°00'	+60'	162°	18
19	22°16'	+60'	122°	21°44'	+60'	122°	21°12'	+60'	123°	20°39'	+60'	123°	20°07'	+60'	123°	19°33'	+60'	124°	19°00'	+60'	163°	19
20	23°16'	+60'	122°	22°44'	+60'	122°	22°12'	+60'	123°	21°39'	+60'	123°	21°07'	+60'	123°	20°33'	+60'	124°	20°00'	+60'	165°	20
21	24°16'	+60'	122°	23°44'	+60'	122°	23°12'	+60'	123°	22°39'	+60'	123°	22°07'	+60'	123°	21°33'	+60'	124°	21°00'	+60'	90°	21
22	25°16'	+60'	122°	24°44'	+60'	122°	24°12'	+60'	123°	23°39'	+60'	123°	23°07'	+60'	123°	22°33'	+60'	124°	22°00'	+60'	180°	22
23	26°15'	+60'	122°	25°44'	+60'	122°	25°12'	+60'	123°	24°39'	+60'	123°	24°06'	+60'	123°	23°33'	+60'	124°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

56° 304° LHA — Latitude SAME as Declination — 56° 304° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

57° 303° LHA — Latitude SAME as Declination — 57° 303° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°16'	+60'	123°	2°43'	+60'	123°	2°11'	+60'	123°	1°38'	+60'	123°	1°05'	+60'	123°	0°33'	+60'	123°	0°00'	+60'	123°	0
1	4°16'	+60'	123°	3°43'	+60'	123°	3°11'	+60'	123°	2°38'	+60'	123°	2°05'	+60'	123°	1°33'	+60'	123°	1°00'	+60'	125°	1
2	5°15'	+60'	123°	4°43'	+60'	123°	4°10'	+60'	123°	3°38'	+60'	123°	3°05'	+60'	123°	2°33'	+60'	123°	2°00'	+60'	125°	2
3	6°15'	+60'	123°	5°43'	+60'	123°	5°10'	+60'	123°	4°38'	+60'	123°	4°05'	+60'	123°	3°33'	+60'	123°	3°00'	+60'	125°	3
4	7°15'	+60'	123°	6°43'	+60'	123°	6°10'	+60'	123°	5°38'	+60'	123°	5°05'	+60'	123°	4°33'	+60'	123°	4°00'	+60'	117°	4
5	8°15'	+60'	122°	7°42'	+60'	123°	7°10'	+60'	123°	6°38'	+60'	123°	6°05'	+60'	123°	5°33'	+60'	123°	5°00'	+60'	103°	5
6	9°14'	+60'	122°	8°42'	+60'	122°	8°10'	+60'	123°	7°38'	+60'	123°	7°05'	+60'	123°	6°33'	+60'	123°	6°00'	+60'	103°	6
7	10°14'	+60'	122°	9°42'	+60'	122°	9°10'	+60'	123°	8°38'	+60'	123°	8°05'	+60'	123°	7°33'	+60'	123°	7°00'	+60'	103°	7
8	11°14'	+60'	122°	10°42'	+60'	122°	10°10'	+60'	122°	9°38'	+60'	123°	9°05'	+60'	123°	8°33'	+60'	123°	8°00'	+60'	90°	8
9	12°14'	+60'	122°	11°42'	+60'	122°	11°10'	+60'	122°	10°37'	+60'	123°	10°05'	+60'	123°	9°33'	+60'	123°	9°00'	+60'	117°	9
10	13°13'	+60'	122°	12°42'	+60'	122°	12°10'	+60'	122°	11°37'	+60'	123°	11°05'	+60'	123°	10°33'	+60'	123°	10°00'	+60'	117°	10
11	14°13'	+60'	122°	13°41'	+60'	122°	13°09'	+60'	122°	12°37'	+60'	122°	12°05'	+60'	123°	11°33'	+60'	123°	11°00'	+60'	117°	11
12	15°13'	+60'	122°	14°41'	+60'	122°	14°09'	+60'	122°	13°37'	+60'	122°	13°05'	+60'	123°	12°33'	+60'	123°	12°00'	+60'	158°	12
13	16°13'	+60'	122°	15°41'	+60'	122°	15°09'	+60'	122°	14°37'	+60'	122°	14°05'	+60'	123°	13°33'	+60'	123°	13°00'	+60'	158°	13
14	17°12'	+60'	122°	16°41'	+60'	122°	16°09'	+60'	122°	15°37'	+60'	122°	15°05'	+60'	123°	14°33'	+60'	123°	14°00'	+60'	159°	14
15	18°12'	+60'	121°	17°41'	+60'	122°	17°09'	+60'	122°	16°37'	+60'	122°	16°05'	+60'	123°	15°33'	+60'	123°	15°00'	+60'	160°	15
16	19°12'	+60'	121°	18°41'	+60'	122°	18°09'	+60'	122°	17°37'	+60'	122°	17°05'	+60'	123°	16°33'	+60'	123°	16°00'	+60'	161°	16
17	20°12'	+60'	121°	19°40'	+60'	122°	19°09'	+60'	122°	18°37'	+60'	122°	18°05'	+60'	122°	17°33'	+60'	123°	17°00'	+60'	161°	17
18	21°11'	+60'	121°	20°40'	+60'	122°	20°09'	+60'	122°	19°37'	+60'	122°	19°05'	+60'	122°	18°33'	+60'	123°	18°00'	+60'	162°	18
19	22°11'	+60'	121°	21°40'	+60'	121°	21°09'	+60'	122°	20°37'	+60'	122°	20°05'	+60'	122°	19°33'	+60'	123°	19°00'	+60'	163°	19
20	23°11'	+60'	121°	22°40'	+60'	121°	22°08'	+60'	122°	21°37'	+60'	122°	21°05'	+60'	122°	20°33'	+60'	123°	20°00'	+60'	165°	20
21	24°11'	+60'	121°	23°40'	+60'	121°	23°08'	+60'	122°	22°37'	+60'	122°	22°05'	+60'	122°	21°33'	+60'	123°	21°00'	+60'	90°	21
22	25°10'	+60'	121°	24°39'	+60'	121°	24°08'	+60'	122°	23°37'	+60'	122°	23°05'	+60'	122°	22°33'	+60'	123°	22°00'	+60'	180°	22
23	26°10'	+60'	121°	25°39'	+60'	121°	25°08'	+60'	121°	24°37'	+60'	122°	24°05'	+60'	122°	23°33'	+60'	123°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

57° 303° LHA — Latitude SAME as Declination — 57° 303° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

58° 302° LHA — Latitude SAME as Declination — 58° 302° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°11'	+60'	122°	2°39'	+60'	122°	2°07'	+60'	122°	1°35'	+60'	122°	1°04'	+60'	122°	0°32'	+60'	122°	0°00'	+60'	122°	0
1	4°10'	+60'	122°	3°39'	+60'	122°	3°07'	+60'	122°	2°35'	+60'	122°	2°04'	+60'	122°	1°32'	+60'	122°	1°00'	+60'	121°	1
2	5°10'	+60'	122°	4°39'	+60'	122°	4°07'	+60'	122°	3°35'	+60'	122°	3°04'	+60'	122°	2°32'	+60'	122°	2°00'	+60'	125°	2
3	6°10'	+60'	122°	5°38'	+60'	122°	5°07'	+60'	122°	4°35'	+60'	122°	4°04'	+60'	122°	3°32'	+60'	122°	3°00'	+60'	125°	3
4	7°10'	+60'	122°	6°38'	+60'	122°	6°07'	+60'	122°	5°35'	+60'	122°	5°03'	+60'	122°	4°32'	+60'	122°	4°00'	+60'	117°	4
5	8°09'	+60'	121°	7°38'	+60'	122°	7°07'	+60'	122°	6°35'	+60'	122°	6°03'	+60'	122°	5°32'	+60'	122°	5°00'	+60'	103°	5
6	9°09'	+60'	121°	8°38'	+60'	121°	8°06'	+60'	122°	7°35'	+60'	122°	7°03'	+60'	122°	6°32'	+60'	122°	6°00'	+60'	103°	6
7	10°09'	+60'	121°	9°38'	+60'	121°	9°06'	+60'	122°	8°35'	+60'	122°	8°03'	+60'	122°	7°32'	+60'	122°	7°00'	+60'	103°	7
8	11°09'	+60'	121°	10°37'	+60'	121°	10°06'	+60'	121°	9°35'	+60'	122°	9°03'	+60'	122°	8°32'	+60'	122°	8°00'	+60'	90°	8
9	12°08'	+60'	121°	11°37'	+60'	121°	11°06'	+60'	121°	10°35'	+60'	122°	10°03'	+60'	122°	9°32'	+60'	122°	9°00'	+60'	117°	9
10	13°08'	+60'	121°	12°37'	+60'	121°	12°06'	+60'	121°	11°35'	+60'	122°	11°03'	+60'	122°	10°32'	+60'	122°	10°00'	+60'	117°	10
11	14°08'	+60'	121°	13°37'	+60'	121°	13°06'	+60'	121°	12°35'	+60'	121°	12°03'	+60'	122°	11°32'	+60'	122°	11°00'	+60'	117°	11
12	15°08'	+60'	121°	14°37'	+60'	121°	14°06'	+60'	121°	13°35'	+60'	121°	13°03'	+60'	122°	12°32'	+60'	122°	12°00'	+60'	158°	12
13	16°07'	+60'	121°	15°37'	+60'	121°	15°06'	+60'	121°	14°35'	+60'	121°	14°03'	+60'	122°	13°32'	+60'	122°	13°00'	+60'	158°	13
14	17°07'	+60'	121°	16°36'	+60'	121°	16°06'	+60'	121°	15°35'	+60'	121°	15°03'	+60'	122°	14°32'	+60'	122°	14°00'	+60'	159°	14
15	18°07'	+60'	120°	17°36'	+60'	121°	17°05'	+60'	121°	16°34'	+60'	121°	16°03'	+60'	122°	15°32'	+60'	122°	15°00'	+60'	160°	15
16	19°07'	+60'	120°	18°36'	+60'	121°	18°05'	+60'	121°	17°34'	+60'	121°	17°03'	+60'	121°	16°32'	+60'	122°	16°00'	+60'	161°	16
17	20°06'	+60'	120°	19°36'	+60'	121°	19°05'	+60'	121°	18°34'	+60'	121°	18°03'	+60'	121°	17°32'	+60'	122°	17°00'	+60'	161°	17
18	21°06'	+60'	120°	20°36'	+60'	121°	20°05'	+60'	121°	19°34'	+60'	121°	19°03'	+60'	121°	18°32'	+60'	122°	18°00'	+60'	162°	18
19	22°06'	+60'	120°	21°36'	+60'	120°	21°05'	+60'	121°	20°34'	+60'	121°	20°03'	+60'	121°	19°32'	+60'	122°	19°00'	+60'	163°	19
20	23°05'	+60'	120°	22°35'	+60'	120°	22°05'	+60'	121°	21°34'	+60'	121°	21°03'	+60'	121°	20°32'	+60'	122°	20°00'	+60'	165°	20
21	24°05'	+60'	120°	23°35'	+60'	120°	23°05'	+60'	121°	22°34'	+60'	121°	22°03'	+60'	121°	21°32'	+60'	122°	21°00'	+60'	90°	21
22	25°05'	+60'	120°	24°35'	+60'	120°	24°05'	+60'	121°	23°34'	+60'	121°	23°03'	+60'	121°	22°32'	+60'	122°	22°00'	+60'	180°	22
23	26°05'	+60'	120°	25°35'	+60'	120°	25°05'	+60'	120°	24°34'	+60'	121°	24°03'	+60'	121°	23°32'	+60'	122°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

58° 302° LHA — Latitude SAME as Declination — 58° 302° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

59° 301° LHA — Latitude SAME as Declination — 59° 301° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°05'	+60'	121°	2°34'	+60'	121°	2°04'	+60'	121°	1°33'	+60'	121°	1°02'	+60'	121°	0°31'	+60'	121°	0°00'	+60'	121°	0
1	4°05'	+60'	121°	3°34'	+60'	121°	3°03'	+60'	121°	2°33'	+60'	121°	2°02'	+60'	121°	1°31'	+60'	121°	1°00'	+60'	121°	1
2	5°05'	+60'	121°	4°34'	+60'	121°	4°03'	+60'	121°	3°33'	+60'	121°	3°02'	+60'	121°	2°31'	+60'	121°	2°00'	+60'	125°	2
3	6°04'	+60'	121°	5°34'	+60'	121°	5°03'	+60'	121°	4°32'	+60'	121°	4°02'	+60'	121°	3°31'	+60'	121°	3°00'	+60'	125°	3
4	7°04'	+60'	120°	6°34'	+60'	121°	6°03'	+60'	121°	5°32'	+60'	121°	5°02'	+60'	121°	4°31'	+60'	121°	4°00'	+60'	117°	4
5	8°04'	+60'	120°	7°34'	+60'	121°	7°03'	+60'	121°	6°32'	+60'	121°	6°02'	+60'	121°	5°31'	+60'	121°	5°00'	+60'	103°	5
6	9°04'	+60'	120°	8°33'	+60'	120°	8°03'	+60'	121°	7°32'	+60'	121°	7°02'	+60'	121°	6°31'	+60'	121°	6°00'	+60'	103°	6
7	10°03'	+60'	120°	9°33'	+60'	120°	9°03'	+60'	121°	8°32'	+60'	121°	8°02'	+60'	121°	7°31'	+60'	121°	7°00'	+60'	103°	7
8	11°03'	+60'	120°	10°33'	+60'	120°	10°03'	+60'	120°	9°32'	+60'	121°	9°02'	+60'	121°	8°31'	+60'	121°	8°00'	+60'	90°	8
9	12°03'	+60'	120°	11°33'	+60'	120°	11°03'	+60'	120°	10°32'	+60'	121°	10°02'	+60'	121°	9°31'	+60'	121°	9°00'	+60'	117°	9
10	13°03'	+60'	120°	12°33'	+60'	120°	12°02'	+60'	120°	11°32'	+60'	121°	11°02'	+60'	121°	10°31'	+60'	121°	10°00'	+60'	117°	10
11	14°02'	+60'	120°	13°32'	+60'	120°	13°02'	+60'	120°	12°32'	+60'	120°	12°01'	+60'	121°	11°31'	+60'	121°	11°00'	+60'	117°	11
12	15°02'	+60'	120°	14°32'	+60'	120°	14°02'	+60'	120°	13°32'	+60'	120°	13°01'	+60'	121°	12°31'	+60'	121°	12°00'	+60'	158°	12
13	16°02'	+60'	120°	15°32'	+60'	120°	15°02'	+60'	120°	14°32'	+60'	120°	14°01'	+60'	121°	13°31'	+60'	121°	13°00'	+60'	158°	13
14	17°02'	+60'	120°	16°32'	+60'	120°	16°02'	+60'	120°	15°32'	+60'	120°	15°01'	+60'	121°	14°31'	+60'	121°	14°00'	+60'	159°	14
15	18°01'	+60'	119°	17°32'	+60'	120°	17°02'	+60'	120°	16°32'	+60'	120°	16°01'	+60'	121°	15°31'	+60'	121°	15°00'	+60'	160°	15
16	19°01'	+60'	119°	18°32'	+60'	120°	18°02'	+60'	120°	17°32'	+60'	120°	17°01'	+60'	120°	16°31'	+60'	121°	16°00'	+60'	161°	16
17	20°01'	+60'	119°	19°31'	+60'	120°	19°02'	+60'	120°	18°32'	+60'	120°	18°01'	+60'	120°	17°31'	+60'	121°	17°00'	+60'	161°	17
18	21°01'	+60'	119°	20°31'	+60'	119°	20°02'	+60'	120°	19°32'	+60'	120°	19°01'	+60'	120°	18°31'	+60'	121°	18°00'	+60'	162°	18
19	22°00'	+60'	119°	21°31'	+60'	119°	21°01'	+60'	120°	20°31'	+60'	120°	20°01'	+60'	120°	19°31'	+60'	121°	19°00'	+60'	163°	19
20	23°00'	+60'	119°	22°31'	+60'	119°	22°01'	+60'	120°	21°31'	+60'	120°	21°01'	+60'	120°	20°31'	+60'	121°	20°00'	+60'	165°	20
21	24°00'	+60'	119°	23°31'	+60'	119°	23°01'	+60'	120°	22°31'	+60'	120°	22°01'	+60'	120°	21°31'	+60'	121°	21°00'	+60'	90°	21
22	24°59'	+60'	119°	24°30'	+60'	119°	24°01'	+60'	120°	23°31'	+60'	120°	23°01'	+60'	120°	22°31'	+60'	121°	22°00'	+60'	180°	22
23	25°59'	+60'	119°	25°30'	+60'	119°	25°01'	+60'	119°	24°31'	+60'	120°	24°01'	+60'	120°	23°31'	+60'	121°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

59° 301° LHA — Latitude SAME as Declination — 59° 301° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

60° 300° LHA — Latitude SAME as Declination — 60° 300° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°00'	+60'	120°	2°30'	+60'	120°	2°00'	+60'	120°	1°30'	+60'	120°	1°00'	+60'	120°	0°30'	+60'	120°	0°00'	+60'	120°	0
1	4°00'	+60'	120°	3°30'	+60'	120°	3°00'	+60'	120°	2°30'	+60'	120°	2°00'	+60'	120°	1°30'	+60'	120°	1°00'	+60'	121°	1
2	4°59'	+60'	120°	4°30'	+60'	120°	4°00'	+60'	120°	3°30'	+60'	120°	3°00'	+60'	120°	2°30'	+60'	120°	2°00'	+60'	117°	2
3	5°59'	+60'	120°	5°29'	+60'	120°	5°00'	+60'	120°	4°30'	+60'	120°	4°00'	+60'	120°	3°30'	+60'	120°	3°00'	+60'	117°	3
4	6°59'	+60'	119°	6°29'	+60'	120°	5°59'	+60'	120°	5°30'	+60'	120°	5°00'	+60'	120°	4°30'	+60'	120°	4°00'	+60'	117°	4
5	7°59'	+60'	119°	7°29'	+60'	120°	6°59'	+60'	120°	6°30'	+60'	120°	6°00'	+60'	120°	5°30'	+60'	120°	5°00'	+60'	103°	5
6	8°58'	+60'	119°	8°29'	+60'	119°	7°59'	+60'	120°	7°30'	+60'	120°	7°00'	+60'	120°	6°30'	+60'	120°	6°00'	+60'	103°	6
7	9°58'	+60'	119°	9°29'	+60'	119°	8°59'	+60'	120°	8°30'	+60'	120°	8°00'	+60'	120°	7°30'	+60'	120°	7°00'	+60'	103°	7
8	10°58'	+60'	119°	10°28'	+60'	119°	9°59'	+60'	119°	9°29'	+60'	120°	9°00'	+60'	120°	8°30'	+60'	120°	8°00'	+60'	90°	8
9	11°57'	+60'	119°	11°28'	+60'	119°	10°59'	+60'	119°	10°29'	+60'	120°	10°00'	+60'	120°	9°30'	+60'	120°	9°00'	+60'	117°	9
10	12°57'	+60'	119°	12°28'	+60'	119°	11°59'	+60'	119°	11°29'	+60'	120°	11°00'	+60'	120°	10°30'	+60'	120°	10°00'	+60'	117°	10
11	13°57'	+60'	119°	13°28'	+60'	119°	12°59'	+60'	119°	12°29'	+60'	119°	12°00'	+60'	120°	11°30'	+60'	120°	11°00'	+60'	117°	11
12	14°57'	+60'	119°	14°28'	+60'	119°	13°59'	+60'	119°	13°29'	+60'	119°	13°00'	+60'	120°	12°30'	+60'	120°	12°00'	+60'	158°	12
13	15°56'	+60'	119°	15°28'	+60'	119°	14°58'	+60'	119°	14°29'	+60'	119°	14°00'	+60'	120°	13°30'	+60'	120°	13°00'	+60'	158°	13
14	16°56'	+60'	119°	16°27'	+60'	119°	15°58'	+60'	119°	15°29'	+60'	119°	15°00'	+60'	120°	14°30'	+60'	120°	14°00'	+60'	159°	14
15	17°56'	+60'	118°	17°27'	+60'	119°	16°58'	+60'	119°	16°29'	+60'	119°	16°00'	+60'	120°	15°30'	+60'	120°	15°00'	+60'	160°	15
16	18°56'	+60'	118°	18°27'	+60'	119°	17°58'	+60'	119°	17°29'	+60'	119°	17°00'	+60'	119°	16°30'	+60'	120°	16°00'	+60'	161°	16
17	19°55'	+60'	118°	19°27'	+60'	119°	18°58'	+60'	119°	18°29'	+60'	119°	18°00'	+60'	119°	17°30'	+60'	120°	17°00'	+60'	161°	17
18	20°55'	+60'	118°	20°27'	+60'	118°	19°58'	+60'	119°	19°29'	+60'	119°	18°59'	+60'	119°	18°30'	+60'	120°	18°00'	+60'	162°	18
19	21°55'	+60'	118°	21°26'	+60'	118°	20°58'	+60'	119°	20°29'	+60'	119°	19°59'	+60'	119°	19°30'	+60'	120°	19°00'	+60'	163°	19
20	22°55'	+60'	118°	22°26'	+60'	118°	21°58'	+60'	119°	21°29'	+60'	119°	20°59'	+60'	119°	20°30'	+60'	120°	20°00'	+60'	165°	20
21	23°54'	+60'	118°	23°26'	+60'	118°	22°57'	+60'	119°	22°29'	+60'	119°	21°59'	+60'	119°	21°30'	+60'	120°	21°00'	+60'	90°	21
22	24°54'	+60'	118°	24°26'	+60'	118°	23°57'	+60'	119°	23°29'	+60'	119°	22°59'	+60'	119°	22°30'	+60'	120°	22°00'	+60'	180°	22
23	25°54'	+60'	118°	25°26'	+60'	118°	24°57'	+60'	118°	24°28'	+60'	119°	23°59'	+60'	119°	23°30'	+60'	120°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

60° 300° LHA — Latitude SAME as Declination — 60° 300° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

61° 299° LHA — Latitude SAME as Declination — 61° 299° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°54'	+60'	119°	2°25'	+60'	119°	1°56'	+60'	119°	1°27'	+60'	119°	0°58'	+60'	119°	0°29'	+60'	119°	0°00'	+60'	119°	0
1	3°54'	+60'	119°	3°25'	+60'	119°	2°56'	+60'	119°	2°27'	+60'	119°	1°58'	+60'	119°	1°29'	+60'	119°	1°00'	+60'	121°	1
2	4°54'	+60'	119°	4°25'	+60'	119°	3°56'	+60'	119°	3°27'	+60'	119°	2°58'	+60'	119°	2°29'	+60'	119°	2°00'	+60'	117°	2
3	5°54'	+60'	119°	5°25'	+60'	119°	4°56'	+60'	119°	4°27'	+60'	119°	3°58'	+60'	119°	3°29'	+60'	119°	3°00'	+60'	117°	3
4	6°53'	+60'	118°	6°25'	+60'	119°	5°56'	+60'	119°	5°27'	+60'	119°	4°58'	+60'	119°	4°29'	+60'	119°	4°00'	+60'	117°	4
5	7°53'	+60'	118°	7°24'	+60'	119°	6°56'	+60'	119°	6°27'	+60'	119°	5°58'	+60'	119°	5°29'	+60'	119°	5°00'	+60'	103°	5
6	8°53'	+60'	118°	8°24'	+60'	118°	7°56'	+60'	119°	7°27'	+60'	119°	6°58'	+60'	119°	6°29'	+60'	119°	6°00'	+60'	103°	6
7	9°53'	+60'	118°	9°24'	+60'	118°	8°55'	+60'	119°	8°27'	+60'	119°	7°58'	+60'	119°	7°29'	+60'	119°	7°00'	+60'	103°	7
8	10°52'	+60'	118°	10°24'	+60'	118°	9°55'	+60'	118°	9°27'	+60'	119°	8°58'	+60'	119°	8°29'	+60'	119°	8°00'	+60'	90°	8
9	11°52'	+60'	118°	11°24'	+60'	118°	10°55'	+60'	118°	10°27'	+60'	119°	9°58'	+60'	119°	9°29'	+60'	119°	9°00'	+60'	117°	9
10	12°52'	+60'	118°	12°24'	+60'	118°	11°55'	+60'	118°	11°27'	+60'	119°	10°58'	+60'	119°	10°29'	+60'	119°	10°00'	+60'	117°	10
11	13°51'	+60'	118°	13°23'	+60'	118°	12°55'	+60'	118°	12°27'	+60'	118°	11°58'	+60'	119°	11°29'	+60'	119°	11°00'	+60'	117°	11
12	14°51'	+60'	118°	14°23'	+60'	118°	13°55'	+60'	118°	13°26'	+60'	118°	12°58'	+60'	119°	12°29'	+60'	119°	12°00'	+60'	158°	12
13	15°51'	+60'	118°	15°23'	+60'	118°	14°55'	+60'	118°	14°26'	+60'	118°	13°58'	+60'	119°	13°29'	+60'	119°	13°00'	+60'	158°	13
14	16°51'	+60'	118°	16°23'	+60'	118°	15°55'	+60'	118°	15°26'	+60'	118°	14°58'	+60'	119°	14°29'	+60'	119°	14°00'	+60'	159°	14
15	17°50'	+60'	117°	17°23'	+60'	118°	16°55'	+60'	118°	16°26'	+60'	118°	15°58'	+60'	119°	15°29'	+60'	119°	15°00'	+60'	160°	15
16	18°50'	+60'	117°	18°22'	+60'	118°	17°54'	+60'	118°	17°26'	+60'	118°	16°58'	+60'	118°	16°29'	+60'	119°	16°00'	+60'	161°	16
17	19°50'	+60'	117°	19°22'	+60'	118°	18°54'	+60'	118°	18°26'	+60'	118°	17°58'	+60'	118°	17°29'	+60'	119°	17°00'	+60'	161°	17
18	20°50'	+60'	117°	20°22'	+60'	117°	19°54'	+60'	118°	19°26'	+60'	118°	18°58'	+60'	118°	18°29'	+60'	119°	18°00'	+60'	162°	18
19	21°49'	+60'	117°	21°22'	+60'	117°	20°54'	+60'	118°	20°26'	+60'	118°	19°58'	+60'	118°	19°29'	+60'	119°	19°00'	+60'	163°	19
20	22°49'	+60'	117°	22°22'	+60'	117°	21°54'	+60'	118°	21°26'	+60'	118°	20°58'	+60'	118°	20°29'	+60'	119°	20°00'	+60'	165°	20
21	23°49'	+60'	117°	23°21'	+60'	117°	22°54'	+60'	118°	22°26'	+60'	118°	21°58'	+60'	118°	21°29'	+60'	119°	21°00'	+60'	90°	21
22	24°48'	+60'	117°	24°21'	+60'	117°	23°54'	+60'	118°	23°26'	+60'	118°	22°58'	+60'	118°	22°29'	+60'	119°	22°00'	+60'	90°	22
23	25°48'	+60'	117°	25°21'	+60'	117°	24°54'	+60'	117°	24°26'	+60'	118°	23°57'	+60'	118°	23°29'	+60'	119°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

61° 299° LHA — Latitude SAME as Declination — 61° 299° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

62° 298° LHA — Latitude SAME as Declination — 62° 298° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°49'	+60'	118°	2°21'	+60'	118°	1°53'	+60'	118°	1°24'	+60'	118°	0°56'	+60'	118°	0°28'	+60'	118°	0°00'	+60'	118°	0
1	3°49'	+60'	118°	3°21'	+60'	118°	2°52'	+60'	118°	2°24'	+60'	118°	1°56'	+60'	118°	1°28'	+60'	118°	1°00'	+60'	117°	1
2	4°48'	+60'	118°	4°20'	+60'	118°	3°52'	+60'	118°	3°24'	+60'	118°	2°56'	+60'	118°	2°28'	+60'	118°	2°00'	+60'	117°	2
3	5°48'	+60'	118°	5°20'	+60'	118°	4°52'	+60'	118°	4°24'	+60'	118°	3°56'	+60'	118°	3°28'	+60'	118°	3°00'	+60'	117°	3
4	6°48'	+60'	117°	6°20'	+60'	118°	5°52'	+60'	118°	5°24'	+60'	118°	4°56'	+60'	118°	4°28'	+60'	118°	4°00'	+60'	117°	4
5	7°47'	+60'	117°	7°20'	+60'	118°	6°52'	+60'	118°	6°24'	+60'	118°	5°56'	+60'	118°	5°28'	+60'	118°	5°00'	+60'	103°	5
6	8°47'	+60'	117°	8°20'	+60'	117°	7°52'	+60'	118°	7°24'	+60'	118°	6°56'	+60'	118°	6°28'	+60'	118°	6°00'	+60'	103°	6
7	9°47'	+60'	117°	9°19'	+60'	117°	8°52'	+60'	118°	8°24'	+60'	118°	7°56'	+60'	118°	7°28'	+60'	118°	7°00'	+60'	103°	7
8	10°47'	+60'	117°	10°19'	+60'	117°	9°52'	+60'	117°	9°24'	+60'	118°	8°56'	+60'	118°	8°28'	+60'	118°	8°00'	+60'	90°	8
9	11°46'	+60'	117°	11°19'	+60'	117°	10°52'	+60'	117°	10°24'	+60'	118°	9°56'	+60'	118°	9°28'	+60'	118°	9°00'	+60'	117°	9
10	12°46'	+60'	117°	12°19'	+60'	117°	11°51'	+60'	117°	11°24'	+60'	117°	10°56'	+60'	118°	10°28'	+60'	118°	10°00'	+60'	117°	10
11	13°46'	+60'	117°	13°19'	+60'	117°	12°51'	+60'	117°	12°24'	+60'	117°	11°56'	+60'	118°	11°28'	+60'	118°	11°00'	+60'	117°	11
12	14°46'	+60'	117°	14°19'	+60'	117°	13°51'	+60'	117°	13°24'	+60'	117°	12°56'	+60'	118°	12°28'	+60'	118°	12°00'	+60'	158°	12
13	15°45'	+60'	117°	15°18'	+60'	117°	14°51'	+60'	117°	14°24'	+60'	117°	13°56'	+60'	118°	13°28'	+60'	118°	13°00'	+60'	158°	13
14	16°45'	+60'	117°	16°18'	+60'	117°	15°51'	+60'	117°	15°24'	+60'	117°	14°56'	+60'	118°	14°28'	+60'	118°	14°00'	+60'	159°	14
15	17°45'	+60'	116°	17°18'	+60'	117°	16°51'	+60'	117°	16°23'	+60'	117°	15°56'	+60'	118°	15°28'	+60'	118°	15°00'	+60'	160°	15
16	18°44'	+60'	116°	18°18'	+60'	117°	17°51'	+60'	117°	17°23'	+60'	117°	16°56'	+60'	117°	16°28'	+60'	118°	16°00'	+60'	90°	16
17	19°44'	+60'	116°	19°18'	+60'	117°	18°51'	+60'	117°	18°23'	+60'	117°	17°56'	+60'	117°	17°28'	+60'	118°	17°00'	+60'	90°	17
18	20°44'	+60'	116°	20°17'	+60'	116°	19°50'	+60'	117°	19°23'	+60'	117°	18°56'	+60'	117°	18°28'	+60'	118°	18°00'	+60'	90°	18
19	21°44'	+60'	116°	21°17'	+60'	116°	20°50'	+60'	117°	20°23'	+60'	117°	19°56'	+60'	117°	19°28'	+60'	118°	19°00'	+60'	90°	19
20	22°43'	+60'	116°	22°17'	+60'	116°	21°50'	+60'	117°	21°23'	+60'	117°	20°56'	+60'	117°	20°28'	+60'	118°	20°00'	+60'	90°	20
21	23°43'	+60'	116°	23°17'	+60'	116°	22°50'	+60'	117°	22°23'	+60'	117°	21°56'	+60'	117°	21°28'	+60'	118°	21°00'	+60'	90°	21
22	24°43'	+60'	116°	24°17'	+60'	116°	23°50'	+60'	116°	23°23'	+60'	117°	22°56'	+60'	117°	22°28'	+60'	118°	22°00'	+60'	90°	22
23	25°42'	+60'	116°	25°16'	+60'	116°	24°50'	+60'	116°	24°23'	+60'	117°	23°56'	+60'	117°	23°28'	+60'	118°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

62° 298° LHA — Latitude SAME as Declination — 62° 298° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

63° 297° LHA — Latitude SAME as Declination — 63° 297° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°43'	+60'	117°	2°16'	+60'	117°	1°49'	+60'	117°	1°22'	+60'	117°	0°54'	+60'	117°	0°27'	+60'	117°	0°00'	+60'	117°	0
1	3°43'	+60'	117°	3°16'	+60'	117°	2°49'	+60'	117°	2°22'	+60'	117°	1°54'	+60'	117°	1°27'	+60'	117°	1°00'	+60'	117°	1
2	4°43'	+60'	117°	4°16'	+60'	117°	3°49'	+60'	117°	3°22'	+60'	117°	2°54'	+60'	117°	2°27'	+60'	117°	2°00'	+60'	117°	2
3	5°42'	+60'	117°	5°16'	+60'	117°	4°49'	+60'	117°	4°21'	+60'	117°	3°54'	+60'	117°	3°27'	+60'	117°	3°00'	+60'	117°	3
4	6°42'	+60'	116°	6°15'	+60'	117°	5°48'	+60'	117°	5°21'	+60'	117°	4°54'	+60'	117°	4°27'	+60'	117°	4°00'	+60'	117°	4
5	7°42'	+60'	116°	7°15'	+60'	117°	6°48'	+60'	117°	6°21'	+60'	117°	5°54'	+60'	117°	5°27'	+60'	117°	5°00'	+60'	103°	5
6	8°42'	+60'	116°	8°15'	+60'	116°	7°48'	+60'	117°	7°21'	+60'	117°	6°54'	+60'	117°	6°27'	+60'	117°	6°00'	+60'	103°	6
7	9°41'	+60'	116°	9°15'	+60'	116°	8°48'	+60'	117°	8°21'	+60'	117°	7°54'	+60'	117°	7°27'	+60'	117°	7°00'	+60'	103°	7
8	10°41'	+60'	116°	10°15'	+60'	116°	9°48'	+60'	116°	9°21'	+60'	117°	8°54'	+60'	117°	8°27'	+60'	117°	8°00'	+60'	90°	8
9	11°41'	+60'	116°	11°14'	+60'	116°	10°48'	+60'	116°	10°21'	+60'	117°	9°54'	+60'	117°	9°27'	+60'	117°	9°00'	+60'	117°	9
10	12°41'	+60'	116°	12°14'	+60'	116°	11°48'	+60'	116°	11°21'	+60'	116°	10°54'	+60'	117°	10°27'	+60'	117°	10°00'	+60'	117°	10
11	13°40'	+60'	116°	13°14'	+60'	116°	12°48'	+60'	116°	12°21'	+60'	116°	11°54'	+60'	117°	11°27'	+60'	117°	11°00'	+60'	117°	11
12	14°40'	+60'	116°	14°14'	+60'	116°	13°47'	+60'	116°	13°21'	+60'	116°	12°54'	+60'	117°	12°27'	+60'	117°	12°00'	+60'	158°	12
13	15°40'	+60'	116°	15°14'	+60'	116°	14°47'	+60'	116°	14°21'	+60'	116°	13°54'	+60'	117°	13°27'	+60'	117°	13°00'	+60'	158°	13
14	16°39'	+60'	116°	16°13'	+60'	116°	15°47'	+60'	116°	15°21'	+60'	116°	14°54'	+60'	117°	14°27'	+60'	117°	14°00'	+60'	159°	14
15	17°39'	+60'	115°	17°13'	+60'	116°	16°47'	+60'	116°	16°21'	+60'	116°	15°54'	+60'	117°	15°27'	+60'	117°	15°00'	+60'	90°	15
16	18°39'	+60'	115°	18°13'	+60'	116°	17°47'	+60'	116°	17°21'	+60'	116°	16°54'	+60'	116°	16°27'	+60'	117°	16°00'	+60'	90°	16
17	19°39'	+60'	115°	19°13'	+60'	116°	18°47'	+60'	116°	18°21'	+60'	116°	17°54'	+60'	116°	17°27'	+60'	117°	17°00'	+60'	90°	17
18	20°38'	+60'	115°	20°13'	+60'	115°	19°47'	+60'	116°	19°20'	+60'	116°	18°54'	+60'	116°	18°27'	+60'	117°	18°00'	+60'	90°	18
19	21°38'	+60'	115°	21°12'	+60'	115°	20°47'	+60'	116°	20°20'	+60'	116°	19°54'	+60'	116°	19°27'	+60'	117°	19°00'	+60'	90°	19
20	22°38'	+60'	115°	22°12'	+60'	115°	21°46'	+60'	116°	21°20'	+60'	116°	20°54'	+60'	116°	20°27'	+60'	117°	20°00'	+60'	90°	20
21	23°37'	+60'	115°	23°12'	+60'	115°	22°46'	+60'	116°	22°20'	+60'	116°	21°54'	+60'	116°	21°27'	+60'	117°	21°00'	+60'	90°	21
22	24°37'	+60'	115°	24°12'	+60'	115°	23°46'	+60'	115°	23°20'	+60'	116°	22°54'	+60'	116°	22°27'	+60'	117°	22°00'	+60'	90°	22
23	25°37'	+60'	115°	25°12'	+60'	115°	24°46'	+60'	115°	24°20'	+60'	116°	23°54'	+60'	116°	23°27'	+60'	117°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

63° 297° LHA — Latitude SAME as Declination — 63° 297° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

64° 296° LHA — Latitude SAME as Declination — 64° 296° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°38'	+60'	116°	2°11'	+60'	116°	1°45'	+60'	116°	1°19'	+60'	116°	0°53'	+60'	116°	0°26'	+60'	116°	0°00'	+60'	116°	0
1	3°37'	+60'	116°	3°11'	+60'	116°	2°45'	+60'	116°	2°19'	+60'	116°	1°53'	+60'	116°	1°26'	+60'	116°	1°00'	+60'	117°	1
2	4°37'	+60'	116°	4°11'	+60'	116°	3°45'	+60'	116°	3°19'	+60'	116°	2°53'	+60'	116°	2°26'	+60'	116°	2°00'	+60'	117°	2
3	5°37'	+60'	116°	5°11'	+60'	116°	4°45'	+60'	116°	4°19'	+60'	116°	3°53'	+60'	116°	3°26'	+60'	116°	3°00'	+60'	117°	3
4	6°37'	+60'	115°	6°11'	+60'	116°	5°45'	+60'	116°	5°19'	+60'	116°	4°52'	+60'	116°	4°26'	+60'	116°	4°00'	+60'	117°	4
5	7°36'	+60'	115°	7°10'	+60'	116°	6°45'	+60'	116°	6°19'	+60'	116°	5°52'	+60'	116°	5°26'	+60'	116°	5°00'	+60'	103°	5
6	8°36'	+60'	115°	8°10'	+60'	115°	7°44'	+60'	116°	7°18'	+60'	116°	6°52'	+60'	116°	6°26'	+60'	116°	6°00'	+60'	103°	6
7	9°36'	+60'	115°	9°10'	+60'	115°	8°44'	+60'	116°	8°18'	+60'	116°	7°52'	+60'	116°	7°26'	+60'	116°	7°00'	+60'	103°	7
8	10°35'	+60'	115°	10°10'	+60'	115°	9°44'	+60'	115°	9°18'	+60'	116°	8°52'	+60'	116°	8°26'	+60'	116°	8°00'	+60'	90°	8
9	11°35'	+60'	115°	11°10'	+60'	115°	10°44'	+60'	115°	10°18'	+60'	116°	9°52'	+60'	116°	9°26'	+60'	116°	9°00'	+60'	117°	9
10	12°35'	+60'	115°	12°09'	+60'	115°	11°44'	+60'	115°	11°18'	+60'	115°	10°52'	+60'	116°	10°26'	+60'	116°	10°00'	+60'	117°	10
11	13°35'	+60'	115°	13°09'	+60'	115°	12°44'	+60'	115°	12°18'	+60'	115°	11°52'	+60'	116°	11°26'	+60'	116°	11°00'	+60'	117°	11
12	14°34'	+60'	115°	14°09'	+60'	115°	13°44'	+60'	115°	13°18'	+60'	115°	12°52'	+60'	116°	12°26'	+60'	116°	12°00'	+60'	158°	12
13	15°34'	+60'	115°	15°09'	+60'	115°	14°44'	+60'	115°	14°18'	+60'	115°	13°52'	+60'	116°	13°26'	+60'	116°	13°00'	+60'	158°	13
14	16°34'	+60'	115°	16°09'	+60'	115°	15°43'	+60'	115°	15°18'	+60'	115°	14°52'	+60'	116°	14°26'	+60'	116°	14°00'	+60'	159°	14
15	17°33'	+60'	114°	17°09'	+60'	115°	16°43'	+60'	115°	16°18'	+60'	115°	15°52'	+60'	116°	15°26'	+60'	116°	15°00'	+60'	90°	15
16	18°33'	+60'	114°	18°08'	+60'	115°	17°43'	+60'	115°	17°18'	+60'	115°	16°52'	+60'	115°	16°26'	+60'	116°	16°00'	+60'	90°	16
17	19°33'	+60'	114°	19°08'	+60'	115°	18°43'	+60'	115°	18°18'	+60'	115°	17°52'	+60'	115°	17°26'	+60'	116°	17°00'	+60'	90°	17
18	20°33'	+60'	114°	20°08'	+60'	114°	19°43'	+60'	115°	19°18'	+60'	115°	18°52'	+60'	115°	18°26'	+60'	116°	18°00'	+60'	90°	18
19	21°32'	+60'	114°	21°08'	+60'	114°	20°43'	+60'	115°	20°18'	+60'	115°	19°52'	+60'	115°	19°26'	+60'	116°	19°00'	+60'	90°	19
20	22°32'	+60'	114°	22°07'	+60'	114°	21°43'	+60'	115°	21°17'	+60'	115°	20°52'	+60'	115°	20°26'	+60'	116°	20°00'	+60'	90°	20
21	23°32'	+60'	114°	23°07'	+60'	114°	22°43'	+60'	115°	22°17'	+60'	115°	21°52'	+60'	115°	21°26'	+60'	116°	21°00'	+60'	90°	21
22	24°31'	+60'	114°	24°07'	+60'	114°	23°42'	+60'	114°	23°17'	+60'	115°	22°52'	+60'	115°	22°26'	+60'	116°	22°00'	+60'	90°	22
23	25°31'	+60'	114°	25°07'	+60'	114°	24°42'	+60'	114°	24°17'	+60'	115°	23°52'	+60'	115°	23°26'	+60'	116°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

64° 296° LHA — Latitude SAME as Declination — 64° 296° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

65° 295° LHA — Latitude SAME as Declination — 65° 295° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°32'	+60'	115°	2°07'	+60'	115°	1°41'	+60'	115°	1°16'	+60'	115°	0°51'	+60'	115°	0°25'	+60'	115°	0°00'	+60'	115°	0
1	3°32'	+60'	115°	3°06'	+60'	115°	2°41'	+60'	115°	2°16'	+60'	115°	1°51'	+60'	115°	1°25'	+60'	115°	1°00'	+60'	113°	1
2	4°31'	+60'	115°	4°06'	+60'	115°	3°41'	+60'	115°	3°16'	+60'	115°	2°51'	+60'	115°	2°25'	+60'	115°	2°00'	+60'	117°	2
3	5°31'	+60'	115°	5°06'	+60'	115°	4°41'	+60'	115°	4°16'	+60'	115°	3°51'	+60'	115°	3°25'	+60'	115°	3°00'	+60'	117°	3
4	6°31'	+60'	114°	6°06'	+60'	115°	5°41'	+60'	115°	5°16'	+60'	115°	4°51'	+60'	115°	4°25'	+60'	115°	4°00'	+60'	117°	4
5	7°31'	+60'	114°	7°06'	+60'	115°	6°41'	+60'	115°	6°16'	+60'	115°	5°51'	+60'	115°	5°25'	+60'	115°	5°00'	+60'	103°	5
6	8°30'	+60'	114°	8°06'	+60'	114°	7°41'	+60'	115°	7°16'	+60'	115°	6°51'	+60'	115°	6°25'	+60'	115°	6°00'	+60'	103°	6
7	9°30'	+60'	114°	9°05'	+60'	114°	8°41'	+60'	114°	8°16'	+60'	115°	7°50'	+60'	115°	7°25'	+60'	115°	7°00'	+60'	103°	7
8	10°30'	+60'	114°	10°05'	+60'	114°	9°40'	+60'	114°	9°15'	+60'	115°	8°50'	+60'	115°	8°25'	+60'	115°	8°00'	+60'	90°	8
9	11°29'	+60'	114°	11°05'	+60'	114°	10°40'	+60'	114°	10°15'	+60'	115°	9°50'	+60'	115°	9°25'	+60'	115°	9°00'	+60'	117°	9
10	12°29'	+60'	114°	12°05'	+60'	114°	11°40'	+60'	114°	11°15'	+60'	114°	10°50'	+60'	115°	10°25'	+60'	115°	10°00'	+60'	117°	10
11	13°29'	+60'	114°	13°05'	+60'	114°	12°40'	+60'	114°	12°15'	+60'	114°	11°50'	+60'	115°	11°25'	+60'	115°	11°00'	+60'	117°	11
12	14°29'	+60'	114°	14°04'	+60'	114°	13°40'	+60'	114°	13°15'	+60'	114°	12°50'	+60'	115°	12°25'	+60'	115°	12°00'	+60'	158°	12
13	15°28'	+60'	114°	15°04'	+60'	114°	14°40'	+60'	114°	14°15'	+60'	114°	13°50'	+60'	115°	13°25'	+60'	115°	13°00'	+60'	158°	13
14	16°28'	+60'	114°	16°04'	+60'	114°	15°40'	+60'	114°	15°15'	+60'	114°	14°50'	+60'	115°	14°25'	+60'	115°	14°00'	+60'	159°	14
15	17°28'	+60'	113°	17°04'	+60'	114°	16°40'	+60'	114°	16°15'	+60'	114°	15°50'	+60'	114°	15°25'	+60'	115°	15°00'	+60'	90°	15
16	18°27'	+60'	113°	18°04'	+60'	114°	17°39'	+60'	114°	17°15'	+60'	114°	16°50'	+60'	114°	16°25'	+60'	115°	16°00'	+60'	90°	16
17	19°27'	+60'	113°	19°03'	+60'	114°	18°39'	+60'	114°	18°15'	+60'	114°	17°50'	+60'	114°	17°25'	+60'	115°	17°00'	+60'	90°	17
18	20°27'	+60'	113°	20°03'	+60'	113°	19°39'	+60'	114°	19°15'	+60'	114°	18°50'	+60'	114°	18°25'	+60'	115°	18°00'	+60'	90°	18
19	21°26'	+60'	113°	21°03'	+60'	113°	20°39'	+60'	114°	20°15'	+60'	114°	19°50'	+60'	114°	19°25'	+60'	115°	19°00'	+60'	90°	19
20	22°26'	+60'	113°	22°03'	+60'	113°	21°39'	+60'	114°	21°15'	+60'	114°	20°50'	+60'	114°	20°25'	+60'	115°	20°00'	+60'	90°	20
21	23°26'	+60'	113°	23°02'	+60'	113°	22°39'	+60'	114°	22°15'	+60'	114°	21°50'	+60'	114°	21°25'	+60'	115°	21°00'	+60'	90°	21
22	24°26'	+60'	113°	24°02'	+60'	113°	23°39'	+60'	113°	23°14'	+60'	114°	22°50'	+60'	114°	22°25'	+60'	115°	22°00'	+60'	90°	22
23	25°25'	+60'	113°	25°02'	+60'	113°	24°38'	+60'	113°	24°14'	+60'	114°	23°50'	+60'	114°	23°25'	+60'	115°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

65° 295° LHA — Latitude SAME as Declination — 65° 295° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

66° 294° LHA — Latitude SAME as Declination — 66° 294° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°26'	+60'	114°	2°02'	+60'	114°	1°38'	+60'	114°	1°13'	+60'	114°	0°49'	+60'	114°	0°24'	+60'	114°	0°00'	+60'	114°	0
1	3°26'	+60'	114°	3°02'	+60'	114°	2°37'	+60'	114°	2°13'	+60'	114°	1°49'	+60'	114°	1°24'	+60'	114°	1°00'	+60'	113°	1
2	4°26'	+60'	114°	4°02'	+60'	114°	3°37'	+60'	114°	3°13'	+60'	114°	2°49'	+60'	114°	2°24'	+60'	114°	2°00'	+60'	117°	2
3	5°25'	+60'	114°	5°01'	+60'	114°	4°37'	+60'	114°	4°13'	+60'	114°	3°49'	+60'	114°	3°24'	+60'	114°	3°00'	+60'	117°	3
4	6°25'	+60'	113°	6°01'	+60'	114°	5°37'	+60'	114°	5°13'	+60'	114°	4°49'	+60'	114°	4°24'	+60'	114°	4°00'	+60'	117°	4
5	7°25'	+60'	113°	7°01'	+60'	114°	6°37'	+60'	114°	6°13'	+60'	114°	5°49'	+60'	114°	5°24'	+60'	114°	5°00'	+60'	103°	5
6	8°25'	+60'	113°	8°01'	+60'	113°	7°37'	+60'	114°	7°13'	+60'	114°	6°49'	+60'	114°	6°24'	+60'	114°	6°00'	+60'	103°	6
7	9°24'	+60'	113°	9°01'	+60'	113°	8°37'	+60'	113°	8°13'	+60'	114°	7°49'	+60'	114°	7°24'	+60'	114°	7°00'	+60'	103°	7
8	10°24'	+60'	113°	10°00'	+60'	113°	9°37'	+60'	113°	9°13'	+60'	114°	8°49'	+60'	114°	8°24'	+60'	114°	8°00'	+60'	90°	8
9	11°24'	+60'	113°	11°00'	+60'	113°	10°36'	+60'	113°	10°13'	+60'	114°	9°49'	+60'	114°	9°24'	+60'	114°	9°00'	+60'	117°	9
10	12°23'	+60'	113°	12°00'	+60'	113°	11°36'	+60'	113°	11°12'	+60'	113°	10°48'	+60'	114°	10°24'	+60'	114°	10°00'	+60'	117°	10
11	13°23'	+60'	113°	13°00'	+60'	113°	12°36'	+60'	113°	12°12'	+60'	113°	11°48'	+60'	114°	11°24'	+60'	114°	11°00'	+60'	117°	11
12	14°23'	+60'	113°	14°00'	+60'	113°	13°36'	+60'	113°	13°12'	+60'	113°	12°48'	+60'	114°	12°24'	+60'	114°	12°00'	+60'	158°	12
13	15°23'	+60'	113°	14°59'	+60'	113°	14°36'	+60'	113°	14°12'	+60'	113°	13°48'	+60'	114°	13°24'	+60'	114°	13°00'	+60'	158°	13
14	16°22'	+60'	113°	15°59'	+60'	113°	15°36'	+60'	113°	15°12'	+60'	113°	14°48'	+60'	114°	14°24'	+60'	114°	14°00'	+60'	159°	14
15	17°22'	+60'	112°	16°59'	+60'	113°	16°36'	+60'	113°	16°12'	+60'	113°	15°48'	+60'	113°	15°24'	+60'	114°	15°00'	+60'	90°	15
16	18°22'	+60'	112°	17°59'	+60'	113°	17°36'	+60'	113°	17°12'	+60'	113°	16°48'	+60'	113°	16°24'	+60'	114°	16°00'	+60'	90°	16
17	19°21'	+60'	112°	18°59'	+60'	113°	18°35'	+60'	113°	18°12'	+60'	113°	17°48'	+60'	113°	17°24'	+60'	114°	17°00'	+60'	90°	17
18	20°21'	+60'	112°	19°58'	+60'	112°	19°35'	+60'	113°	19°12'	+60'	113°	18°48'	+60'	113°	18°24'	+60'	114°	18°00'	+60'	90°	18
19	21°21'	+60'	112°	20°58'	+60'	112°	20°35'	+60'	113°	20°12'	+60'	113°	19°48'	+60'	113°	19°24'	+60'	114°	19°00'	+60'	90°	19
20	22°20'	+60'	112°	21°58'	+60'	112°	21°35'	+60'	113°	21°12'	+60'	113°	20°48'	+60'	113°	20°24'	+60'	114°	20°00'	+60'	90°	20
21	23°20'	+60'	112°	22°58'	+60'	112°	22°35'	+60'	113°	22°12'	+60'	113°	21°48'	+60'	113°	21°24'	+60'	114°	21°00'	+60'	90°	21
22	24°20'	+60'	112°	23°57'	+60'	112°	23°35'	+60'	112°	23°12'	+60'	113°	22°48'	+60'	113°	22°24'	+60'	114°	22°00'	+60'	90°	22
23	25°19'	+60'	112°	24°57'	+60'	112°	24°35'	+60'	112°	24°12'	+60'	113°	23°48'	+60'	113°	23°24'	+60'	114°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

66° 294° LHA — Latitude SAME as Declination — 66° 294° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

67° 293° LHA — Latitude SAME as Declination — 67° 293° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°20'	+60'	113°	1°57'	+60'	113°	1°34'	+60'	113°	1°10'	+60'	113°	0°47'	+60'	113°	0°23'	+60'	113°	0°00'	+60'	113°	0
1	3°20'	+60'	113°	2°57'	+60'	113°	2°34'	+60'	113°	2°10'	+60'	113°	1°47'	+60'	113°	1°23'	+60'	113°	1°00'	+60'	113°	1
2	4°20'	+60'	113°	3°57'	+60'	113°	3°33'	+60'	113°	3°10'	+60'	113°	2°47'	+60'	113°	2°23'	+60'	113°	2°00'	+60'	110°	2
3	5°20'	+60'	113°	4°57'	+60'	113°	4°33'	+60'	113°	4°10'	+60'	113°	3°47'	+60'	113°	3°23'	+60'	113°	3°00'	+60'	110°	3
4	6°19'	+60'	112°	5°56'	+60'	113°	5°33'	+60'	113°	5°10'	+60'	113°	4°47'	+60'	113°	4°23'	+60'	113°	4°00'	+60'	117°	4
5	7°19'	+60'	112°	6°56'	+60'	113°	6°33'	+60'	113°	6°10'	+60'	113°	5°47'	+60'	113°	5°23'	+60'	113°	5°00'	+60'	103°	5
6	8°19'	+60'	112°	7°56'	+60'	112°	7°33'	+60'	113°	7°10'	+60'	113°	6°47'	+60'	113°	6°23'	+60'	113°	6°00'	+60'	103°	6
7	9°18'	+60'	112°	8°56'	+60'	112°	8°33'	+60'	112°	8°10'	+60'	113°	7°47'	+60'	113°	7°23'	+60'	113°	7°00'	+60'	103°	7
8	10°18'	+60'	112°	9°56'	+60'	112°	9°33'	+60'	112°	9°10'	+60'	113°	8°47'	+60'	113°	8°23'	+60'	113°	8°00'	+60'	90°	8
9	11°18'	+60'	112°	10°55'	+60'	112°	10°33'	+60'	112°	10°10'	+60'	113°	9°47'	+60'	113°	9°23'	+60'	113°	9°00'	+60'	117°	9
10	12°18'	+60'	112°	11°55'	+60'	112°	11°32'	+60'	112°	11°10'	+60'	112°	10°47'	+60'	113°	10°23'	+60'	113°	10°00'	+60'	117°	10
11	13°17'	+60'	112°	12°55'	+60'	112°	12°32'	+60'	112°	12°10'	+60'	112°	11°47'	+60'	113°	11°23'	+60'	113°	11°00'	+60'	117°	11
12	14°17'	+60'	112°	13°55'	+60'	112°	13°32'	+60'	112°	13°09'	+60'	112°	12°47'	+60'	113°	12°23'	+60'	113°	12°00'	+60'	158°	12
13	15°17'	+60'	112°	14°55'	+60'	112°	14°32'	+60'	112°	14°09'	+60'	112°	13°46'	+60'	113°	13°23'	+60'	113°	13°00'	+60'	158°	13
14	16°16'	+60'	111°	15°54'	+60'	112°	15°32'	+60'	112°	15°09'	+60'	112°	14°46'	+60'	113°	14°23'	+60'	113°	14°00'	+60'	159°	14
15	17°16'	+60'	111°	16°54'	+60'	112°	16°32'	+60'	112°	16°09'	+60'	112°	15°46'	+60'	112°	15°23'	+60'	113°	15°00'	+60'	90°	15
16	18°16'	+60'	111°	17°54'	+60'	112°	17°32'	+60'	112°	17°09'	+60'	112°	16°46'	+60'	112°	16°23'	+60'	113°	16°00'	+60'	90°	16
17	19°16'	+60'	111°	18°54'	+60'	112°	18°32'	+60'	112°	18°09'	+60'	112°	17°46'	+60'	112°	17°23'	+60'	113°	17°00'	+60'	90°	17
18	20°15'	+60'	111°	19°53'	+60'	111°	19°31'	+60'	112°	19°09'	+60'	112°	18°46'	+60'	112°	18°23'	+60'	113°	18°00'	+60'	90°	18
19	21°15'	+60'	111°	20°53'	+60'	111°	20°31'	+60'	112°	20°09'	+60'	112°	19°46'	+60'	112°	19°23'	+60'	113°	19°00'	+60'	90°	19
20	22°15'	+60'	111°	21°53'	+60'	111°	21°31'	+60'	112°	21°09'	+60'	112°	20°46'	+60'	112°	20°23'	+60'	113°	20°00'	+60'	90°	20
21	23°14'	+60'	111°	22°53'	+60'	111°	22°31'	+60'	112°	22°09'	+60'	112°	21°46'	+60'	112°	21°23'	+60'	113°	21°00'	+60'	90°	21
22	24°14'	+60'	111°	23°53'	+60'	111°	23°31'	+60'	111°	23°09'	+60'	112°	22°46'	+60'	112°	22°23'	+60'	113°	22°00'	+60'	90°	22
23	25°14'	+60'	111°	24°52'	+60'	111°	24°31'	+60'	111°	24°09'	+60'	112°	23°46'	+60'	112°	23°23'	+60'	113°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

67° 293° LHA — Latitude SAME as Declination — 67° 293° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

68° 292° LHA — Latitude SAME as Declination — 68° 292° LHA

Dec°	84 Hc°	d'	Z°	85 Hc°	d'	Z°	86 Hc°	d'	Z°	87 Hc°	d'	Z°	88 Hc°	d'	Z°	89 Hc°	d'	Z°	90 Hc°	d'	Z°	Dec°
0	2°15'	+60'	112°	1°52'	+60'	112°	1°30'	+60'	112°	1°07'	+60'	112°	0°45'	+60'	112°	0°22'	+60'	112°	0°00'	+60'	112°	0
1	3°14'	+60'	112°	2°52'	+60'	112°	2°30'	+60'	112°	2°07'	+60'	112°	1°45'	+60'	112°	1°22'	+60'	112°	1°00'	+60'	113°	1
2	4°14'	+60'	112°	3°52'	+60'	112°	3°30'	+60'	112°	3°07'	+60'	112°	2°45'	+60'	112°	2°22'	+60'	112°	2°00'	+60'	110°	2
3	5°14'	+60'	112°	4°52'	+60'	112°	4°29'	+60'	112°	4°07'	+60'	112°	3°45'	+60'	112°	3°22'	+60'	112°	3°00'	+60'	110°	3
4	6°14'	+60'	112°	5°51'	+60'	112°	5°29'	+60'	112°	5°07'	+60'	112°	4°45'	+60'	112°	4°22'	+60'	112°	4°00'	+60'	117°	4
5	7°13'	+60'	111°	6°51'	+60'	112°	6°29'	+60'	112°	6°07'	+60'	112°	5°45'	+60'	112°	5°22'	+60'	112°	5°00'	+60'	103°	5
6	8°13'	+60'	111°	7°51'	+60'	111°	7°29'	+60'	112°	7°07'	+60'	112°	6°45'	+60'	112°	6°22'	+60'	112°	6°00'	+60'	103°	6
7	9°13'	+60'	111°	8°51'	+60'	111°	8°29'	+60'	111°	8°07'	+60'	112°	7°45'	+60'	112°	7°22'	+60'	112°	7°00'	+60'	103°	7
8	10°12'	+60'	111°	9°51'	+60'	111°	9°29'	+60'	111°	9°07'	+60'	112°	8°45'	+60'	112°	8°22'	+60'	112°	8°00'	+60'	90°	8
9	11°12'	+60'	111°	10°50'	+60'	111°	10°29'	+60'	111°	10°07'	+60'	112°	9°45'	+60'	112°	9°22'	+60'	112°	9°00'	+60'	117°	9
10	12°12'	+60'	111°	11°50'	+60'	111°	11°29'	+60'	111°	11°07'	+60'	111°	10°45'	+60'	112°	10°22'	+60'	112°	10°00'	+60'	117°	10
11	13°11'	+60'	111°	12°50'	+60'	111°	12°28'	+60'	111°	12°07'	+60'	111°	11°45'	+60'	112°	11°22'	+60'	112°	11°00'	+60'	117°	11
12	14°11'	+60'	111°	13°50'	+60'	111°	13°28'	+60'	111°	13°07'	+60'	111°	12°45'	+60'	112°	12°22'	+60'	112°	12°00'	+60'	158°	12
13	15°11'	+60'	111°	14°50'	+60'	111°	14°28'	+60'	111°	14°06'	+60'	111°	13°45'	+60'	112°	13°22'	+60'	112°	13°00'	+60'	158°	13
14	16°11'	+60'	110°	15°49'	+60'	111°	15°28'	+60'	111°	15°06'	+60'	111°	14°44'	+60'	112°	14°22'	+60'	112°	14°00'	+60'	159°	14
15	17°10'	+60'	110°	16°49'	+60'	111°	16°28'	+60'	111°	16°06'	+60'	111°	15°44'	+60'	111°	15°22'	+60'	112°	15°00'	+60'	90°	15
16	18°10'	+60'	110°	17°49'	+60'	111°	17°28'	+60'	111°	17°06'	+60'	111°	16°44'	+60'	111°	16°22'	+60'	112°	16°00'	+60'	90°	16
17	19°10'	+60'	110°	18°49'	+60'	110°	18°28'	+60'	111°	18°06'	+60'	111°	17°44'	+60'	111°	17°22'	+60'	112°	17°00'	+60'	90°	17
18	20°09'	+60'	110°	19°49'	+60'	110°	19°27'	+60'	111°	19°06'	+60'	111°	18°44'	+60'	111°	18°22'	+60'	112°	18°00'	+60'	90°	18
19	21°09'	+60'	110°	20°48'	+60'	110°	20°27'	+60'	111°	20°06'	+60'	111°	19°44'	+60'	111°	19°22'	+60'	112°	19°00'	+60'	90°	19
20	22°09'	+60'	110°	21°48'	+60'	110°	21°27'	+60'	111°	21°06'	+60'	111°	20°44'	+60'	111°	20°22'	+60'	112°	20°00'	+60'	90°	20
21	23°08'	+60'	110°	22°48'	+60'	110°	22°27'	+60'	111°	22°06'	+60'	111°	21°44'	+60'	111°	21°22'	+60'	112°	21°00'	+60'	90°	21
22	24°08'	+60'	110°	23°48'	+60'	110°	23°27'	+60'	110°	23°06'	+60'	111°	22°44'	+60'	111°	22°22'	+60'	112°	22°00'	+60'	90°	22
23	25°08'	+60'	109°	24°47'	+60'	110°	24°27'	+60'	110°	24°06'	+60'	111°	23°44'	+60'	111°	23°22'	+60'	112°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

68° 292° LHA — Latitude SAME as Declination — 68° 292° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

69° 291° LHA — Latitude SAME as Declination — 69° 291° LHA

Dec°	84 Hc°	d'	Z°	85 Hc°	d'	Z°	86 Hc°	d'	Z°	87 Hc°	d'	Z°	88 Hc°	d'	Z°	89 Hc°	d'	Z°	90 Hc°	d'	Z°	Dec°
0	2°09'	+60'	111°	1°47'	+60'	111°	1°26'	+60'	111°	1°04'	+60'	111°	0°43'	+60'	111°	0°22'	+60'	111°	0°00'	+60'	111°	0
1	3°09'	+60'	111°	2°47'	+60'	111°	2°26'	+60'	111°	2°04'	+60'	111°	1°43'	+60'	111°	1°21'	+60'	111°	1°00'	+60'	110°	1
2	4°08'	+60'	111°	3°47'	+60'	111°	3°26'	+60'	111°	3°04'	+60'	111°	2°43'	+60'	111°	2°21'	+60'	111°	2°00'	+60'	110°	2
3	5°08'	+60'	111°	4°47'	+60'	111°	4°26'	+60'	111°	4°04'	+60'	111°	3°43'	+60'	111°	3°21'	+60'	111°	3°00'	+60'	110°	3
4	6°08'	+60'	111°	5°47'	+60'	111°	5°25'	+60'	111°	5°04'	+60'	111°	4°43'	+60'	111°	4°21'	+60'	111°	4°00'	+60'	117°	4
5	7°07'	+60'	110°	6°46'	+60'	111°	6°25'	+60'	111°	6°04'	+60'	111°	5°43'	+60'	111°	5°21'	+60'	111°	5°00'	+60'	103°	5
6	8°07'	+60'	110°	7°46'	+60'	110°	7°25'	+60'	111°	7°04'	+60'	111°	6°43'	+60'	111°	6°21'	+60'	111°	6°00'	+60'	103°	6
7	9°07'	+60'	110°	8°46'	+60'	110°	8°25'	+60'	110°	8°04'	+60'	111°	7°43'	+60'	111°	7°21'	+60'	111°	7°00'	+60'	103°	7
8	10°06'	+60'	110°	9°46'	+60'	110°	9°25'	+60'	110°	9°04'	+60'	111°	8°43'	+60'	111°	8°21'	+60'	111°	8°00'	+60'	90°	8
9	11°06'	+60'	110°	10°46'	+60'	110°	10°25'	+60'	110°	10°04'	+60'	111°	9°43'	+60'	111°	9°21'	+60'	111°	9°00'	+60'	117°	9
10	12°06'	+60'	110°	11°45'	+60'	110°	11°25'	+60'	110°	11°04'	+60'	110°	10°43'	+60'	111°	10°21'	+60'	111°	10°00'	+60'	117°	10
11	13°06'	+60'	110°	12°45'	+60'	110°	12°25'	+60'	110°	12°04'	+60'	110°	11°43'	+60'	111°	11°21'	+60'	111°	11°00'	+60'	117°	11
12	14°05'	+60'	110°	13°45'	+60'	110°	13°24'	+60'	110°	13°04'	+60'	110°	12°43'	+60'	111°	12°21'	+60'	111°	12°00'	+60'	158°	12
13	15°05'	+60'	110°	14°45'	+60'	110°	14°24'	+60'	110°	14°04'	+60'	110°	13°43'	+60'	111°	13°21'	+60'	111°	13°00'	+60'	158°	13
14	16°05'	+60'	109°	15°45'	+60'	110°	15°24'	+60'	110°	15°03'	+60'	110°	14°43'	+60'	111°	14°21'	+60'	111°	14°00'	+60'	159°	14
15	17°04'	+60'	109°	16°44'	+60'	110°	16°24'	+60'	110°	16°03'	+60'	110°	15°43'	+60'	110°	15°21'	+60'	111°	15°00'	+60'	90°	15
16	18°04'	+60'	109°	17°44'	+60'	110°	17°24'	+60'	110°	17°03'	+60'	110°	16°42'	+60'	110°	16°21'	+60'	111°	16°00'	+60'	90°	16
17	19°04'	+60'	109°	18°44'	+60'	109°	18°24'	+60'	110°	18°03'	+60'	110°	17°42'	+60'	110°	17°21'	+60'	111°	17°00'	+60'	90°	17
18	20°03'	+60'	109°	19°44'	+60'	109°	19°24'	+60'	110°	19°03'	+60'	110°	18°42'	+60'	110°	18°21'	+60'	111°	18°00'	+60'	90°	18
19	21°03'	+60'	109°	20°43'	+60'	109°	20°23'	+60'	110°	20°03'	+60'	110°	19°42'	+60'	110°	19°21'	+60'	111°	19°00'	+60'	90°	19
20	22°03'	+60'	109°	21°43'	+60'	109°	21°23'	+60'	110°	21°03'	+60'	110°	20°42'	+60'	110°	20°21'	+60'	111°	20°00'	+60'	90°	20
21	23°02'	+60'	109°	22°43'	+60'	109°	22°23'	+60'	110°	22°03'	+60'	110°	21°42'	+60'	110°	21°21'	+60'	111°	21°00'	+60'	90°	21
22	24°02'	+60'	109°	23°43'	+60'	109°	23°23'	+60'	109°	23°03'	+60'	110°	22°42'	+60'	110°	22°21'	+60'	111°	22°00'	+60'	90°	22
23	25°02'	+60'	108°	24°42'	+60'	109°	24°23'	+60'	109°	24°03'	+60'	110°	23°42'	+60'	110°	23°21'	+60'	111°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

69° 291° LHA — Latitude SAME as Declination — 69° 291° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

70° 290° LHA — Latitude SAME as Declination — 70° 290° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°03'	+60'	110°	1°42'	+60'	110°	1°22'	+60'	110°	1°02'	+60'	110°	0°41'	+60'	110°	0°21'	+60'	110°	0°00'	+60'	110°	0
1	3°03'	+60'	110°	2°42'	+60'	110°	2°22'	+60'	110°	2°01'	+60'	110°	1°41'	+60'	110°	1°21'	+60'	110°	1°00'	+60'	110°	1
2	4°02'	+60'	110°	3°42'	+60'	110°	3°22'	+60'	110°	3°01'	+60'	110°	2°41'	+60'	110°	2°21'	+60'	110°	2°00'	+60'	110°	2
3	5°02'	+60'	110°	4°42'	+60'	110°	4°22'	+60'	110°	4°01'	+60'	110°	3°41'	+60'	110°	3°20'	+60'	110°	3°00'	+60'	110°	3
4	6°02'	+60'	110°	5°42'	+60'	110°	5°22'	+60'	110°	5°01'	+60'	110°	4°41'	+60'	110°	4°20'	+60'	110°	4°00'	+60'	117°	4
5	7°01'	+60'	109°	6°41'	+60'	110°	6°21'	+60'	110°	6°01'	+60'	110°	5°41'	+60'	110°	5°20'	+60'	110°	5°00'	+60'	103°	5
6	8°01'	+60'	109°	7°41'	+60'	109°	7°21'	+60'	110°	7°01'	+60'	110°	6°41'	+60'	110°	6°20'	+60'	110°	6°00'	+60'	103°	6
7	9°01'	+60'	109°	8°41'	+60'	109°	8°21'	+60'	109°	8°01'	+60'	110°	7°41'	+60'	110°	7°20'	+60'	110°	7°00'	+60'	90°	7
8	10°01'	+60'	109°	9°41'	+60'	109°	9°21'	+60'	109°	9°01'	+60'	110°	8°41'	+60'	110°	8°20'	+60'	110°	8°00'	+60'	90°	8
9	11°00'	+60'	109°	10°41'	+60'	109°	10°21'	+60'	109°	10°01'	+60'	110°	9°41'	+60'	110°	9°20'	+60'	110°	9°00'	+60'	117°	9
10	12°00'	+60'	109°	11°40'	+60'	109°	11°21'	+60'	109°	11°01'	+60'	109°	10°41'	+60'	110°	10°20'	+60'	110°	10°00'	+60'	117°	10
11	13°00'	+60'	109°	12°40'	+60'	109°	12°21'	+60'	109°	12°01'	+60'	109°	11°41'	+60'	110°	11°20'	+60'	110°	11°00'	+60'	117°	11
12	13°59'	+60'	109°	13°40'	+60'	109°	13°20'	+60'	109°	13°01'	+60'	109°	12°41'	+60'	110°	12°20'	+60'	110°	12°00'	+60'	158°	12
13	14°59'	+60'	109°	14°40'	+60'	109°	14°20'	+60'	109°	14°01'	+60'	109°	13°41'	+60'	110°	13°20'	+60'	110°	13°00'	+60'	158°	13
14	15°59'	+60'	108°	15°40'	+60'	109°	15°20'	+60'	109°	15°00'	+60'	109°	14°41'	+60'	110°	14°20'	+60'	110°	14°00'	+60'	159°	14
15	16°58'	+60'	108°	16°39'	+60'	109°	16°20'	+60'	109°	16°00'	+60'	109°	15°41'	+60'	109°	15°20'	+60'	110°	15°00'	+60'	90°	15
16	17°58'	+60'	108°	17°39'	+60'	109°	17°20'	+60'	109°	17°00'	+60'	109°	16°41'	+60'	109°	16°20'	+60'	110°	16°00'	+60'	90°	16
17	18°58'	+60'	108°	18°39'	+60'	108°	18°20'	+60'	109°	18°00'	+60'	109°	17°40'	+60'	109°	17°20'	+60'	110°	17°00'	+60'	90°	17
18	19°57'	+60'	108°	19°39'	+60'	108°	19°20'	+60'	109°	19°00'	+60'	109°	18°40'	+60'	109°	18°20'	+60'	110°	18°00'	+60'	90°	18
19	20°57'	+60'	108°	20°38'	+60'	108°	20°19'	+60'	109°	20°00'	+60'	109°	19°40'	+60'	109°	19°20'	+60'	110°	19°00'	+60'	90°	19
20	21°57'	+60'	108°	21°38'	+60'	108°	21°19'	+60'	109°	21°00'	+60'	109°	20°40'	+60'	109°	20°20'	+60'	110°	20°00'	+60'	90°	20
21	22°56'	+60'	108°	22°38'	+60'	108°	22°19'	+60'	108°	22°00'	+60'	109°	21°40'	+60'	109°	21°20'	+60'	110°	21°00'	+60'	90°	21
22	23°56'	+60'	108°	23°38'	+60'	108°	23°19'	+60'	108°	23°00'	+60'	109°	22°40'	+60'	109°	22°20'	+60'	110°	22°00'	+60'	90°	22
23	24°56'	+60'	107°	24°38'	+60'	108°	24°19'	+60'	108°	24°00'	+60'	109°	23°40'	+60'	109°	23°20'	+60'	110°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

70° 290° LHA — Latitude SAME as Declination — 70° 290° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

71° 289° LHA — Latitude SAME as Declination — 71° 289° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°57'	+60'	109°	1°38'	+60'	109°	1°18'	+60'	109°	0°59'	+60'	109°	0°39'	+60'	109°	0°20'	+60'	109°	0°00'	+60'	109°	0
1	2°57'	+60'	109°	2°37'	+60'	109°	2°18'	+60'	109°	1°59'	+60'	109°	1°39'	+60'	109°	1°20'	+60'	109°	1°00'	+60'	110°	1
2	3°56'	+60'	109°	3°37'	+60'	109°	3°18'	+60'	109°	2°58'	+60'	109°	2°39'	+60'	109°	2°20'	+60'	109°	2°00'	+60'	110°	2
3	4°56'	+60'	109°	4°37'	+60'	109°	4°18'	+60'	109°	3°58'	+60'	109°	3°39'	+60'	109°	3°20'	+60'	109°	3°00'	+60'	110°	3
4	5°56'	+60'	109°	5°37'	+60'	109°	5°18'	+60'	109°	4°58'	+60'	109°	4°39'	+60'	109°	4°20'	+60'	109°	4°00'	+60'	103°	4
5	6°56'	+60'	108°	6°37'	+60'	109°	6°17'	+60'	109°	5°58'	+60'	109°	5°39'	+60'	109°	5°19'	+60'	109°	5°00'	+60'	90°	5
6	7°55'	+60'	108°	7°36'	+60'	108°	7°17'	+60'	109°	6°58'	+60'	109°	6°39'	+60'	109°	6°19'	+60'	109°	6°00'	+60'	90°	6
7	8°55'	+60'	108°	8°36'	+60'	108°	8°17'	+60'	108°	7°58'	+60'	109°	7°39'	+60'	109°	7°19'	+60'	109°	7°00'	+60'	90°	7
8	9°55'	+60'	108°	9°36'	+60'	108°	9°17'	+60'	108°	8°58'	+60'	109°	8°39'	+60'	109°	8°19'	+60'	109°	8°00'	+60'	90°	8
9	10°54'	+60'	108°	10°36'	+60'	108°	10°17'	+60'	108°	9°58'	+60'	109°	9°39'	+60'	109°	9°19'	+60'	109°	9°00'	+60'	117°	9
10	11°54'	+60'	108°	11°35'	+60'	108°	11°17'	+60'	108°	10°58'	+60'	108°	10°39'	+60'	109°	10°19'	+60'	109°	10°00'	+60'	117°	10
11	12°54'	+60'	108°	12°35'	+60'	108°	12°17'	+60'	108°	11°58'	+60'	108°	11°39'	+60'	109°	11°19'	+60'	109°	11°00'	+60'	117°	11
12	13°53'	+60'	108°	13°35'	+60'	108°	13°16'	+60'	108°	12°58'	+60'	108°	12°39'	+60'	109°	12°19'	+60'	109°	12°00'	+60'	158°	12
13	14°53'	+60'	108°	14°35'	+60'	108°	14°16'	+60'	108°	13°58'	+60'	108°	13°39'	+60'	109°	13°19'	+60'	109°	13°00'	+60'	158°	13
14	15°53'	+60'	107°	15°35'	+60'	108°	15°16'	+60'	108°	14°58'	+60'	108°	14°39'	+60'	109°	14°19'	+60'	109°	14°00'	+60'	159°	14
15	16°52'	+60'	107°	16°34'	+60'	108°	16°16'	+60'	108°	15°57'	+60'	108°	15°39'	+60'	108°	15°19'	+60'	109°	15°00'	+60'	90°	15
16	17°52'	+60'	107°	17°34'	+60'	108°	17°16'	+60'	108°	16°57'	+60'	108°	16°39'	+60'	108°	16°19'	+60'	109°	16°00'	+60'	90°	16
17	18°52'	+60'	107°	18°34'	+60'	107°	18°16'	+60'	108°	17°57'	+60'	108°	17°38'	+60'	108°	17°19'	+60'	109°	17°00'	+60'	90°	17
18	19°51'	+60'	107°	19°34'	+60'	107°	19°16'	+60'	108°	18°57'	+60'	108°	18°38'	+60'	108°	18°19'	+60'	109°	18°00'	+60'	90°	18
19	20°51'	+60'	107°	20°33'	+60'	107°	20°15'	+60'	108°	19°57'	+60'	108°	19°38'	+60'	108°	19°19'	+60'	109°	19°00'	+60'	90°	19
20	21°51'	+60'	107°	21°33'	+60'	107°	21°15'	+60'	108°	20°57'	+60'	108°	20°38'	+60'	108°	20°19'	+60'	109°	20°00'	+60'	90°	20
21	22°50'	+60'	107°	22°33'	+60'	107°	22°15'	+60'	107°	21°57'	+60'	108°	21°38'	+60'	108°	21°19'	+60'	109°	21°00'	+60'	90°	21
22	23°50'	+60'	107°	23°33'	+60'	107°	23°15'	+60'	107°	22°57'	+60'	108°	22°38'	+60'	108°	22°19'	+60'	109°	22°00'	+60'	90°	22
23	24°50'	+60'	106°	24°33'	+60'	107°	24°15'	+60'	107°	23°57'	+60'	108°	23°38'	+60'	108°	23°19'	+60'	109°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

71° 289° LHA — Latitude SAME as Declination — 71° 289° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

72° 288° LHA Latitude SAME as Declination 72° 288° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°51'	+60'	108°	1°33'	+60'	108°	1°14'	+60'	108°	0°56'	+60'	108°	0°37'	+60'	108°	0°19'	+60'	108°	0°00'	+60'	108°	0
1	2°51'	+60'	108°	2°32'	+60'	108°	2°14'	+60'	108°	1°56'	+60'	108°	1°37'	+60'	108°	1°19'	+60'	108°	1°00'	+60'	106°	1
2	3°50'	+60'	108°	3°32'	+60'	108°	3°14'	+60'	108°	2°55'	+60'	108°	2°37'	+60'	108°	2°19'	+60'	108°	2°00'	+60'	110°	2
3	4°50'	+60'	108°	4°32'	+60'	108°	4°14'	+60'	108°	3°55'	+60'	108°	3°37'	+60'	108°	3°19'	+60'	108°	3°00'	+60'	110°	3
4	5°50'	+60'	108°	5°32'	+60'	108°	5°14'	+60'	108°	4°55'	+60'	108°	4°37'	+60'	108°	4°19'	+60'	108°	4°00'	+60'	103°	4
5	6°50'	+60'	107°	6°32'	+60'	108°	6°13'	+60'	108°	5°55'	+60'	108°	5°37'	+60'	108°	5°18'	+60'	108°	5°00'	+60'	90°	5
6	7°49'	+60'	107°	7°31'	+60'	107°	7°13'	+60'	108°	6°55'	+60'	108°	6°37'	+60'	108°	6°18'	+60'	108°	6°00'	+60'	90°	6
7	8°49'	+60'	107°	8°31'	+60'	107°	8°13'	+60'	107°	7°55'	+60'	108°	7°37'	+60'	108°	7°18'	+60'	108°	7°00'	+60'	90°	7
8	9°49'	+60'	107°	9°31'	+60'	107°	9°13'	+60'	107°	8°55'	+60'	108°	8°37'	+60'	108°	8°18'	+60'	108°	8°00'	+60'	90°	8
9	10°48'	+60'	107°	10°31'	+60'	107°	10°13'	+60'	107°	9°55'	+60'	108°	9°37'	+60'	108°	9°18'	+60'	108°	9°00'	+60'	117°	9
10	11°48'	+60'	107°	11°31'	+60'	107°	11°13'	+60'	107°	10°55'	+60'	107°	10°37'	+60'	108°	10°18'	+60'	108°	10°00'	+60'	117°	10
11	12°48'	+60'	107°	12°30'	+60'	107°	12°13'	+60'	107°	11°55'	+60'	107°	11°37'	+60'	108°	11°18'	+60'	108°	11°00'	+60'	117°	11
12	13°47'	+60'	107°	13°30'	+60'	107°	13°12'	+60'	107°	12°55'	+60'	107°	12°37'	+60'	108°	12°18'	+60'	108°	12°00'	+60'	158°	12
13	14°47'	+60'	107°	14°30'	+60'	107°	14°12'	+60'	107°	13°55'	+60'	107°	13°37'	+60'	108°	13°18'	+60'	108°	13°00'	+60'	158°	13
14	15°47'	+60'	106°	15°30'	+60'	107°	15°12'	+60'	107°	14°55'	+60'	107°	14°37'	+60'	108°	14°18'	+60'	108°	14°00'	+60'	159°	14
15	16°46'	+60'	106°	16°29'	+60'	107°	16°12'	+60'	107°	15°54'	+60'	107°	15°37'	+60'	107°	15°18'	+60'	108°	15°00'	+60'	90°	15
16	17°46'	+60'	106°	17°29'	+60'	107°	17°12'	+60'	107°	16°54'	+60'	107°	16°37'	+60'	107°	16°18'	+60'	108°	16°00'	+60'	90°	16
17	18°46'	+60'	106°	18°29'	+60'	106°	18°12'	+60'	107°	17°54'	+60'	107°	17°36'	+60'	107°	17°18'	+60'	108°	17°00'	+60'	90°	17
18	19°45'	+60'	106°	19°29'	+60'	106°	19°12'	+60'	107°	18°54'	+60'	107°	18°36'	+60'	107°	18°18'	+60'	108°	18°00'	+60'	90°	18
19	20°45'	+60'	106°	20°28'	+60'	106°	20°11'	+60'	107°	19°54'	+60'	107°	19°36'	+60'	107°	19°18'	+60'	108°	19°00'	+60'	90°	19
20	21°45'	+60'	106°	21°28'	+60'	106°	21°11'	+60'	107°	20°54'	+60'	107°	20°36'	+60'	107°	20°18'	+60'	108°	20°00'	+60'	90°	20
21	22°44'	+60'	106°	22°28'	+60'	106°	22°11'	+60'	106°	21°54'	+60'	107°	21°36'	+60'	107°	21°18'	+60'	108°	21°00'	+60'	90°	21
22	23°44'	+60'	106°	23°28'	+60'	106°	23°11'	+60'	106°	22°54'	+60'	107°	22°36'	+60'	107°	22°18'	+60'	108°	22°00'	+60'	90°	22
23	24°44'	+60'	105°	24°28'	+60'	106°	24°11'	+60'	106°	23°54'	+60'	107°	23°36'	+60'	107°	23°18'	+60'	108°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

72° 288° LHA Latitude SAME as Declination 72° 288° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

73° 287° LHA Latitude SAME as Declination 73° 287° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°45'	+60'	107°	1°28'	+60'	107°	1°10'	+60'	107°	0°53'	+60'	107°	0°35'	+60'	107°	0°18'	+60'	107°	0°00'	+60'	107°	0
1	2°45'	+60'	107°	2°27'	+60'	107°	2°10'	+60'	107°	1°53'	+60'	107°	1°35'	+60'	107°	1°18'	+60'	107°	1°00'	+60'	106°	1
2	3°44'	+60'	107°	3°27'	+60'	107°	3°10'	+60'	107°	2°52'	+60'	107°	2°35'	+60'	107°	2°18'	+60'	107°	2°00'	+60'	110°	2
3	4°44'	+60'	107°	4°27'	+60'	107°	4°10'	+60'	107°	3°52'	+60'	107°	3°35'	+60'	107°	3°18'	+60'	107°	3°00'	+60'	110°	3
4	5°44'	+60'	107°	5°27'	+60'	107°	5°10'	+60'	107°	4°52'	+60'	107°	4°35'	+60'	107°	4°18'	+60'	107°	4°00'	+60'	103°	4
5	6°44'	+60'	106°	6°27'	+60'	107°	6°09'	+60'	107°	5°52'	+60'	107°	5°35'	+60'	107°	5°17'	+60'	107°	5°00'	+60'	90°	5
6	7°43'	+60'	106°	7°26'	+60'	106°	7°09'	+60'	107°	6°52'	+60'	107°	6°35'	+60'	107°	6°17'	+60'	107°	6°00'	+60'	90°	6
7	8°43'	+60'	106°	8°26'	+60'	106°	8°09'	+60'	106°	7°52'	+60'	107°	7°35'	+60'	107°	7°17'	+60'	107°	7°00'	+60'	90°	7
8	9°43'	+60'	106°	9°26'	+60'	106°	9°09'	+60'	106°	8°52'	+60'	107°	8°35'	+60'	107°	8°17'	+60'	107°	8°00'	+60'	90°	8
9	10°42'	+60'	106°	10°26'	+60'	106°	10°09'	+60'	106°	9°52'	+60'	107°	9°35'	+60'	107°	9°17'	+60'	107°	9°00'	+60'	117°	9
10	11°42'	+60'	106°	11°25'	+60'	106°	11°09'	+60'	106°	10°52'	+60'	106°	10°35'	+60'	107°	10°17'	+60'	107°	10°00'	+60'	117°	10
11	12°42'	+60'	106°	12°25'	+60'	106°	12°09'	+60'	106°	11°52'	+60'	106°	11°35'	+60'	107°	11°17'	+60'	107°	11°00'	+60'	117°	11
12	13°41'	+60'	106°	13°25'	+60'	106°	13°08'	+60'	106°	12°52'	+60'	106°	12°35'	+60'	107°	12°17'	+60'	107°	12°00'	+60'	158°	12
13	14°41'	+60'	106°	14°25'	+60'	106°	14°08'	+60'	106°	13°52'	+60'	106°	13°35'	+60'	107°	13°17'	+60'	107°	13°00'	+60'	158°	13
14	15°41'	+60'	105°	15°25'	+60'	106°	15°08'	+60'	106°	14°52'	+60'	106°	14°35'	+60'	107°	14°17'	+60'	107°	14°00'	+60'	159°	14
15	16°40'	+60'	105°	16°24'	+60'	106°	16°08'	+60'	106°	15°51'	+60'	106°	15°35'	+60'	106°	15°17'	+60'	107°	15°00'	+60'	90°	15
16	17°40'	+60'	105°	17°24'	+60'	106°	17°08'	+60'	106°	16°51'	+60'	106°	16°35'	+60'	106°	16°17'	+60'	107°	16°00'	+60'	90°	16
17	18°40'	+60'	105°	18°24'	+60'	105°	18°08'	+60'	106°	17°51'	+60'	106°	17°34'	+60'	106°	17°17'	+60'	107°	17°00'	+60'	90°	17
18	19°39'	+60'	105°	19°24'	+60'	105°	19°08'	+60'	106°	18°51'	+60'	106°	18°34'	+60'	106°	18°17'	+60'	107°	18°00'	+60'	90°	18
19	20°39'	+60'	105°	20°23'	+60'	105°	20°07'	+60'	106°	19°51'	+60'	106°	19°34'	+60'	106°	19°17'	+60'	107°	19°00'	+60'	90°	19
20	21°39'	+60'	105°	21°23'	+60'	105°	21°07'	+60'	106°	20°51'	+60'	106°	20°34'	+60'	106°	20°17'	+60'	107°	20°00'	+60'	90°	20
21	22°38'	+60'	105°	22°23'	+60'	105°	22°07'	+60'	105°	21°51'	+60'	106°	21°34'	+60'	106°	21°17'	+60'	107°	21°00'	+60'	90°	21
22	23°38'	+60'	105°	23°23'	+60'	105°	23°07'	+60'	105°	22°51'	+60'	106°	22°34'	+60'	106°	22°17'	+60'	107°	22°00'	+60'	90°	22
23	24°38'	+60'	104°	24°22'	+60'	105°	24°07'	+60'	105°	23°51'	+60'	106°	23°34'	+60'	106°	23°17'	+60'	107°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

73° 287° LHA Latitude SAME as Declination 73° 287° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

74° 286° LHA — Latitude SAME as Declination — 74° 286° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°39'	+60'	106°	1°23'	+60'	106°	1°06'	+60'	106°	0°50'	+60'	106°	0°33'	+60'	106°	0°17'	+60'	106°	0°00'	+60'	106°	0
1	2°39'	+60'	106°	2°22'	+60'	106°	2°06'	+60'	106°	1°50'	+60'	106°	1°33'	+60'	106°	1°17'	+60'	106°	1°00'	+60'	106°	1
2	3°38'	+60'	106°	3°22'	+60'	106°	3°06'	+60'	106°	2°49'	+60'	106°	2°33'	+60'	106°	2°17'	+60'	106°	2°00'	+60'	103°	2
3	4°38'	+60'	106°	4°22'	+60'	106°	4°06'	+60'	106°	3°49'	+60'	106°	3°33'	+60'	106°	3°17'	+60'	106°	3°00'	+60'	103°	3
4	5°38'	+60'	106°	5°22'	+60'	106°	5°06'	+60'	106°	4°49'	+60'	106°	4°33'	+60'	106°	4°17'	+60'	106°	4°00'	+60'	103°	4
5	6°38'	+60'	105°	6°22'	+60'	106°	6°05'	+60'	106°	5°49'	+60'	106°	5°33'	+60'	106°	5°16'	+60'	106°	5°00'	+60'	90°	5
6	7°37'	+60'	105°	7°21'	+60'	105°	7°05'	+60'	106°	6°49'	+60'	106°	6°33'	+60'	106°	6°16'	+60'	106°	6°00'	+60'	90°	6
7	8°37'	+60'	105°	8°21'	+60'	105°	8°05'	+60'	105°	7°49'	+60'	106°	7°33'	+60'	106°	7°16'	+60'	106°	7°00'	+60'	90°	7
8	9°37'	+60'	105°	9°21'	+60'	105°	9°05'	+60'	105°	8°49'	+60'	106°	8°33'	+60'	106°	8°16'	+60'	106°	8°00'	+60'	90°	8
9	10°36'	+60'	105°	10°21'	+60'	105°	10°05'	+60'	105°	9°49'	+60'	106°	9°33'	+60'	106°	9°16'	+60'	106°	9°00'	+60'	117°	9
10	11°36'	+60'	105°	11°20'	+60'	105°	11°05'	+60'	105°	10°49'	+60'	105°	10°33'	+60'	106°	10°16'	+60'	106°	10°00'	+60'	117°	10
11	12°36'	+60'	105°	12°20'	+60'	105°	12°05'	+60'	105°	11°49'	+60'	105°	11°33'	+60'	106°	11°16'	+60'	106°	11°00'	+60'	117°	11
12	13°35'	+60'	105°	13°20'	+60'	105°	13°04'	+60'	105°	12°49'	+60'	105°	12°33'	+60'	106°	12°16'	+60'	106°	12°00'	+60'	158°	12
13	14°35'	+60'	105°	14°20'	+60'	105°	14°04'	+60'	105°	13°49'	+60'	105°	13°33'	+60'	106°	13°16'	+60'	106°	13°00'	+60'	158°	13
14	15°35'	+60'	104°	15°20'	+60'	105°	15°04'	+60'	105°	14°49'	+60'	105°	14°33'	+60'	106°	14°16'	+60'	106°	14°00'	+60'	159°	14
15	16°34'	+60'	104°	16°19'	+60'	105°	16°04'	+60'	105°	15°48'	+60'	105°	15°33'	+60'	105°	15°16'	+60'	106°	15°00'	+60'	90°	15
16	17°34'	+60'	104°	17°19'	+60'	105°	17°04'	+60'	105°	16°48'	+60'	105°	16°33'	+60'	105°	16°16'	+60'	106°	16°00'	+60'	90°	16
17	18°34'	+60'	104°	18°19'	+60'	104°	18°04'	+60'	105°	17°48'	+60'	105°	17°32'	+60'	105°	17°16'	+60'	106°	17°00'	+60'	90°	17
18	19°33'	+60'	104°	19°19'	+60'	104°	19°04'	+60'	105°	18°48'	+60'	105°	18°32'	+60'	105°	18°16'	+60'	106°	18°00'	+60'	90°	18
19	20°33'	+60'	104°	20°18'	+60'	104°	20°03'	+60'	105°	19°48'	+60'	105°	19°32'	+60'	105°	19°16'	+60'	106°	19°00'	+60'	90°	19
20	21°33'	+60'	104°	21°18'	+60'	104°	21°03'	+60'	105°	20°48'	+60'	105°	20°32'	+60'	105°	20°16'	+60'	106°	20°00'	+60'	90°	20
21	22°32'	+60'	104°	22°18'	+60'	104°	22°03'	+60'	104°	21°48'	+60'	105°	21°32'	+60'	105°	21°16'	+60'	106°	21°00'	+60'	90°	21
22	23°32'	+60'	104°	23°18'	+60'	104°	23°03'	+60'	104°	22°48'	+60'	105°	22°32'	+60'	105°	22°16'	+60'	106°	22°00'	+60'	90°	22
23	24°32'	+60'	103°	24°17'	+60'	104°	24°03'	+60'	104°	23°48'	+60'	105°	23°32'	+60'	105°	23°16'	+60'	106°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

74° 286° LHA — Latitude SAME as Declination — 74° 286° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

75° 285° LHA — Latitude SAME as Declination — 75° 285° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°33'	+60'	105°	1°18'	+60'	105°	1°02'	+60'	105°	0°47'	+60'	105°	0°31'	+60'	105°	0°16'	+60'	105°	0°00'	+60'	105°	0
1	2°33'	+60'	105°	2°17'	+60'	105°	2°02'	+60'	105°	1°46'	+60'	105°	1°31'	+60'	105°	1°16'	+60'	105°	1°00'	+60'	106°	1
2	3°32'	+60'	105°	3°17'	+60'	105°	3°02'	+60'	105°	2°46'	+60'	105°	2°31'	+60'	105°	2°16'	+60'	105°	2°00'	+60'	103°	2
3	4°32'	+60'	105°	4°17'	+60'	105°	4°02'	+60'	105°	3°46'	+60'	105°	3°31'	+60'	105°	3°16'	+60'	105°	3°00'	+60'	103°	3
4	5°32'	+60'	105°	5°17'	+60'	105°	5°02'	+60'	105°	4°46'	+60'	105°	4°31'	+60'	105°	4°15'	+60'	105°	4°00'	+60'	103°	4
5	6°31'	+60'	104°	6°16'	+60'	105°	6°01'	+60'	105°	5°46'	+60'	105°	5°31'	+60'	105°	5°15'	+60'	105°	5°00'	+60'	90°	5
6	7°31'	+60'	104°	7°16'	+60'	104°	7°01'	+60'	105°	6°46'	+60'	105°	6°31'	+60'	105°	6°15'	+60'	105°	6°00'	+60'	90°	6
7	8°31'	+60'	104°	8°16'	+60'	104°	8°01'	+60'	104°	7°46'	+60'	105°	7°31'	+60'	105°	7°15'	+60'	105°	7°00'	+60'	90°	7
8	9°31'	+60'	104°	9°16'	+60'	104°	9°01'	+60'	104°	8°46'	+60'	105°	8°31'	+60'	105°	8°15'	+60'	105°	8°00'	+60'	90°	8
9	10°30'	+60'	104°	10°16'	+60'	104°	10°01'	+60'	104°	9°46'	+60'	105°	9°31'	+60'	105°	9°15'	+60'	105°	9°00'	+60'	117°	9
10	11°30'	+60'	104°	11°15'	+60'	104°	11°01'	+60'	104°	10°46'	+60'	104°	10°31'	+60'	105°	10°15'	+60'	105°	10°00'	+60'	117°	10
11	12°30'	+60'	104°	12°15'	+60'	104°	12°01'	+60'	104°	11°46'	+60'	104°	11°31'	+60'	105°	11°15'	+60'	105°	11°00'	+60'	117°	11
12	13°29'	+60'	104°	13°15'	+60'	104°	13°00'	+60'	104°	12°46'	+60'	104°	12°31'	+60'	105°	12°15'	+60'	105°	12°00'	+60'	158°	12
13	14°29'	+60'	104°	14°15'	+60'	104°	14°00'	+60'	104°	13°46'	+60'	104°	13°31'	+60'	105°	13°15'	+60'	105°	13°00'	+60'	158°	13
14	15°29'	+60'	103°	15°14'	+60'	104°	15°00'	+60'	104°	14°45'	+60'	104°	14°31'	+60'	105°	14°15'	+60'	105°	14°00'	+60'	159°	14
15	16°28'	+60'	103°	16°14'	+60'	104°	16°00'	+60'	104°	15°45'	+60'	104°	15°31'	+60'	104°	15°15'	+60'	105°	15°00'	+60'	90°	15
16	17°28'	+60'	103°	17°14'	+60'	104°	17°00'	+60'	104°	16°45'	+60'	104°	16°30'	+60'	104°	16°15'	+60'	105°	16°00'	+60'	90°	16
17	18°28'	+60'	103°	18°14'	+60'	103°	18°00'	+60'	104°	17°45'	+60'	104°	17°30'	+60'	104°	17°15'	+60'	105°	17°00'	+60'	90°	17
18	19°27'	+60'	103°	19°14'	+60'	103°	19°00'	+60'	104°	18°45'	+60'	104°	18°30'	+60'	104°	18°15'	+60'	105°	18°00'	+60'	90°	18
19	20°27'	+60'	103°	20°13'	+60'	103°	19°59'	+60'	104°	19°45'	+60'	104°	19°30'	+60'	104°	19°15'	+60'	105°	19°00'	+60'	90°	19
20	21°27'	+60'	103°	21°13'	+60'	103°	20°59'	+60'	104°	20°45'	+60'	104°	20°30'	+60'	104°	20°15'	+60'	105°	20°00'	+60'	90°	20
21	22°26'	+60'	103°	22°13'	+60'	103°	21°59'	+60'	103°	21°45'	+60'	104°	21°30'	+60'	104°	21°15'	+60'	105°	21°00'	+60'	90°	21
22	23°26'	+60'	103°	23°13'	+60'	103°	22°59'	+60'	103°	22°45'	+60'	104°	22°30'	+60'	104°	22°15'	+60'	105°	22°00'	+60'	90°	22
23	24°25'	+60'	102°	24°12'	+60'	103°	23°59'	+60'	103°	23°45'	+60'	104°	23°30'	+60'	104°	23°15'	+60'	105°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

75° 285° LHA — Latitude SAME as Declination — 75° 285° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

76° 284° LHA — Latitude SAME as Declination — 76° 284° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°27'	+60'	104°	1°12'	+60'	104°	0°58'	+60'	104°	0°44'	+60'	104°	0°29'	+60'	104°	0°15'	+60'	104°	0°00'	+60'	104°	0
1	2°27'	+60'	104°	2°12'	+60'	104°	1°58'	+60'	104°	1°43'	+60'	104°	1°29'	+60'	104°	1°15'	+60'	104°	1°00'	+60'	103°	1
2	3°26'	+60'	104°	3°12'	+60'	104°	2°58'	+60'	104°	2°43'	+60'	104°	2°29'	+60'	104°	2°14'	+60'	104°	2°00'	+60'	103°	2
3	4°26'	+60'	104°	4°12'	+60'	104°	3°58'	+60'	104°	3°43'	+60'	104°	3°29'	+60'	104°	3°14'	+60'	104°	3°00'	+60'	103°	3
4	5°26'	+60'	104°	5°12'	+60'	104°	4°57'	+60'	104°	4°43'	+60'	104°	4°29'	+60'	104°	4°14'	+60'	104°	4°00'	+60'	103°	4
5	6°25'	+60'	103°	6°11'	+60'	104°	5°57'	+60'	104°	5°43'	+60'	104°	5°29'	+60'	104°	5°14'	+60'	104°	5°00'	+60'	90°	5
6	7°25'	+60'	103°	7°11'	+60'	103°	6°57'	+60'	104°	6°43'	+60'	104°	6°29'	+60'	104°	6°14'	+60'	104°	6°00'	+60'	90°	6
7	8°25'	+60'	103°	8°11'	+60'	103°	7°57'	+60'	103°	7°43'	+60'	104°	7°29'	+60'	104°	7°14'	+60'	104°	7°00'	+60'	90°	7
8	9°24'	+60'	103°	9°11'	+60'	103°	8°57'	+60'	103°	8°43'	+60'	104°	8°29'	+60'	104°	8°14'	+60'	104°	8°00'	+60'	90°	8
9	10°24'	+60'	103°	10°11'	+60'	103°	9°57'	+60'	103°	9°43'	+60'	104°	9°29'	+60'	104°	9°14'	+60'	104°	9°00'	+60'	117°	9
10	11°24'	+60'	103°	11°10'	+60'	103°	10°57'	+60'	103°	10°43'	+60'	103°	10°29'	+60'	104°	10°14'	+60'	104°	10°00'	+60'	117°	10
11	12°23'	+60'	103°	12°10'	+60'	103°	11°56'	+60'	103°	11°43'	+60'	103°	11°29'	+60'	104°	11°14'	+60'	104°	11°00'	+60'	117°	11
12	13°23'	+60'	103°	13°10'	+60'	103°	12°56'	+60'	103°	12°43'	+60'	103°	12°29'	+60'	104°	12°14'	+60'	104°	12°00'	+60'	158°	12
13	14°23'	+60'	103°	14°10'	+60'	103°	13°56'	+60'	103°	13°43'	+60'	103°	13°29'	+60'	104°	13°14'	+60'	104°	13°00'	+60'	158°	13
14	15°22'	+60'	102°	15°09'	+60'	103°	14°56'	+60'	103°	14°42'	+60'	103°	14°29'	+60'	104°	14°14'	+60'	104°	14°00'	+60'	159°	14
15	16°22'	+60'	102°	16°09'	+60'	103°	15°56'	+60'	103°	15°42'	+60'	103°	15°28'	+60'	103°	15°14'	+60'	104°	15°00'	+60'	90°	15
16	17°22'	+60'	102°	17°09'	+60'	103°	16°56'	+60'	103°	16°42'	+60'	103°	16°28'	+60'	103°	16°14'	+60'	104°	16°00'	+60'	90°	16
17	18°21'	+60'	102°	18°09'	+60'	102°	17°56'	+60'	103°	17°42'	+60'	103°	17°28'	+60'	103°	17°14'	+60'	104°	17°00'	+60'	90°	17
18	19°21'	+60'	102°	19°08'	+60'	102°	18°55'	+60'	103°	18°42'	+60'	103°	18°28'	+60'	103°	18°14'	+60'	104°	18°00'	+60'	90°	18
19	20°21'	+60'	102°	20°08'	+60'	102°	19°55'	+60'	103°	19°42'	+60'	103°	19°28'	+60'	103°	19°14'	+60'	104°	19°00'	+60'	90°	19
20	21°20'	+60'	102°	21°08'	+60'	102°	20°55'	+60'	103°	20°42'	+60'	103°	20°28'	+60'	103°	20°14'	+60'	104°	20°00'	+60'	90°	20
21	22°20'	+60'	102°	22°08'	+60'	102°	21°55'	+60'	102°	21°42'	+60'	103°	21°28'	+60'	103°	21°14'	+60'	104°	21°00'	+60'	90°	21
22	23°20'	+60'	102°	23°07'	+60'	102°	22°55'	+60'	102°	22°42'	+60'	103°	22°28'	+60'	103°	22°14'	+60'	104°	22°00'	+60'	90°	22
23	24°19'	+60'	101°	24°07'	+60'	102°	23°55'	+60'	102°	23°42'	+60'	103°	23°28'	+60'	103°	23°14'	+60'	104°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

76° 284° LHA — Latitude SAME as Declination — 76° 284° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

77° 283° LHA — Latitude SAME as Declination — 77° 283° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°21'	+60'	103°	1°07'	+60'	103°	0°54'	+60'	103°	0°40'	+60'	103°	0°27'	+60'	103°	0°13'	+60'	103°	0°00'	+60'	103°	0
1	2°21'	+60'	103°	2°07'	+60'	103°	1°54'	+60'	103°	1°40'	+60'	103°	1°27'	+60'	103°	1°13'	+60'	103°	1°00'	+60'	103°	1
2	3°20'	+60'	103°	3°07'	+60'	103°	2°54'	+60'	103°	2°40'	+60'	103°	2°27'	+60'	103°	2°13'	+60'	103°	2°00'	+60'	103°	2
3	4°20'	+60'	103°	4°07'	+60'	103°	3°54'	+60'	103°	3°40'	+60'	103°	3°27'	+60'	103°	3°13'	+60'	103°	3°00'	+60'	103°	3
4	5°20'	+60'	103°	5°07'	+60'	103°	4°53'	+60'	103°	4°40'	+60'	103°	4°27'	+60'	103°	4°13'	+60'	103°	4°00'	+60'	103°	4
5	6°19'	+60'	102°	6°06'	+60'	103°	5°53'	+60'	103°	5°40'	+60'	103°	5°27'	+60'	103°	5°13'	+60'	103°	5°00'	+60'	90°	5
6	7°19'	+60'	102°	7°06'	+60'	102°	6°53'	+60'	103°	6°40'	+60'	103°	6°27'	+60'	103°	6°13'	+60'	103°	6°00'	+60'	90°	6
7	8°19'	+60'	102°	8°06'	+60'	102°	7°53'	+60'	102°	7°40'	+60'	103°	7°27'	+60'	103°	7°13'	+60'	103°	7°00'	+60'	90°	7
8	9°18'	+60'	102°	9°06'	+60'	102°	8°53'	+60'	102°	8°40'	+60'	103°	8°27'	+60'	103°	8°13'	+60'	103°	8°00'	+60'	63°	8
9	10°18'	+60'	102°	10°05'	+60'	102°	9°53'	+60'	102°	9°40'	+60'	103°	9°27'	+60'	103°	9°13'	+60'	103°	9°00'	+60'	117°	9
10	11°18'	+60'	102°	11°05'	+60'	102°	10°53'	+60'	102°	10°40'	+60'	102°	10°27'	+60'	103°	10°13'	+60'	103°	10°00'	+60'	90°	10
11	12°17'	+60'	102°	12°05'	+60'	102°	11°52'	+60'	102°	11°40'	+60'	102°	11°27'	+60'	103°	11°13'	+60'	103°	11°00'	+60'	90°	11
12	13°17'	+60'	102°	13°05'	+60'	102°	12°52'	+60'	102°	12°40'	+60'	102°	12°27'	+60'	103°	12°13'	+60'	103°	12°00'	+60'	118°	12
13	14°17'	+60'	102°	14°05'	+60'	102°	13°52'	+60'	102°	13°39'	+60'	102°	13°27'	+60'	103°	13°13'	+60'	103°	13°00'	+60'	118°	13
14	15°16'	+60'	101°	15°04'	+60'	102°	14°52'	+60'	102°	14°39'	+60'	102°	14°26'	+60'	103°	14°13'	+60'	103°	14°00'	+60'	62°	14
15	16°16'	+60'	101°	16°04'	+60'	102°	15°52'	+60'	102°	15°39'	+60'	102°	15°26'	+60'	102°	15°13'	+60'	103°	15°00'	+60'	90°	15
16	17°16'	+60'	101°	17°04'	+60'	102°	16°52'	+60'	102°	16°39'	+60'	102°	16°26'	+60'	102°	16°13'	+60'	103°	16°00'	+60'	90°	16
17	18°15'	+60'	101°	18°04'	+60'	101°	17°52'	+60'	102°	17°39'	+60'	102°	17°26'	+60'	102°	17°13'	+60'	103°	17°00'	+60'	90°	17
18	19°15'	+60'	101°	19°03'	+60'	101°	18°51'	+60'	102°	18°39'	+60'	102°	18°26'	+60'	102°	18°13'	+60'	103°	18°00'	+60'	90°	18
19	20°15'	+60'	101°	20°03'	+60'	101°	19°51'	+60'	102°	19°39'	+60'	102°	19°26'	+60'	102°	19°13'	+60'	103°	19°00'	+60'	90°	19
20	21°14'	+60'	101°	21°03'	+60'	101°	20°51'	+60'	102°	20°39'	+60'	102°	20°26'	+60'	102°	20°13'	+60'	103°	20°00'	+60'	90°	20
21	22°14'	+60'	101°	22°03'	+60'	101°	21°51'	+60'	101°	21°39'	+60'	102°	21°26'	+60'	102°	21°13'	+60'	103°	21°00'	+60'	90°	21
22	23°14'	+60'	101°	23°02'	+60'	101°	22°51'	+60'	101°	22°39'	+60'	102°	22°26'	+60'	102°	22°13'	+60'	103°	22°00'	+60'	90°	22
23	24°13'	+60'	100°	24°02'	+60'	101°	23°51'	+60'	101°	23°39'	+60'	102°	23°26'	+60'	102°	23°13'	+60'	103°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

77° 283° LHA — Latitude SAME as Declination — 77° 283° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

78° 282° LHA — Latitude SAME as Declination — 78° 282° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°15'	+60'	102°	1°02'	+60'	102°	0°50'	+60'	102°	0°37'	+60'	102°	0°25'	+60'	102°	0°12'	+60'	102°	0°00'	+60'	102°	0
1	2°14'	+60'	102°	2°02'	+60'	102°	1°50'	+60'	102°	1°37'	+60'	102°	1°25'	+60'	102°	1°12'	+60'	102°	1°00'	+60'	103°	1
2	3°14'	+60'	102°	3°02'	+60'	102°	2°50'	+60'	102°	2°37'	+60'	102°	2°25'	+60'	102°	2°12'	+60'	102°	2°00'	+60'	103°	2
3	4°14'	+60'	102°	4°02'	+60'	102°	3°49'	+60'	102°	3°37'	+60'	102°	3°25'	+60'	102°	3°12'	+60'	102°	3°00'	+60'	103°	3
4	5°13'	+60'	102°	5°01'	+60'	102°	4°49'	+60'	102°	4°37'	+60'	102°	4°25'	+60'	102°	4°12'	+60'	102°	4°00'	+60'	103°	4
5	6°13'	+60'	101°	6°01'	+60'	102°	5°49'	+60'	102°	5°37'	+60'	102°	5°25'	+60'	102°	5°12'	+60'	102°	5°00'	+60'	90°	5
6	7°13'	+60'	101°	7°01'	+60'	101°	6°49'	+60'	102°	6°37'	+60'	102°	6°25'	+60'	102°	6°12'	+60'	102°	6°00'	+60'	90°	6
7	8°12'	+60'	101°	8°01'	+60'	101°	7°49'	+60'	101°	7°37'	+60'	102°	7°25'	+60'	102°	7°12'	+60'	102°	7°00'	+60'	90°	7
8	9°12'	+60'	101°	9°01'	+60'	101°	8°49'	+60'	101°	8°37'	+60'	102°	8°25'	+60'	102°	8°12'	+60'	102°	8°00'	+60'	63°	8
9	10°12'	+60'	101°	10°00'	+60'	101°	9°49'	+60'	101°	9°37'	+60'	102°	9°25'	+60'	102°	9°12'	+60'	102°	9°00'	+60'	117°	9
10	11°12'	+60'	101°	11°00'	+60'	101°	10°48'	+60'	101°	10°37'	+60'	101°	10°25'	+60'	102°	10°12'	+60'	102°	10°00'	+60'	90°	10
11	12°11'	+60'	101°	12°00'	+60'	101°	11°48'	+60'	101°	11°37'	+60'	101°	11°25'	+60'	102°	11°12'	+60'	102°	11°00'	+60'	90°	11
12	13°11'	+60'	101°	13°00'	+60'	101°	12°48'	+60'	101°	12°36'	+60'	101°	12°25'	+60'	102°	12°12'	+60'	102°	12°00'	+60'	118°	12
13	14°11'	+60'	101°	13°59'	+60'	101°	13°48'	+60'	101°	13°36'	+60'	101°	13°24'	+60'	102°	13°12'	+60'	102°	13°00'	+60'	118°	13
14	15°10'	+60'	100°	14°59'	+60'	101°	14°48'	+60'	101°	14°36'	+60'	101°	14°24'	+60'	102°	14°12'	+60'	102°	14°00'	+60'	62°	14
15	16°10'	+60'	100°	15°59'	+60'	101°	15°48'	+60'	101°	15°36'	+60'	101°	15°24'	+60'	101°	15°12'	+60'	102°	15°00'	+60'	90°	15
16	17°10'	+60'	100°	16°59'	+60'	101°	16°48'	+60'	101°	16°36'	+60'	101°	16°24'	+60'	101°	16°12'	+60'	102°	16°00'	+60'	90°	16
17	18°09'	+60'	100°	17°58'	+60'	100°	17°47'	+60'	101°	17°36'	+60'	101°	17°24'	+60'	101°	17°12'	+60'	102°	17°00'	+60'	90°	17
18	19°09'	+60'	100°	18°58'	+60'	100°	18°47'	+60'	101°	18°36'	+60'	101°	18°24'	+60'	101°	18°12'	+60'	102°	18°00'	+60'	90°	18
19	20°08'	+60'	100°	19°58'	+60'	100°	19°47'	+60'	101°	19°36'	+60'	101°	19°24'	+60'	101°	19°12'	+60'	102°	19°00'	+60'	90°	19
20	21°08'	+60'	100°	20°58'	+60'	100°	20°47'	+60'	101°	20°36'	+60'	101°	20°24'	+60'	101°	20°12'	+60'	102°	20°00'	+60'	90°	20
21	22°08'	+60'	100°	21°57'	+60'	100°	21°47'	+60'	100°	21°36'	+60'	101°	21°24'	+60'	101°	21°12'	+60'	102°	21°00'	+60'	90°	21
22	23°07'	+60'	100°	22°57'	+60'	100°	22°47'	+60'	100°	22°36'	+60'	101°	22°24'	+60'	101°	22°12'	+60'	102°	22°00'	+60'	90°	22
23	24°07'	+60'	99°	23°57'	+60'	100°	23°46'	+60'	100°	23°35'	+60'	101°	23°24'	+60'	101°	23°12'	+60'	102°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

78° 282° LHA — Latitude SAME as Declination — 78° 282° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

79° 281° LHA — Latitude SAME as Declination — 79° 281° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°09'	+60'	101°	0°57'	+60'	101°	0°46'	+60'	101°	0°34'	+60'	101°	0°23'	+60'	101°	0°11'	+60'	101°	0°00'	+60'	101°	0
1	2°08'	+60'	101°	1°57'	+60'	101°	1°46'	+60'	101°	1°34'	+60'	101°	1°23'	+60'	101°	1°11'	+60'	101°	1°00'	+60'	100°	1
2	3°08'	+60'	101°	2°57'	+60'	101°	2°45'	+60'	101°	2°34'	+60'	101°	2°23'	+60'	101°	2°11'	+60'	101°	2°00'	+60'	103°	2
3	4°08'	+60'	101°	3°57'	+60'	101°	3°45'	+60'	101°	3°34'	+60'	101°	3°23'	+60'	101°	3°11'	+60'	101°	3°00'	+60'	103°	3
4	5°07'	+60'	101°	4°56'	+60'	101°	4°45'	+60'	101°	4°34'	+60'	101°	4°23'	+60'	101°	4°11'	+60'	101°	4°00'	+60'	103°	4
5	6°07'	+60'	100°	5°56'	+60'	101°	5°45'	+60'	101°	5°34'	+60'	101°	5°23'	+60'	101°	5°11'	+60'	101°	5°00'	+60'	90°	5
6	7°07'	+60'	100°	6°56'	+60'	100°	6°45'	+60'	101°	6°34'	+60'	101°	6°23'	+60'	101°	6°11'	+60'	101°	6°00'	+60'	90°	6
7	8°06'	+60'	100°	7°56'	+60'	100°	7°45'	+60'	100°	7°34'	+60'	101°	7°23'	+60'	101°	7°11'	+60'	101°	7°00'	+60'	90°	7
8	9°06'	+60'	100°	8°55'	+60'	100°	8°45'	+60'	100°	8°34'	+60'	101°	8°23'	+60'	101°	8°11'	+60'	101°	8°00'	+60'	63°	8
9	10°06'	+60'	100°	9°55'	+60'	100°	9°44'	+60'	100°	9°34'	+60'	101°	9°23'	+60'	101°	9°11'	+60'	101°	9°00'	+60'	117°	9
10	11°05'	+60'	100°	10°55'	+60'	100°	10°44'	+60'	100°	10°34'	+60'	100°	10°23'	+60'	101°	10°11'	+60'	101°	10°00'	+60'	90°	10
11	12°05'	+60'	100°	11°55'	+60'	100°	11°44'	+60'	100°	11°33'	+60'	100°	11°22'	+60'	101°	11°11'	+60'	101°	11°00'	+60'	90°	11
12	13°05'	+60'	100°	12°54'	+60'	100°	12°44'	+60'	100°	12°33'	+60'	100°	12°22'	+60'	101°	12°11'	+60'	101°	12°00'	+60'	118°	12
13	14°04'	+60'	100°	13°54'	+60'	100°	13°44'	+60'	100°	13°33'	+60'	100°	13°22'	+60'	101°	13°11'	+60'	101°	13°00'	+60'	118°	13
14	15°04'	+60'	99°	14°54'	+60'	100°	14°44'	+60'	100°	14°33'	+60'	100°	14°22'	+60'	101°	14°11'	+60'	101°	14°00'	+60'	62°	14
15	16°04'	+60'	99°	15°54'	+60'	100°	15°44'	+60'	100°	15°33'	+60'	100°	15°22'	+60'	100°	15°11'	+60'	101°	15°00'	+60'	90°	15
16	17°03'	+60'	99°	16°54'	+60'	100°	16°43'	+60'	100°	16°33'	+60'	100°	16°22'	+60'	100°	16°11'	+60'	101°	16°00'	+60'	90°	16
17	18°03'	+60'	99°	17°53'	+60'	99°	17°43'	+60'	100°	17°33'	+60'	100°	17°22'	+60'	100°	17°11'	+60'	101°	17°00'	+60'	90°	17
18	19°03'	+60'	99°	18°53'	+60'	99°	18°43'	+60'	100°	18°33'	+60'	100°	18°22'	+60'	100°	18°11'	+60'	101°	18°00'	+60'	90°	18
19	20°02'	+60'	99°	19°53'	+60'	99°	19°43'	+60'	100°	19°33'	+60'	100°	19°22'	+60'	100°	19°11'	+60'	101°	19°00'	+60'	90°	19
20	21°02'	+60'	99°	20°53'	+60'	99°	20°43'	+60'	100°	20°33'	+60'	100°	20°22'	+60'	100°	20°11'	+60'	101°	20°00'	+60'	90°	20
21	22°02'	+60'	99°	21°52'	+60'	99°	21°43'	+60'	99°	21°33'	+60'	100°	21°22'	+60'	100°	21°11'	+60'	101°	21°00'	+60'	90°	21
22	23°01'	+60'	99°	22°52'	+60'	99°	22°42'	+60'	99°	22°32'	+60'	100°	22°22'	+60'	100°	22°11'	+60'	101°	22°00'	+60'	90°	22
23	24°01'	+60'	98°	23°52'	+60'	99°	23°42'	+60'	99°	23°32'	+60'	100°	23°22'	+60'	100°	23°11'	+60'	101°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

79° 281° LHA — Latitude SAME as Declination — 79° 281° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

80° 280° LHA — Latitude SAME as Declination — 80° 280° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°02'	+60'	100°	0°52'	+60'	100°	0°42'	+60'	100°	0°31'	+60'	100°	0°21'	+60'	100°	0°10'	+60'	100°	0°00'	+60'	100°	0
1	2°02'	+60'	100°	1°52'	+60'	100°	1°42'	+60'	100°	1°31'	+60'	100°	1°21'	+60'	100°	1°10'	+60'	100°	1°00'	+60'	100°	1
2	3°02'	+60'	100°	2°52'	+60'	100°	2°41'	+60'	100°	2°31'	+60'	100°	2°21'	+60'	100°	2°10'	+60'	100°	2°00'	+60'	103°	2
3	4°01'	+60'	100°	3°51'	+60'	100°	3°41'	+60'	100°	3°31'	+60'	100°	3°21'	+60'	100°	3°10'	+60'	100°	3°00'	+60'	103°	3
4	5°01'	+60'	100°	4°51'	+60'	100°	4°41'	+60'	100°	4°31'	+60'	100°	4°21'	+60'	100°	4°10'	+60'	100°	4°00'	+60'	103°	4
5	6°01'	+60'	99°	5°51'	+60'	100°	5°41'	+60'	100°	5°31'	+60'	100°	5°21'	+60'	100°	5°10'	+60'	100°	5°00'	+60'	90°	5
6	7°00'	+60'	99°	6°51'	+60'	99°	6°41'	+60'	100°	6°31'	+60'	100°	6°21'	+60'	100°	6°10'	+60'	100°	6°00'	+60'	90°	6
7	8°00'	+60'	99°	7°50'	+60'	99°	7°41'	+60'	99°	7°31'	+60'	100°	7°21'	+60'	100°	7°10'	+60'	100°	7°00'	+60'	90°	7
8	9°00'	+60'	99°	8°50'	+60'	99°	8°40'	+60'	99°	8°31'	+60'	100°	8°21'	+60'	100°	8°10'	+60'	100°	8°00'	+60'	63°	8
9	10°00'	+60'	99°	9°50'	+60'	99°	9°40'	+60'	99°	9°31'	+60'	100°	9°21'	+60'	100°	9°10'	+60'	100°	9°00'	+60'	117°	9
10	10°59'	+60'	99°	10°50'	+60'	99°	10°40'	+60'	99°	10°30'	+60'	99°	10°20'	+60'	100°	10°10'	+60'	100°	10°00'	+60'	90°	10
11	11°59'	+60'	99°	11°50'	+60'	99°	11°40'	+60'	99°	11°30'	+60'	99°	11°20'	+60'	100°	11°10'	+60'	100°	11°00'	+60'	90°	11
12	12°59'	+60'	99°	12°49'	+60'	99°	12°40'	+60'	99°	12°30'	+60'	99°	12°20'	+60'	100°	12°10'	+60'	100°	12°00'	+60'	118°	12
13	13°58'	+60'	99°	13°49'	+60'	99°	13°40'	+60'	99°	13°30'	+60'	99°	13°20'	+60'	100°	13°10'	+60'	100°	13°00'	+60'	118°	13
14	14°58'	+60'	98°	14°49'	+60'	99°	14°40'	+60'	99°	14°30'	+60'	99°	14°20'	+60'	100°	14°10'	+60'	100°	14°00'	+60'	62°	14
15	15°57'	+60'	98°	15°49'	+60'	99°	15°39'	+60'	99°	15°30'	+60'	99°	15°20'	+60'	99°	15°10'	+60'	100°	15°00'	+60'	90°	15
16	16°57'	+60'	98°	16°48'	+60'	99°	16°39'	+60'	99°	16°30'	+60'	99°	16°20'	+60'	99°	16°10'	+60'	100°	16°00'	+60'	90°	16
17	17°57'	+60'	98°	17°48'	+60'	98°	17°39'	+60'	99°	17°30'	+60'	99°	17°20'	+60'	99°	17°10'	+60'	100°	17°00'	+60'	90°	17
18	18°56'	+60'	98°	18°48'	+60'	98°	18°39'	+60'	99°	18°30'	+60'	99°	18°20'	+60'	99°	18°10'	+60'	100°	18°00'	+60'	90°	18
19	19°56'	+60'	98°	19°48'	+60'	98°	19°39'	+60'	99°	19°30'	+60'	99°	19°20'	+60'	99°	19°10'	+60'	100°	19°00'	+60'	90°	19
20	20°56'	+60'	98°	20°47'	+60'	98°	20°39'	+60'	99°	20°30'	+60'	99°	20°20'	+60'	99°	20°10'	+60'	100°	20°00'	+60'	90°	20
21	21°55'	+60'	98°	21°47'	+60'	98°	21°39'	+60'	98°	21°29'	+60'	99°	21°20'	+60'	99°	21°10'	+60'	100°	21°00'	+60'	90°	21
22	22°55'	+60'	98°	22°47'	+60'	98°	22°38'	+60'	98°	22°29'	+60'	99°	22°20'	+60'	99°	22°10'	+60'	100°	22°00'	+60'	90°	22
23	23°55'	+60'	97°	23°47'	+60'	98°	23°38'	+60'	98°	23°29'	+60'	99°	23°20'	+60'	99°	23°10'	+60'	100°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

80° 280° LHA — Latitude SAME as Declination — 80° 280° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

81° 279° LHA — Latitude SAME as Declination — 81° 279° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°56'	+60'	99°	0°47'	+60'	99°	0°38'	+60'	99°	0°28'	+60'	99°	0°19'	+60'	99°	0°09'	+60'	99°	0°00'	+60'	99°	0
1	1°56'	+60'	99°	1°47'	+60'	99°	1°37'	+60'	99°	1°28'	+60'	99°	1°19'	+60'	99°	1°09'	+60'	99°	1°00'	+60'	100°	1
2	2°56'	+60'	99°	2°46'	+60'	99°	2°37'	+60'	99°	2°28'	+60'	99°	2°19'	+60'	99°	2°09'	+60'	99°	2°00'	+60'	97°	2
3	3°55'	+60'	99°	3°46'	+60'	99°	3°37'	+60'	99°	3°28'	+60'	99°	3°19'	+60'	99°	3°09'	+60'	99°	3°00'	+60'	97°	3
4	4°55'	+60'	99°	4°46'	+60'	99°	4°37'	+60'	99°	4°28'	+60'	99°	4°19'	+60'	99°	4°09'	+60'	99°	4°00'	+60'	103°	4
5	5°55'	+60'	98°	5°46'	+60'	99°	5°37'	+60'	99°	5°28'	+60'	99°	5°19'	+60'	99°	5°09'	+60'	99°	5°00'	+60'	90°	5
6	6°54'	+60'	98°	6°46'	+60'	98°	6°37'	+60'	99°	6°28'	+60'	99°	6°19'	+60'	99°	6°09'	+60'	99°	6°00'	+60'	90°	6
7	7°54'	+60'	98°	7°45'	+60'	98°	7°37'	+60'	98°	7°28'	+60'	99°	7°19'	+60'	99°	7°09'	+60'	99°	7°00'	+60'	90°	7
8	8°54'	+60'	98°	8°45'	+60'	98°	8°36'	+60'	98°	8°27'	+60'	99°	8°18'	+60'	99°	8°09'	+60'	99°	8°00'	+60'	63°	8
9	9°53'	+60'	98°	9°45'	+60'	98°	9°36'	+60'	98°	9°27'	+60'	99°	9°18'	+60'	99°	9°09'	+60'	99°	9°00'	+60'	117°	9
10	10°53'	+60'	98°	10°45'	+60'	98°	10°36'	+60'	98°	10°27'	+60'	98°	10°18'	+60'	99°	10°09'	+60'	99°	10°00'	+60'	90°	10
11	11°53'	+60'	98°	11°44'	+60'	98°	11°36'	+60'	98°	11°27'	+60'	98°	11°18'	+60'	99°	11°09'	+60'	99°	11°00'	+60'	90°	11
12	12°52'	+60'	98°	12°44'	+60'	98°	12°36'	+60'	98°	12°27'	+60'	98°	12°18'	+60'	99°	12°09'	+60'	99°	12°00'	+60'	118°	12
13	13°52'	+60'	98°	13°44'	+60'	98°	13°36'	+60'	98°	13°27'	+60'	98°	13°18'	+60'	99°	13°09'	+60'	99°	13°00'	+60'	118°	13
14	14°52'	+60'	97°	14°44'	+60'	98°	14°35'	+60'	98°	14°27'	+60'	98°	14°18'	+60'	99°	14°09'	+60'	99°	14°00'	+60'	62°	14
15	15°51'	+60'	97°	15°43'	+60'	98°	15°35'	+60'	98°	15°27'	+60'	98°	15°18'	+60'	98°	15°09'	+60'	99°	15°00'	+60'	90°	15
16	16°51'	+60'	97°	16°43'	+60'	98°	16°35'	+60'	98°	16°27'	+60'	98°	16°18'	+60'	98°	16°09'	+60'	99°	16°00'	+60'	90°	16
17	17°51'	+60'	97°	17°43'	+60'	97°	17°35'	+60'	98°	17°27'	+60'	98°	17°18'	+60'	98°	17°09'	+60'	99°	17°00'	+60'	90°	17
18	18°50'	+60'	97°	18°43'	+60'	97°	18°35'	+60'	98°	18°27'	+60'	98°	18°18'	+60'	98°	18°09'	+60'	99°	18°00'	+60'	90°	18
19	19°50'	+60'	97°	19°42'	+60'	97°	19°35'	+60'	98°	19°27'	+60'	98°	19°18'	+60'	98°	19°09'	+60'	99°	19°00'	+60'	90°	19
20	20°49'	+60'	97°	20°42'	+60'	97°	20°35'	+60'	98°	20°26'	+60'	98°	20°18'	+60'	98°	20°09'	+60'	99°	20°00'	+60'	90°	20
21	21°49'	+60'	97°	21°42'	+60'	97°	21°34'	+60'	97°	21°26'	+60'	98°	21°18'	+60'	98°	21°09'	+60'	99°	21°00'	+60'	90°	21
22	22°49'	+60'	97°	22°42'	+60'	97°	22°34'	+60'	97°	22°26'	+60'	98°	22°18'	+60'	98°	22°09'	+60'	99°	22°00'	+60'	90°	22
23	23°48'	+60'	96°	23°41'	+60'	97°	23°34'	+60'	97°	23°26'	+60'	98°	23°18'	+60'	98°	23°09'	+60'	99°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

81° 279° LHA — Latitude SAME as Declination — 81° 279° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

82° 278° LHA — Latitude SAME as Declination — 82° 278° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	0°50'	+60'	98°	0°42'	+60'	98°	0°33'	+60'	98°	0°25'	+60'	98°	0°17'	+60'	98°	0°08'	+60'	98°	0°00'	+60'	98°	0
1	1°50'	+60'	98°	1°41'	+60'	98°	1°33'	+60'	98°	1°25'	+60'	98°	1°17'	+60'	98°	1°08'	+60'	98°	1°00'	+60'	97°	1
2	2°49'	+60'	98°	2°41'	+60'	98°	2°33'	+60'	98°	2°25'	+60'	98°	2°17'	+60'	98°	2°08'	+60'	98°	2°00'	+60'	97°	2
3	3°49'	+60'	98°	3°41'	+60'	98°	3°33'	+60'	98°	3°25'	+60'	98°	3°17'	+60'	98°	3°08'	+60'	98°	3°00'	+60'	97°	3
4	4°49'	+60'	98°	4°41'	+60'	98°	4°33'	+60'	98°	4°25'	+60'	98°	4°17'	+60'	98°	4°08'	+60'	98°	4°00'	+60'	103°	4
5	5°48'	+60'	97°	5°41'	+60'	98°	5°33'	+60'	98°	5°25'	+60'	98°	5°17'	+60'	98°	5°08'	+60'	98°	5°00'	+60'	90°	5
6	6°48'	+60'	97°	6°40'	+60'	97°	6°33'	+60'	98°	6°25'	+60'	98°	6°16'	+60'	98°	6°08'	+60'	98°	6°00'	+60'	90°	6
7	7°48'	+60'	97°	7°40'	+60'	97°	7°32'	+60'	97°	7°24'	+60'	98°	7°16'	+60'	98°	7°08'	+60'	98°	7°00'	+60'	90°	7
8	8°47'	+60'	97°	8°40'	+60'	97°	8°32'	+60'	97°	8°24'	+60'	98°	8°16'	+60'	98°	8°08'	+60'	98°	8°00'	+60'	63°	8
9	9°47'	+60'	97°	9°40'	+60'	97°	9°32'	+60'	97°	9°24'	+60'	98°	9°16'	+60'	98°	9°08'	+60'	98°	9°00'	+60'	117°	9
10	10°47'	+60'	97°	10°39'	+60'	97°	10°32'	+60'	97°	10°24'	+60'	97°	10°16'	+60'	98°	10°08'	+60'	98°	10°00'	+60'	90°	10
11	11°46'	+60'	97°	11°39'	+60'	97°	11°32'	+60'	97°	11°24'	+60'	97°	11°16'	+60'	98°	11°08'	+60'	98°	11°00'	+60'	90°	11
12	12°46'	+60'	97°	12°39'	+60'	97°	12°32'	+60'	97°	12°24'	+60'	97°	12°16'	+60'	98°	12°08'	+60'	98°	12°00'	+60'	118°	12
13	13°46'	+60'	97°	13°39'	+60'	97°	13°31'	+60'	97°	13°24'	+60'	97°	13°16'	+60'	98°	13°08'	+60'	98°	13°00'	+60'	118°	13
14	14°45'	+60'	96°	14°38'	+60'	97°	14°31'	+60'	97°	14°24'	+60'	97°	14°16'	+60'	98°	14°08'	+60'	98°	14°00'	+60'	62°	14
15	15°45'	+60'	96°	15°38'	+60'	97°	15°31'	+60'	97°	15°24'	+60'	97°	15°16'	+60'	97°	15°08'	+60'	98°	15°00'	+60'	90°	15
16	16°45'	+60'	96°	16°38'	+60'	97°	16°31'	+60'	97°	16°24'	+60'	97°	16°16'	+60'	97°	16°08'	+60'	98°	16°00'	+60'	90°	16
17	17°44'	+60'	96°	17°38'	+60'	96°	17°31'	+60'	97°	17°24'	+60'	97°	17°16'	+60'	97°	17°08'	+60'	98°	17°00'	+60'	90°	17
18	18°44'	+60'	96°	18°38'	+60'	96°	18°31'	+60'	97°	18°24'	+60'	97°	18°16'	+60'	97°	18°08'	+60'	98°	18°00'	+60'	90°	18
19	19°44'	+60'	96°	19°37'	+60'	96°	19°31'	+60'	97°	19°23'	+60'	97°	19°16'	+60'	97°	19°08'	+60'	98°	19°00'	+60'	90°	19
20	20°43'	+60'	96°	20°37'	+60'	96°	20°30'	+60'	97°	20°23'	+60'	97°	20°16'	+60'	97°	20°08'	+60'	98°	20°00'	+60'	90°	20
21	21°43'	+60'	96°	21°37'	+60'	96°	21°30'	+60'	96°	21°23'	+60'	97°	21°16'	+60'	97°	21°08'	+60'	98°	21°00'	+60'	90°	21
22	22°43'	+60'	96°	22°36'	+60'	96°	22°30'	+60'	96°	22°23'	+60'	97°	22°16'	+60'	97°	22°08'	+60'	98°	22°00'	+60'	90°	22
23	23°42'	+60'	95°	23°36'	+60'	96°	23°30'	+60'	96°	23°23'	+60'	97°	23°16'	+60'	97°	23°08'	+60'	98°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

82° 278° LHA — Latitude SAME as Declination — 82° 278° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

83° 277° LHA — Latitude SAME as Declination — 83° 277° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	0°44'	+60'	97°	0°37'	+60'	97°	0°29'	+60'	97°	0°22'	+60'	97°	0°15'	+60'	97°	0°07'	+60'	97°	0°00'	+60'	97°	0
1	1°43'	+60'	97°	1°36'	+60'	97°	1°29'	+60'	97°	1°22'	+60'	97°	1°15'	+60'	97°	1°07'	+60'	97°	1°00'	+60'	97°	1
2	2°43'	+60'	97°	2°36'	+60'	97°	2°29'	+60'	97°	2°22'	+60'	97°	2°15'	+60'	97°	2°07'	+60'	97°	2°00'	+60'	97°	2
3	3°43'	+60'	97°	3°36'	+60'	97°	3°29'	+60'	97°	3°22'	+60'	97°	3°15'	+60'	97°	3°07'	+60'	97°	3°00'	+60'	97°	3
4	4°42'	+60'	97°	4°36'	+60'	97°	4°29'	+60'	97°	4°22'	+60'	97°	4°14'	+60'	97°	4°07'	+60'	97°	4°00'	+60'	103°	4
5	5°42'	+60'	96°	5°35'	+60'	97°	5°29'	+60'	97°	5°22'	+60'	97°	5°14'	+60'	97°	5°07'	+60'	97°	5°00'	+60'	90°	5
6	6°42'	+60'	96°	6°35'	+60'	96°	6°28'	+60'	97°	6°21'	+60'	97°	6°14'	+60'	97°	6°07'	+60'	97°	6°00'	+60'	90°	6
7	7°42'	+60'	96°	7°35'	+60'	96°	7°28'	+60'	96°	7°21'	+60'	97°	7°14'	+60'	97°	7°07'	+60'	97°	7°00'	+60'	90°	7
8	8°41'	+60'	96°	8°35'	+60'	96°	8°28'	+60'	96°	8°21'	+60'	97°	8°14'	+60'	97°	8°07'	+60'	97°	8°00'	+60'	63°	8
9	9°41'	+60'	96°	9°34'	+60'	96°	9°28'	+60'	96°	9°21'	+60'	97°	9°14'	+60'	97°	9°07'	+60'	97°	9°00'	+60'	117°	9
10	10°41'	+60'	96°	10°34'	+60'	96°	10°28'	+60'	96°	10°21'	+60'	96°	10°14'	+60'	97°	10°07'	+60'	97°	10°00'	+60'	90°	10
11	11°40'	+60'	96°	11°34'	+60'	96°	11°28'	+60'	96°	11°21'	+60'	96°	11°14'	+60'	97°	11°07'	+60'	97°	11°00'	+60'	90°	11
12	12°40'	+60'	96°	12°34'	+60'	96°	12°27'	+60'	96°	12°21'	+60'	96°	12°14'	+60'	97°	12°07'	+60'	97°	12°00'	+60'	118°	12
13	13°39'	+60'	96°	13°34'	+60'	96°	13°27'	+60'	96°	13°21'	+60'	96°	13°14'	+60'	97°	13°07'	+60'	97°	13°00'	+60'	118°	13
14	14°39'	+60'	95°	14°33'	+60'	96°	14°27'	+60'	96°	14°21'	+60'	96°	14°14'	+60'	97°	14°07'	+60'	97°	14°00'	+60'	62°	14
15	15°39'	+60'	95°	15°33'	+60'	96°	15°27'	+60'	96°	15°21'	+60'	96°	15°14'	+60'	96°	15°07'	+60'	97°	15°00'	+60'	90°	15
16	16°38'	+60'	95°	16°33'	+60'	96°	16°27'	+60'	96°	16°21'	+60'	96°	16°14'	+60'	96°	16°07'	+60'	97°	16°00'	+60'	90°	16
17	17°38'	+60'	95°	17°33'	+60'	95°	17°27'	+60'	96°	17°21'	+60'	96°	17°14'	+60'	96°	17°07'	+60'	97°	17°00'	+60'	90°	17
18	18°38'	+60'	95°	18°32'	+60'	95°	18°27'	+60'	96°	18°20'	+60'	96°	18°14'	+60'	96°	18°07'	+60'	97°	18°00'	+60'	90°	18
19	19°37'	+60'	95°	19°32'	+60'	95°	19°26'	+60'	96°	19°20'	+60'	96°	19°14'	+60'	96°	19°07'	+60'	97°	19°00'	+60'	90°	19
20	20°37'	+60'	95°	20°32'	+60'	95°	20°26'	+60'	96°	20°20'	+60'	96°	20°14'	+60'	96°	20°07'	+60'	97°	20°00'	+60'	90°	20
21	21°37'	+60'	95°	21°32'	+60'	95°	21°26'	+60'	95°	21°20'	+60'	96°	21°14'	+60'	96°	21°07'	+60'	97°	21°00'	+60'	90°	21
22	22°36'	+60'	95°	22°31'	+60'	95°	22°26'	+60'	95°	22°20'	+60'	96°	22°14'	+60'	96°	22°07'	+60'	97°	22°00'	+60'	90°	22
23	23°36'	+60'	94°	23°31'	+60'	95°	23°26'	+60'	95°	23°20'	+60'	96°	23°14'	+60'	96°	23°07'	+60'	97°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

83° 277° LHA — Latitude SAME as Declination — 83° 277° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

84° 276° LHA — Latitude SAME as Declination — 84° 276° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°38'	+60'	96°	0°31'	+60'	96°	0°25'	+60'	96°	0°19'	+60'	96°	0°13'	+60'	96°	0°06'	+60'	96°	0°00'	+60'	96°	0
1	1°37'	+60'	96°	1°31'	+60'	96°	1°25'	+60'	96°	1°19'	+60'	96°	1°13'	+60'	96°	1°06'	+60'	96°	1°00'	+60'	97°	1
2	2°37'	+60'	96°	2°31'	+60'	96°	2°25'	+60'	96°	2°19'	+60'	96°	2°12'	+60'	96°	2°06'	+60'	96°	2°00'	+60'	97°	2
3	3°37'	+60'	96°	3°31'	+60'	96°	3°25'	+60'	96°	3°19'	+60'	96°	3°12'	+60'	96°	3°06'	+60'	96°	3°00'	+60'	97°	3
4	4°36'	+60'	96°	4°30'	+60'	96°	4°24'	+60'	96°	4°18'	+60'	96°	4°12'	+60'	96°	4°06'	+60'	96°	4°00'	+60'	90°	4
5	5°36'	+60'	95°	5°30'	+60'	96°	5°24'	+60'	96°	5°18'	+60'	96°	5°12'	+60'	96°	5°06'	+60'	96°	5°00'	+60'	77°	5
6	6°36'	+60'	95°	6°30'	+60'	95°	6°24'	+60'	96°	6°18'	+60'	96°	6°12'	+60'	96°	6°06'	+60'	96°	6°00'	+60'	77°	6
7	7°35'	+60'	95°	7°30'	+60'	95°	7°24'	+60'	95°	7°18'	+60'	96°	7°12'	+60'	96°	7°06'	+60'	96°	7°00'	+60'	77°	7
8	8°35'	+60'	95°	8°29'	+60'	95°	8°24'	+60'	95°	8°18'	+60'	96°	8°12'	+60'	96°	8°06'	+60'	96°	8°00'	+60'	63°	8
9	9°35'	+60'	95°	9°29'	+60'	95°	9°24'	+60'	95°	9°18'	+60'	96°	9°12'	+60'	96°	9°06'	+60'	96°	9°00'	+60'	117°	9
10	10°34'	+60'	95°	10°29'	+60'	95°	10°24'	+60'	95°	10°18'	+60'	95°	10°12'	+60'	96°	10°06'	+60'	96°	10°00'	+60'	90°	10
11	11°34'	+60'	95°	11°29'	+60'	95°	11°23'	+60'	95°	11°18'	+60'	95°	11°12'	+60'	96°	11°06'	+60'	96°	11°00'	+60'	90°	11
12	12°34'	+60'	95°	12°29'	+60'	95°	12°23'	+60'	95°	12°18'	+60'	95°	12°12'	+60'	96°	12°06'	+60'	96°	12°00'	+60'	118°	12
13	13°33'	+60'	95°	13°28'	+60'	95°	13°23'	+60'	95°	13°18'	+60'	95°	13°12'	+60'	96°	13°06'	+60'	96°	13°00'	+60'	118°	13
14	14°33'	+60'	94°	14°28'	+60'	95°	14°23'	+60'	95°	14°18'	+60'	95°	14°12'	+60'	96°	14°06'	+60'	96°	14°00'	+60'	62°	14
15	15°33'	+60'	94°	15°28'	+60'	95°	15°23'	+60'	95°	15°18'	+60'	95°	15°12'	+60'	95°	15°06'	+60'	96°	15°00'	+60'	90°	15
16	16°32'	+60'	94°	16°28'	+60'	95°	16°23'	+60'	95°	16°17'	+60'	95°	16°12'	+60'	95°	16°06'	+60'	96°	16°00'	+60'	90°	16
17	17°32'	+60'	94°	17°27'	+60'	94°	17°23'	+60'	95°	17°17'	+60'	95°	17°12'	+60'	95°	17°06'	+60'	96°	17°00'	+60'	90°	17
18	18°31'	+60'	94°	18°27'	+60'	94°	18°22'	+60'	95°	18°17'	+60'	95°	18°12'	+60'	95°	18°06'	+60'	96°	18°00'	+60'	90°	18
19	19°31'	+60'	94°	19°27'	+60'	94°	19°22'	+60'	95°	19°17'	+60'	95°	19°12'	+60'	95°	19°06'	+60'	96°	19°00'	+60'	90°	19
20	20°31'	+60'	94°	20°27'	+60'	94°	20°22'	+60'	95°	20°17'	+60'	95°	20°12'	+60'	95°	20°06'	+60'	96°	20°00'	+60'	90°	20
21	21°30'	+60'	94°	21°26'	+60'	94°	21°22'	+60'	94°	21°17'	+60'	95°	21°12'	+60'	95°	21°06'	+60'	96°	21°00'	+60'	90°	21
22	22°30'	+60'	94°	22°26'	+60'	94°	22°22'	+60'	94°	22°17'	+60'	95°	22°12'	+60'	95°	22°06'	+60'	96°	22°00'	+60'	90°	22
23	23°30'	+60'	93°	23°26'	+60'	94°	23°22'	+60'	94°	23°17'	+60'	95°	23°12'	+60'	95°	23°06'	+60'	96°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

84° 276° LHA — Latitude SAME as Declination — 84° 276° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

85° 275° LHA — Latitude SAME as Declination — 85° 275° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°31'	+60'	95°	0°26'	+60'	95°	0°21'	+60'	95°	0°16'	+60'	95°	0°10'	+60'	95°	0°05'	+60'	95°	0°00'	+60'	95°	0
1	1°31'	+60'	95°	1°26'	+60'	95°	1°21'	+60'	95°	1°16'	+60'	95°	1°10'	+60'	95°	1°05'	+60'	95°	1°00'	+60'	97°	1
2	2°31'	+60'	95°	2°26'	+60'	95°	2°21'	+60'	95°	2°16'	+60'	95°	2°10'	+60'	95°	2°05'	+60'	95°	2°00'	+60'	97°	2
3	3°30'	+60'	95°	3°25'	+60'	95°	3°20'	+60'	95°	3°15'	+60'	95°	3°10'	+60'	95°	3°05'	+60'	95°	3°00'	+60'	97°	3
4	4°30'	+60'	95°	4°25'	+60'	95°	4°20'	+60'	95°	4°15'	+60'	95°	4°10'	+60'	95°	4°05'	+60'	95°	4°00'	+60'	90°	4
5	5°30'	+60'	94°	5°25'	+60'	95°	5°20'	+60'	95°	5°15'	+60'	95°	5°10'	+60'	95°	5°05'	+60'	95°	5°00'	+60'	77°	5
6	6°29'	+60'	94°	6°25'	+60'	94°	6°20'	+60'	95°	6°15'	+60'	95°	6°10'	+60'	95°	6°05'	+60'	95°	6°00'	+60'	77°	6
7	7°29'	+60'	94°	7°25'	+60'	94°	7°20'	+60'	94°	7°15'	+60'	95°	7°10'	+60'	95°	7°05'	+60'	95°	7°00'	+60'	77°	7
8	8°29'	+60'	94°	8°24'	+60'	94°	8°20'	+60'	94°	8°15'	+60'	95°	8°10'	+60'	95°	8°05'	+60'	95°	8°00'	+60'	63°	8
9	9°28'	+60'	94°	9°24'	+60'	94°	9°20'	+60'	94°	9°15'	+60'	95°	9°10'	+60'	95°	9°05'	+60'	95°	9°00'	+60'	117°	9
10	10°28'	+60'	94°	10°24'	+60'	94°	10°19'	+60'	94°	10°15'	+60'	94°	10°10'	+60'	95°	10°05'	+60'	95°	10°00'	+60'	90°	10
11	11°28'	+60'	94°	11°24'	+60'	94°	11°19'	+60'	94°	11°15'	+60'	94°	11°10'	+60'	95°	11°05'	+60'	95°	11°00'	+60'	90°	11
12	12°27'	+60'	94°	12°23'	+60'	94°	12°19'	+60'	94°	12°15'	+60'	94°	12°10'	+60'	95°	12°05'	+60'	95°	12°00'	+60'	118°	12
13	13°27'	+60'	94°	13°23'	+60'	94°	13°19'	+60'	94°	13°15'	+60'	94°	13°10'	+60'	95°	13°05'	+60'	95°	13°00'	+60'	118°	13
14	14°27'	+60'	93°	14°23'	+60'	94°	14°19'	+60'	94°	14°15'	+60'	94°	14°10'	+60'	94°	14°05'	+60'	95°	14°00'	+60'	62°	14
15	15°26'	+60'	93°	15°23'	+60'	94°	15°19'	+60'	94°	15°14'	+60'	94°	15°10'	+60'	94°	15°05'	+60'	95°	15°00'	+60'	90°	15
16	16°26'	+60'	93°	16°22'	+60'	94°	16°19'	+60'	94°	16°14'	+60'	94°	16°10'	+60'	94°	16°05'	+60'	95°	16°00'	+60'	90°	16
17	17°26'	+60'	93°	17°22'	+60'	93°	17°18'	+60'	94°	17°14'	+60'	94°	17°10'	+60'	94°	17°05'	+60'	95°	17°00'	+60'	90°	17
18	18°25'	+60'	93°	18°22'	+60'	93°	18°18'	+60'	94°	18°14'	+60'	94°	18°10'	+60'	94°	18°05'	+60'	95°	18°00'	+60'	90°	18
19	19°25'	+60'	93°	19°22'	+60'	93°	19°18'	+60'	94°	19°14'	+60'	94°	19°10'	+60'	94°	19°05'	+60'	95°	19°00'	+60'	90°	19
20	20°24'	+60'	93°	20°21'	+60'	93°	20°18'	+60'	94°	20°14'	+60'	94°	20°10'	+60'	94°	20°05'	+60'	95°	20°00'	+60'	90°	20
21	21°24'	+60'	93°	21°21'	+60'	93°	21°18'	+60'	93°	21°14'	+60'	94°	21°10'	+60'	94°	21°05'	+60'	95°	21°00'	+60'	90°	21
22	22°24'	+60'	93°	22°21'	+60'	93°	22°18'	+60'	93°	22°14'	+60'	94°	22°10'	+60'	94°	22°05'	+60'	95°	22°00'	+60'	90°	22
23	23°23'	+60'	92°	23°21'	+60'	93°	23°17'	+60'	93°	23°14'	+60'	94°	23°10'	+60'	94°	23°05'	+60'	95°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

85° 275° LHA — Latitude SAME as Declination — 85° 275° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

86° 274° LHA — Latitude SAME as Declination — 86° 274° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°25'	+60'	94°	0°21'	+60'	94°	0°17'	+60'	94°	0°13'	+60'	94°	0°08'	+60'	94°	0°04'	+60'	94°	0°00'	+60'	94°	0
1	1°25'	+60'	94°	1°21'	+60'	94°	1°17'	+60'	94°	1°12'	+60'	94°	1°08'	+60'	94°	1°04'	+60'	94°	1°00'	+60'	93°	1
2	2°24'	+60'	94°	2°20'	+60'	94°	2°16'	+60'	94°	2°12'	+60'	94°	2°08'	+60'	94°	2°04'	+60'	94°	2°00'	+60'	97°	2
3	3°24'	+60'	94°	3°20'	+60'	94°	3°16'	+60'	94°	3°12'	+60'	94°	3°08'	+60'	94°	3°04'	+60'	94°	3°00'	+60'	97°	3
4	4°24'	+60'	94°	4°20'	+60'	94°	4°16'	+60'	94°	4°12'	+60'	94°	4°08'	+60'	94°	4°04'	+60'	94°	4°00'	+60'	90°	4
5	5°23'	+60'	93°	5°20'	+60'	94°	5°16'	+60'	94°	5°12'	+60'	94°	5°08'	+60'	94°	5°04'	+60'	94°	5°00'	+60'	77°	5
6	6°23'	+60'	93°	6°20'	+60'	93°	6°16'	+60'	94°	6°12'	+60'	94°	6°08'	+60'	94°	6°04'	+60'	94°	6°00'	+60'	77°	6
7	7°23'	+60'	93°	7°19'	+60'	93°	7°16'	+60'	94°	7°12'	+60'	94°	7°08'	+60'	94°	7°04'	+60'	94°	7°00'	+60'	77°	7
8	8°22'	+60'	93°	8°19'	+60'	93°	8°16'	+60'	93°	8°12'	+60'	94°	8°08'	+60'	94°	8°04'	+60'	94°	8°00'	+60'	63°	8
9	9°22'	+60'	93°	9°19'	+60'	93°	9°15'	+60'	93°	9°12'	+60'	94°	9°08'	+60'	94°	9°04'	+60'	94°	9°00'	+60'	117°	9
10	10°22'	+60'	93°	10°19'	+60'	93°	10°15'	+60'	93°	10°12'	+60'	93°	10°08'	+60'	94°	10°04'	+60'	94°	10°00'	+60'	90°	10
11	11°21'	+60'	93°	11°18'	+60'	93°	11°15'	+60'	93°	11°12'	+60'	93°	11°08'	+60'	94°	11°04'	+60'	94°	11°00'	+60'	90°	11
12	12°21'	+60'	93°	12°18'	+60'	93°	12°15'	+60'	93°	12°12'	+60'	93°	12°08'	+60'	94°	12°04'	+60'	94°	12°00'	+60'	118°	12
13	13°21'	+60'	93°	13°18'	+60'	93°	13°15'	+60'	93°	13°11'	+60'	93°	13°08'	+60'	94°	13°04'	+60'	94°	13°00'	+60'	118°	13
14	14°20'	+60'	92°	14°18'	+60'	93°	14°15'	+60'	93°	14°11'	+60'	93°	14°08'	+60'	93°	14°04'	+60'	94°	14°00'	+60'	62°	14
15	15°20'	+60'	92°	15°17'	+60'	93°	15°14'	+60'	93°	15°11'	+60'	93°	15°08'	+60'	93°	15°04'	+60'	94°	15°00'	+60'	90°	15
16	16°20'	+60'	92°	16°17'	+60'	93°	16°14'	+60'	93°	16°11'	+60'	93°	16°08'	+60'	93°	16°04'	+60'	94°	16°00'	+60'	90°	16
17	17°19'	+60'	92°	17°17'	+60'	92°	17°14'	+60'	93°	17°11'	+60'	93°	17°08'	+60'	93°	17°04'	+60'	94°	17°00'	+60'	90°	17
18	18°19'	+60'	92°	18°17'	+60'	92°	18°14'	+60'	93°	18°11'	+60'	93°	18°08'	+60'	93°	18°04'	+60'	94°	18°00'	+60'	90°	18
19	19°19'	+60'	92°	19°16'	+60'	92°	19°14'	+60'	93°	19°11'	+60'	93°	19°08'	+60'	93°	19°04'	+60'	94°	19°00'	+60'	90°	19
20	20°18'	+60'	92°	20°16'	+60'	92°	20°14'	+60'	93°	20°11'	+60'	93°	20°08'	+60'	93°	20°04'	+60'	94°	20°00'	+60'	90°	20
21	21°18'	+60'	92°	21°16'	+60'	92°	21°14'	+60'	92°	21°11'	+60'	93°	21°08'	+60'	93°	21°04'	+60'	94°	21°00'	+60'	90°	21
22	22°17'	+60'	92°	22°16'	+60'	92°	22°13'	+60'	92°	22°11'	+60'	93°	22°08'	+60'	93°	22°04'	+60'	94°	22°00'	+60'	90°	22
23	23°17'	+60'	91°	23°15'	+60'	92°	23°13'	+60'	92°	23°11'	+60'	93°	23°07'	+60'	93°	23°04'	+60'	94°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

86° 274° LHA — Latitude SAME as Declination — 86° 274° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

87° 273° LHA — Latitude SAME as Declination — 87° 273° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°19'	+60'	93°	0°16'	+60'	93°	0°13'	+60'	93°	0°09'	+60'	93°	0°06'	+60'	93°	0°03'	+60'	93°	0°00'	+60'	93°	0
1	1°18'	+60'	93°	1°15'	+60'	93°	1°12'	+60'	93°	1°09'	+60'	93°	1°06'	+60'	93°	1°03'	+60'	93°	1°00'	+60'	93°	1
2	2°18'	+60'	93°	2°15'	+60'	93°	2°12'	+60'	93°	2°09'	+60'	93°	2°06'	+60'	93°	2°03'	+60'	93°	2°00'	+60'	90°	2
3	3°18'	+60'	93°	3°15'	+60'	93°	3°12'	+60'	93°	3°09'	+60'	93°	3°06'	+60'	93°	3°03'	+60'	93°	3°00'	+60'	90°	3
4	4°17'	+60'	93°	4°15'	+60'	93°	4°12'	+60'	93°	4°09'	+60'	93°	4°06'	+60'	93°	4°03'	+60'	93°	4°00'	+60'	90°	4
5	5°17'	+60'	92°	5°15'	+60'	93°	5°12'	+60'	93°	5°09'	+60'	93°	5°06'	+60'	93°	5°03'	+60'	93°	5°00'	+60'	77°	5
6	6°17'	+60'	92°	6°14'	+60'	92°	6°12'	+60'	93°	6°09'	+60'	93°	6°06'	+60'	93°	6°03'	+60'	93°	6°00'	+60'	77°	6
7	7°16'	+60'	92°	7°14'	+60'	92°	7°12'	+60'	93°	7°09'	+60'	93°	7°06'	+60'	93°	7°03'	+60'	93°	7°00'	+60'	77°	7
8	8°16'	+60'	92°	8°14'	+60'	92°	8°11'	+60'	92°	8°09'	+60'	93°	8°06'	+60'	93°	8°03'	+60'	93°	8°00'	+60'	63°	8
9	9°16'	+60'	92°	9°14'	+60'	92°	9°11'	+60'	92°	9°09'	+60'	93°	9°06'	+60'	93°	9°03'	+60'	93°	9°00'	+60'	117°	9
10	10°15'	+60'	92°	10°13'	+60'	92°	10°11'	+60'	92°	10°09'	+60'	92°	10°06'	+60'	93°	10°03'	+60'	93°	10°00'	+60'	90°	10
11	11°15'	+60'	92°	11°13'	+60'	92°	11°11'	+60'	92°	11°09'	+60'	92°	11°06'	+60'	93°	11°03'	+60'	93°	11°00'	+60'	90°	11
12	12°15'	+60'	92°	12°13'	+60'	92°	12°11'	+60'	92°	12°08'	+60'	92°	12°06'	+60'	93°	12°03'	+60'	93°	12°00'	+60'	118°	12
13	13°14'	+60'	92°	13°13'	+60'	92°	13°11'	+60'	92°	13°08'	+60'	92°	13°06'	+60'	93°	13°03'	+60'	93°	13°00'	+60'	118°	13
14	14°14'	+60'	91°	14°12'	+60'	92°	14°10'	+60'	92°	14°08'	+60'	92°	14°06'	+60'	93°	14°03'	+60'	93°	14°00'	+60'	62°	14
15	15°14'	+60'	91°	15°12'	+60'	92°	15°10'	+60'	92°	15°08'	+60'	92°	15°06'	+60'	92°	15°03'	+60'	93°	15°00'	+60'	90°	15
16	16°13'	+60'	91°	16°12'	+60'	92°	16°10'	+60'	92°	16°08'	+60'	92°	16°06'	+60'	92°	16°03'	+60'	93°	16°00'	+60'	90°	16
17	17°13'	+60'	91°	17°12'	+60'	91°	17°10'	+60'	92°	17°08'	+60'	92°	17°06'	+60'	92°	17°03'	+60'	93°	17°00'	+60'	90°	17
18	18°13'	+60'	91°	18°11'	+60'	91°	18°10'	+60'	92°	18°08'	+60'	92°	18°06'	+60'	92°	18°03'	+60'	93°	18°00'	+60'	90°	18
19	19°12'	+60'	91°	19°11'	+60'	91°	19°10'	+60'	92°	19°08'	+60'	92°	19°06'	+60'	92°	19°03'	+60'	93°	19°00'	+60'	90°	19
20	20°12'	+60'	91°	20°11'	+60'	91°	20°10'	+60'	92°	20°08'	+60'	92°	20°06'	+60'	92°	20°03'	+60'	93°	20°00'	+60'	90°	20
21	21°12'	+60'	91°	21°11'	+60'	91°	21°09'	+60'	91°	21°08'	+60'	92°	21°05'	+60'	92°	21°03'	+60'	93°	21°00'	+60'	90°	21
22	22°11'	+60'	91°	22°10'	+60'	91°	22°09'	+60'	91°	22°08'	+60'	92°	22°05'	+60'	92°	22°03'	+60'	93°	22°00'	+60'	90°	22
23	23°11'	+60'	90°	23°10'	+60'	91°	23°09'	+60'	91°	23°07'	+60'	92°	23°05'	+60'	92°	23°03'	+60'	93°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

87° 273° LHA — Latitude SAME as Declination — 87° 273° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

88° 272° LHA — Latitude SAME as Declination — 88° 272° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°13'	+60'	92°	0°10'	+60'	92°	0°08'	+60'	92°	0°06'	+60'	92°	0°04'	+60'	92°	0°02'	+60'	92°	0°00'	+60'	92°	0
1	1°12'	+60'	92°	1°10'	+60'	92°	1°08'	+60'	92°	1°06'	+60'	92°	1°04'	+60'	92°	1°02'	+60'	92°	1°00'	+60'	93°	1
2	2°12'	+60'	92°	2°10'	+60'	92°	2°08'	+60'	92°	2°06'	+60'	92°	2°04'	+60'	92°	2°02'	+60'	92°	2°00'	+60'	90°	2
3	3°12'	+60'	92°	3°10'	+60'	92°	3°08'	+60'	92°	3°06'	+60'	92°	3°04'	+60'	92°	3°02'	+60'	92°	3°00'	+60'	90°	3
4	4°11'	+60'	92°	4°10'	+60'	92°	4°08'	+60'	92°	4°06'	+60'	92°	4°04'	+60'	92°	4°02'	+60'	92°	4°00'	+60'	90°	4
5	5°11'	+60'	91°	5°09'	+60'	92°	5°08'	+60'	92°	5°06'	+60'	92°	5°04'	+60'	92°	5°02'	+60'	92°	5°00'	+60'	77°	5
6	6°11'	+60'	91°	6°09'	+60'	91°	6°07'	+60'	92°	6°06'	+60'	92°	6°04'	+60'	92°	6°02'	+60'	92°	6°00'	+60'	77°	6
7	7°10'	+60'	91°	7°09'	+60'	91°	7°07'	+60'	92°	7°06'	+60'	92°	7°04'	+60'	92°	7°02'	+60'	92°	7°00'	+60'	77°	7
8	8°10'	+60'	91°	8°09'	+60'	91°	8°07'	+60'	91°	8°06'	+60'	92°	8°04'	+60'	92°	8°02'	+60'	92°	8°00'	+60'	63°	8
9	9°10'	+60'	91°	9°08'	+60'	91°	9°07'	+60'	91°	9°06'	+60'	92°	9°04'	+60'	92°	9°02'	+60'	92°	9°00'	+60'	117°	9
10	10°09'	+60'	91°	10°08'	+60'	91°	10°07'	+60'	91°	10°05'	+60'	91°	10°04'	+60'	92°	10°02'	+60'	92°	10°00'	+60'	90°	10
11	11°09'	+60'	91°	11°08'	+60'	91°	11°07'	+60'	91°	11°05'	+60'	91°	11°04'	+60'	92°	11°02'	+60'	92°	11°00'	+60'	90°	11
12	12°09'	+60'	91°	12°08'	+60'	91°	12°07'	+60'	91°	12°05'	+60'	91°	12°04'	+60'	92°	12°02'	+60'	92°	12°00'	+60'	118°	12
13	13°08'	+60'	91°	13°07'	+60'	91°	13°06'	+60'	91°	13°05'	+60'	91°	13°04'	+60'	92°	13°02'	+60'	92°	13°00'	+60'	118°	13
14	14°08'	+60'	90°	14°07'	+60'	91°	14°06'	+60'	91°	14°05'	+60'	91°	14°04'	+60'	92°	14°02'	+60'	92°	14°00'	+60'	62°	14
15	15°07'	+60'	90°	15°07'	+60'	91°	15°06'	+60'	91°	15°05'	+60'	91°	15°04'	+60'	91°	15°02'	+60'	92°	15°00'	+60'	90°	15
16	16°07'	+60'	90°	16°07'	+60'	91°	16°06'	+60'	91°	16°05'	+60'	91°	16°04'	+60'	91°	16°02'	+60'	92°	16°00'	+60'	90°	16
17	17°07'	+60'	90°	17°06'	+60'	90°	17°06'	+60'	91°	17°05'	+60'	91°	17°04'	+60'	91°	17°02'	+60'	92°	17°00'	+60'	90°	17
18	18°06'	+60'	90°	18°06'	+60'	90°	18°06'	+60'	91°	18°05'	+60'	91°	18°04'	+60'	91°	18°02'	+60'	92°	18°00'	+60'	90°	18
19	19°06'	+60'	90°	19°06'	+60'	90°	19°05'	+60'	91°	19°05'	+60'	91°	19°03'	+60'	91°	19°02'	+60'	92°	19°00'	+60'	90°	19
20	20°06'	+60'	90°	20°06'	+60'	90°	20°05'	+60'	91°	20°05'	+60'	91°	20°03'	+60'	91°	20°02'	+60'	92°	20°00'	+60'	90°	20
21	21°05'	+60'	90°	21°05'	+60'	90°	21°05'	+60'	90°	21°04'	+60'	91°	21°03'	+60'	91°	21°02'	+60'	92°	21°00'	+60'	90°	21
22	22°05'	+60'	90°	22°05'	+60'	90°	22°05'	+60'	90°	22°04'	+60'	91°	22°03'	+60'	91°	22°02'	+60'	92°	22°00'	+60'	90°	22
23	23°05'	+60'	89°	23°05'	+60'	90°	23°05'	+60'	90°	23°04'	+60'	91°	23°03'	+60'	91°	23°02'	+60'	92°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

88° 272° LHA — Latitude SAME as Declination — 88° 272° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

89° 271° LHA — Latitude SAME as Declination — 89° 271° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°06'	+60'	91°	0°05'	+60'	91°	0°04'	+60'	91°	0°03'	+60'	91°	0°02'	+60'	91°	0°01'	+60'	91°	0°00'	+60'	91°	0
1	1°06'	+60'	91°	1°05'	+60'	91°	1°04'	+60'	91°	1°03'	+60'	91°	1°02'	+60'	91°	1°01'	+60'	91°	1°00'	+60'	90°	1
2	2°06'	+60'	91°	2°05'	+60'	91°	2°04'	+60'	91°	2°03'	+60'	91°	2°02'	+60'	91°	2°01'	+60'	91°	2°00'	+60'	90°	2
3	3°05'	+60'	91°	3°05'	+60'	91°	3°04'	+60'	91°	3°03'	+60'	91°	3°02'	+60'	91°	3°01'	+60'	91°	3°00'	+60'	90°	3
4	4°05'	+60'	91°	4°04'	+60'	91°	4°04'	+60'	91°	4°03'	+60'	91°	4°02'	+60'	91°	4°01'	+60'	91°	4°00'	+60'	90°	4
5	5°05'	+60'	90°	5°04'	+60'	91°	5°03'	+60'	91°	5°03'	+60'	91°	5°02'	+60'	91°	5°01'	+60'	91°	5°00'	+60'	77°	5
6	6°04'	+60'	90°	6°04'	+60'	90°	6°03'	+60'	91°	6°03'	+60'	91°	6°02'	+60'	91°	6°01'	+60'	91°	6°00'	+60'	77°	6
7	7°04'	+60'	90°	7°04'	+60'	90°	7°03'	+60'	91°	7°03'	+60'	91°	7°02'	+60'	91°	7°01'	+60'	91°	7°00'	+60'	77°	7
8	8°04'	+60'	90°	8°03'	+60'	90°	8°03'	+60'	90°	8°02'	+60'	91°	8°02'	+60'	91°	8°01'	+60'	91°	8°00'	+60'	63°	8
9	9°03'	+60'	90°	9°03'	+60'	90°	9°03'	+60'	90°	9°02'	+60'	91°	9°02'	+60'	91°	9°01'	+60'	91°	9°00'	+60'	117°	9
10	10°03'	+60'	90°	10°03'	+60'	90°	10°03'	+60'	90°	10°02'	+60'	90°	10°02'	+60'	91°	10°01'	+60'	91°	10°00'	+60'	90°	10
11	11°03'	+60'	90°	11°03'	+60'	90°	11°03'	+60'	90°	11°02'	+60'	90°	11°02'	+60'	91°	11°01'	+60'	91°	11°00'	+60'	90°	11
12	12°02'	+60'	90°	12°02'	+60'	90°	12°02'	+60'	90°	12°02'	+60'	90°	12°02'	+60'	91°	12°01'	+60'	91°	12°00'	+60'	118°	12
13	13°02'	+60'	90°	13°02'	+60'	90°	13°02'	+60'	90°	13°02'	+60'	90°	13°02'	+60'	91°	13°01'	+60'	91°	13°00'	+60'	118°	13
14	14°02'	+60'	90°	14°02'	+60'	90°	14°02'	+60'	90°	14°02'	+60'	90°	14°02'	+60'	91°	14°01'	+60'	91°	14°00'	+60'	62°	14
15	15°01'	+60'	89°	15°02'	+60'	90°	15°02'	+60'	90°	15°02'	+60'	90°	15°02'	+60'	90°	15°01'	+60'	91°	15°00'	+60'	90°	15
16	16°01'	+60'	89°	16°01'	+60'	90°	16°02'	+60'	90°	16°02'	+60'	90°	16°01'	+60'	90°	16°01'	+60'	91°	16°00'	+60'	90°	16
17	17°01'	+60'	89°	17°01'	+60'	89°	17°02'	+60'	90°	17°02'	+60'	90°	17°01'	+60'	90°	17°01'	+60'	91°	17°00'	+60'	90°	17
18	18°00'	+60'	89°	18°01'	+60'	89°	18°01'	+60'	90°	18°02'	+60'	90°	18°01'	+60'	90°	18°01'	+60'	91°	18°00'	+60'	90°	18
19	19°00'	+60'	89°	19°01'	+60'	89°	19°01'	+60'	90°	19°02'	+60'	90°	19°01'	+60'	90°	19°01'	+60'	91°	19°00'	+60'	90°	19
20	19°59'	+60'	89°	20°00'	+60'	89°	20°01'	+60'	90°	20°01'	+60'	90°	20°01'	+60'	90°	20°01'	+60'	91°	20°00'	+60'	90°	20
21	20°59'	+60'	89°	21°00'	+60'	89°	21°01'	+60'	89°	21°01'	+60'	90°	21°01'	+60'	90°	21°01'	+60'	91°	21°00'	+60'	90°	21
22	21°59'	+60'	89°	22°00'	+60'	89°	22°01'	+60'	89°	22°01'	+60'	90°	22°01'	+60'	90°	22°01'	+60'	91°	22°00'	+60'	90°	22
23	22°58'	+60'	88°	23°00'	+60'	89°	23°01'	+60'	89°	23°01'	+60'	90°	23°01'	+60'	90°	23°01'	+60'	91°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

89° 271° LHA — Latitude SAME as Declination — 89° 271° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

90° 270° LHA — Latitude SAME or CONTRARY as Declination — 90° 270° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	0°00'	+60'	90°	0°00'	+60'	90°	0°00'	+60'	90°	0°00'	+60'	90°	0°00'	+60'	90°	0°00'	+60'	90°	0°00'	+60'	90°	0
1	1°00'	+60'	90°	1°00'	+60'	90°	1°00'	+60'	90°	1°00'	+60'	90°	1°00'	+60'	90°	1°00'	+60'	90°	1°00'	+60'	90°	1
2	1°59'	+60'	90°	2°00'	+60'	90°	2°00'	+60'	90°	2°00'	+60'	90°	2°00'	+60'	90°	2°00'	+60'	90°	2°00'	+60'	90°	2
3	2°59'	+60'	90°	2°59'	+60'	90°	3°00'	+60'	90°	3°00'	+60'	90°	3°00'	+60'	90°	3°00'	+60'	90°	3°00'	+60'	90°	3
4	3°59'	+60'	90°	3°59'	+60'	90°	3°59'	+60'	90°	4°00'	+60'	90°	4°00'	+60'	90°	4°00'	+60'	90°	4°00'	+60'	90°	4
5	4°58'	+60'	89°	4°59'	+60'	90°	4°59'	+60'	90°	5°00'	+60'	90°	5°00'	+60'	90°	5°00'	+60'	90°	5°00'	+60'	77°	5
6	5°58'	+60'	89°	5°59'	+60'	89°	5°59'	+60'	90°	6°00'	+60'	90°	6°00'	+60'	90°	6°00'	+60'	90°	6°00'	+60'	77°	6
7	6°58'	+60'	89°	6°58'	+60'	89°	6°59'	+60'	90°	6°59'	+60'	90°	7°00'	+60'	90°	7°00'	+60'	90°	7°00'	+60'	77°	7
8	7°57'	+60'	89°	7°58'	+60'	89°	7°59'	+60'	89°	7°59'	+60'	90°	8°00'	+60'	90°	8°00'	+60'	90°	8°00'	+60'	63°	8
9	8°57'	+60'	89°	8°58'	+60'	89°	8°59'	+60'	89°	8°59'	+60'	90°	9°00'	+60'	90°	9°00'	+60'	90°	9°00'	+60'	117°	9
10	9°57'	+60'	89°	9°58'	+60'	89°	9°59'	+60'	89°	9°59'	+60'	89°	10°00'	+60'	90°	10°00'	+60'	90°	10°00'	+60'	90°	10
11	10°56'	+60'	89°	10°57'	+60'	89°	10°58'	+60'	89°	10°59'	+60'	89°	11°00'	+60'	90°	11°00'	+60'	90°	11°00'	+60'	90°	11
12	11°56'	+60'	89°	11°57'	+60'	89°	11°58'	+60'	89°	11°59'	+60'	89°	12°00'	+60'	90°	12°00'	+60'	90°	12°00'	+60'	118°	12
13	12°56'	+60'	89°	12°57'	+60'	89°	12°58'	+60'	89°	12°59'	+60'	89°	13°00'	+60'	90°	13°00'	+60'	90°	13°00'	+60'	118°	13
14	13°55'	+60'	89°	13°57'	+60'	89°	13°58'	+60'	89°	13°59'	+60'	89°	13°59'	+60'	90°	14°00'	+60'	90°	14°00'	+60'	62°	14
15	14°55'	+60'	88°	14°56'	+60'	89°	14°58'	+60'	89°	14°59'	+60'	89°	14°59'	+60'	89°	15°00'	+60'	90°	15°00'	+60'	90°	15
16	15°55'	+60'	88°	15°56'	+60'	89°	15°58'	+60'	89°	15°59'	+60'	89°	15°59'	+60'	89°	16°00'	+60'	90°	16°00'	+60'	90°	16
17	16°54'	+60'	88°	16°56'	+60'	88°	16°57'	+60'	89°	16°59'	+60'	89°	16°59'	+60'	89°	17°00'	+60'	90°	17°00'	+60'	90°	17
18	17°54'	+60'	88°	17°56'	+60'	88°	17°57'	+60'	89°	17°58'	+60'	89°	17°59'	+60'	89°	18°00'	+60'	90°	18°00'	+60'	90°	18
19	18°54'	+60'	88°	18°55'	+60'	88°	18°57'	+60'	89°	18°58'	+60'	89°	18°59'	+60'	89°	19°00'	+60'	90°	19°00'	+60'	90°	19
20	19°53'	+60'	88°	19°55'	+60'	88°	19°57'	+60'	89°	19°58'	+60'	89°	19°59'	+60'	89°	20°00'	+60'	90°	20°00'	+60'	90°	20
21	20°53'	+60'	88°	20°55'	+60'	88°	20°57'	+60'	88°	20°58'	+60'	89°	20°59'	+60'	89°	21°00'	+60'	90°	21°00'	+60'	90°	21
22	21°52'	+60'	88°	21°55'	+60'	88°	21°57'	+60'	88°	21°58'	+60'	89°	21°59'	+60'	89°	22°00'	+60'	90°	22°00'	+60'	90°	22
23	22°52'	+60'	87°	22°54'	+60'	88°	22°56'	+60'	88°	22°58'	+60'	89°	22°59'	+60'	89°	23°00'	+60'	90°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

90° 270° LHA — Latitude CONTRARY or SAME as Declination — 90° 270° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

89° 271° LHA — Latitude CONTRARY to Declination — 89° 271° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	0°06'	-60'	91°	0°05'	-60'	91°	0°04'	-60'	91°	0°03'	-60'	91°	0°02'	-60'	91°	0°01'	-60'	91°	0°00'	-60'	91°	0
1	0°53'	+60'	89°	0°55'	+60'	89°	0°56'	+60'	89°	0°57'	+60'	89°	0°58'	+60'	89°	0°59'	+60'	89°	1°00'	+60'	90°	1
2	1°53'	+60'	89°	1°54'	+60'	89°	1°56'	+60'	89°	1°57'	+60'	89°	1°58'	+60'	89°	1°59'	+60'	89°	2°00'	+60'	90°	2
3	2°53'	+60'	89°	2°54'	+60'	89°	2°55'	+60'	89°	2°57'	+60'	89°	2°58'	+60'	89°	2°59'	+60'	89°	3°00'	+60'	90°	3
4	3°52'	+60'	89°	3°54'	+60'	89°	3°55'	+60'	89°	3°57'	+60'	89°	3°58'	+60'	89°	3°59'	+60'	89°	4°00'	+60'	90°	4
5	4°52'	+60'	88°	4°54'	+60'	89°	4°55'	+60'	89°	4°56'	+60'	89°	4°58'	+60'	89°	4°59'	+60'	89°	5°00'	+60'	77°	5
6	5°52'	+60'	88°	5°53'	+60'	88°	5°55'	+60'	89°	5°56'	+60'	89°	5°58'	+60'	89°	5°59'	+60'	89°	6°00'	+60'	77°	6
7	6°51'	+60'	88°	6°53'	+60'	88°	6°55'	+60'	89°	6°56'	+60'	89°	6°58'	+60'	89°	6°59'	+60'	89°	7°00'	+60'	77°	7
8	7°51'	+60'	88°	7°53'	+60'	88°	7°55'	+60'	88°	7°56'	+60'	89°	7°58'	+60'	89°	7°59'	+60'	89°	8°00'	+60'	63°	8
9	8°51'	+60'	88°	8°53'	+60'	88°	8°54'	+60'	88°	8°56'	+60'	89°	8°58'	+60'	89°	8°59'	+60'	89°	9°00'	+60'	117°	9
10	9°50'	+60'	88°	9°52'	+60'	88°	9°54'	+60'	88°	9°56'	+60'	88°	9°58'	+60'	89°	9°59'	+60'	89°	10°00'	+60'	90°	10
11	10°50'	+60'	88°	10°52'	+60'	88°	10°54'	+60'	88°	10°56'	+60'	88°	10°57'	+60'	89°	10°59'	+60'	89°	11°00'	+60'	90°	11
12	11°50'	+60'	88°	11°52'	+60'	88°	11°54'	+60'	88°	11°56'	+60'	88°	11°57'	+60'	89°	11°59'	+60'	89°	12°00'	+60'	118°	12
13	12°49'	+60'	88°	12°52'	+60'	88°	12°54'	+60'	88°	12°56'	+60'	88°	12°57'	+60'	89°	12°59'	+60'	89°	13°00'	+60'	118°	13
14	13°49'	+60'	88°	13°52'	+60'	88°	13°54'	+60'	88°	13°56'	+60'	88°	13°57'	+60'	89°	13°59'	+60'	89°	14°00'	+60'	62°	14
15	14°49'	+60'	87°	14°51'	+60'	88°	14°54'	+60'	88°	14°56'	+60'	88°	14°57'	+60'	88°	14°59'	+60'	89°	15°00'	+60'	90°	15
16	15°48'	+60'	87°	15°51'	+60'	88°	15°53'	+60'	88°	15°56'	+60'	88°	15°57'	+60'	88°	15°59'	+60'	89°	16°00'	+60'	90°	16
17	16°48'	+60'	87°	16°51'	+60'	87°	16°53'	+60'	88°	16°55'	+60'	88°	16°57'	+60'	88°	16°59'	+60'	89°	17°00'	+60'	90°	17
18	17°48'	+60'	87°	17°51'	+60'	87°	17°53'	+60'	88°	17°55'	+60'	88°	17°57'	+60'	88°	17°59'	+60'	89°	18°00'	+60'	90°	18
19	18°47'	+60'	87°	18°50'	+60'	87°	18°53'	+60'	88°	18°55'	+60'	88°	18°57'	+60'	88°	18°59'	+60'	89°	19°00'	+60'	90°	19
20	19°47'	+60'	87°	19°50'	+60'	87°	19°53'	+60'	88°	19°55'	+60'	88°	19°57'	+60'	88°	19°59'	+60'	89°	20°00'	+60'	90°	20
21	20°47'	+60'	87°	20°50'	+60'	87°	20°53'	+60'	87°	20°55'	+60'	88°	20°57'	+60'	88°	20°59'	+60'	89°	21°00'	+60'	90°	21
22	21°46'	+60'	87°	21°49'	+60'	87°	21°52'	+60'	87°	21°55'	+60'	88°	21°57'	+60'	88°	21°59'	+60'	89°	22°00'	+60'	90°	22
23	22°46'	+60'	86°	22°49'	+60'	87°	22°52'	+60'	87°	22°55'	+60'	88°	22°57'	+60'	88°	22°59'	+60'	89°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

91° 269° LHA — Latitude SAME as DECLINATION — 91° 269° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

88° 272° LHA — Latitude CONTRARY to Declination — 88° 272° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	0°13'	-60'	92°	0°10'	-60'	92°	0°08'	-60'	92°	0°06'	-60'	92°	0°04'	-60'	92°	0°02'	-60'	92°	0°00'	-60'	92°	0
1	0°47'	+60'	88°	0°49'	+60'	88°	0°51'	+60'	88°	0°54'	+60'	88°	0°56'	+60'	88°	0°58'	+60'	88°	1°00'	+60'	87°	1
2	1°47'	+60'	88°	1°49'	+60'	88°	1°51'	+60'	88°	1°54'	+60'	88°	1°56'	+60'	88°	1°58'	+60'	88°	2°00'	+60'	90°	2
3	2°46'	+60'	88°	2°49'	+60'	88°	2°51'	+60'	88°	2°53'	+60'	88°	2°56'	+60'	88°	2°58'	+60'	88°	3°00'	+60'	90°	3
4	3°46'	+60'	88°	3°49'	+60'	88°	3°51'	+60'	88°	3°53'	+60'	88°	3°56'	+60'	88°	3°58'	+60'	88°	4°00'	+60'	90°	4
5	4°46'	+60'	87°	4°48'	+60'	88°	4°51'	+60'	88°	4°53'	+60'	88°	4°56'	+60'	88°	4°58'	+60'	88°	5°00'	+60'	77°	5
6	5°45'	+60'	87°	5°48'	+60'	87°	5°51'	+60'	88°	5°53'	+60'	88°	5°56'	+60'	88°	5°58'	+60'	88°	6°00'	+60'	77°	6
7	6°45'	+60'	87°	6°48'	+60'	87°	6°51'	+60'	88°	6°53'	+60'	88°	6°56'	+60'	88°	6°58'	+60'	88°	7°00'	+60'	77°	7
8	7°45'	+60'	87°	7°48'	+60'	87°	7°50'	+60'	87°	7°53'	+60'	88°	7°56'	+60'	88°	7°58'	+60'	88°	8°00'	+60'	63°	8
9	8°44'	+60'	87°	8°47'	+60'	87°	8°50'	+60'	87°	8°53'	+60'	88°	8°55'	+60'	88°	8°58'	+60'	88°	9°00'	+60'	117°	9
10	9°44'	+60'	87°	9°47'	+60'	87°	9°50'	+60'	87°	9°53'	+60'	87°	9°55'	+60'	88°	9°58'	+60'	88°	10°00'	+60'	90°	10
11	10°44'	+60'	87°	10°47'	+60'	87°	10°50'	+60'	87°	10°53'	+60'	87°	10°55'	+60'	88°	10°58'	+60'	88°	11°00'	+60'	90°	11
12	11°43'	+60'	87°	11°47'	+60'	87°	11°50'	+60'	87°	11°53'	+60'	87°	11°55'	+60'	88°	11°58'	+60'	88°	12°00'	+60'	118°	12
13	12°43'	+60'	87°	12°47'	+60'	87°	12°50'	+60'	87°	12°53'	+60'	87°	12°55'	+60'	88°	12°58'	+60'	88°	13°00'	+60'	118°	13
14	13°43'	+60'	87°	13°46'	+60'	87°	13°50'	+60'	87°	13°53'	+60'	87°	13°55'	+60'	88°	13°58'	+60'	88°	14°00'	+60'	62°	14
15	14°42'	+60'	86°	14°46'	+60'	87°	14°49'	+60'	87°	14°52'	+60'	87°	14°55'	+60'	87°	14°58'	+60'	88°	15°00'	+60'	90°	15
16	15°42'	+60'	86°	15°46'	+60'	87°	15°49'	+60'	87°	15°52'	+60'	87°	15°55'	+60'	87°	15°58'	+60'	88°	16°00'	+60'	90°	16
17	16°42'	+60'	86°	16°46'	+60'	86°	16°49'	+60'	87°	16°52'	+60'	87°	16°55'	+60'	87°	16°58'	+60'	88°	17°00'	+60'	90°	17
18	17°41'	+60'	86°	17°45'	+60'	86°	17°49'	+60'	87°	17°52'	+60'	87°	17°55'	+60'	87°	17°58'	+60'	88°	18°00'	+60'	90°	18
19	18°41'	+60'	86°	18°45'	+60'	86°	18°49'	+60'	87°	18°52'	+60'	87°	18°55'	+60'	87°	18°58'	+60'	88°	19°00'	+60'	90°	19
20	19°41'	+60'	86°	19°45'	+60'	86°	19°49'	+60'	87°	19°52'	+60'	87°	19°55'	+60'	87°	19°58'	+60'	88°	20°00'	+60'	90°	20
21	20°40'	+60'	86°	20°45'	+60'	86°	20°48'	+60'	86°	20°52'	+60'	87°	20°55'	+60'	87°	20°58'	+60'	88°	21°00'	+60'	90°	21
22	21°40'	+60'	86°	21°44'	+60'	86°	21°48'	+60'	86°	21°52'	+60'	87°	21°55'	+60'	87°	21°58'	+60'	88°	22°00'	+60'	90°	22
23	22°39'	+60'	85°	22°44'	+60'	86°	22°48'	+60'	86°	22°52'	+60'	87°	22°55'	+60'	87°	22°58'	+60'	88°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

92° 268° LHA — Latitude SAME as DECLINATION — 92° 268° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

87° 273° LHA — Latitude CONTRARY to Declination — 87° 273° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	0°19'	-60'	93°	0°16'	-60'	93°	0°13'	-60'	93°	0°09'	-60'	93°	0°06'	-60'	93°	0°03'	-60'	93°	0°00'	-60'	93°	0
1	0°41'	+60'	87°	0°44'	+60'	87°	0°47'	+60'	87°	0°51'	+60'	87°	0°54'	+60'	87°	0°57'	+60'	87°	1°00'	+60'	87°	1
2	1°41'	+60'	87°	1°44'	+60'	87°	1°47'	+60'	87°	1°50'	+60'	87°	1°54'	+60'	87°	1°57'	+60'	87°	2°00'	+60'	90°	2
3	2°40'	+60'	87°	2°44'	+60'	87°	2°47'	+60'	87°	2°50'	+60'	87°	2°54'	+60'	87°	2°57'	+60'	87°	3°00'	+60'	90°	3
4	3°40'	+60'	87°	3°43'	+60'	87°	3°47'	+60'	87°	3°50'	+60'	87°	3°54'	+60'	87°	3°57'	+60'	87°	4°00'	+60'	90°	4
5	4°40'	+60'	86°	4°43'	+60'	87°	4°47'	+60'	87°	4°50'	+60'	87°	4°54'	+60'	87°	4°57'	+60'	87°	5°00'	+60'	77°	5
6	5°39'	+60'	86°	5°43'	+60'	86°	5°47'	+60'	87°	5°50'	+60'	87°	5°54'	+60'	87°	5°57'	+60'	87°	6°00'	+60'	77°	6
7	6°39'	+60'	86°	6°43'	+60'	86°	6°46'	+60'	87°	6°50'	+60'	87°	6°53'	+60'	87°	6°57'	+60'	87°	7°00'	+60'	77°	7
8	7°39'	+60'	86°	7°42'	+60'	86°	7°46'	+60'	86°	7°50'	+60'	87°	7°53'	+60'	87°	7°57'	+60'	87°	8°00'	+60'	63°	8
9	8°38'	+60'	86°	8°42'	+60'	86°	8°46'	+60'	86°	8°50'	+60'	87°	8°53'	+60'	87°	8°57'	+60'	87°	9°00'	+60'	117°	9
10	9°38'	+60'	86°	9°42'	+60'	86°	9°46'	+60'	86°	9°50'	+60'	86°	9°53'	+60'	87°	9°57'	+60'	87°	10°00'	+60'	90°	10
11	10°38'	+60'	86°	10°42'	+60'	86°	10°46'	+60'	86°	10°50'	+60'	86°	10°53'	+60'	87°	10°57'	+60'	87°	11°00'	+60'	90°	11
12	11°37'	+60'	86°	11°42'	+60'	86°	11°46'	+60'	86°	11°50'	+60'	86°	11°53'	+60'	87°	11°57'	+60'	87°	12°00'	+60'	118°	12
13	12°37'	+60'	86°	12°41'	+60'	86°	12°46'	+60'	86°	12°49'	+60'	86°	12°53'	+60'	87°	12°57'	+60'	87°	13°00'	+60'	118°	13
14	13°37'	+60'	86°	13°41'	+60'	86°	13°45'	+60'	86°	13°49'	+60'	86°	13°53'	+60'	87°	13°57'	+60'	87°	14°00'	+60'	62°	14
15	14°36'	+60'	85°	14°41'	+60'	86°	14°45'	+60'	86°	14°49'	+60'	86°	14°53'	+60'	86°	14°57'	+60'	87°	15°00'	+60'	90°	15
16	15°36'	+60'	85°	15°41'	+60'	86°	15°45'	+60'	86°	15°49'	+60'	86°	15°53'	+60'	86°	15°57'	+60'	87°	16°00'	+60'	90°	16
17	16°35'	+60'	85°	16°40'	+60'	85°	16°45'	+60'	86°	16°49'	+60'	86°	16°53'	+60'	86°	16°57'	+60'	87°	17°00'	+60'	90°	17
18	17°35'	+60'	85°	17°40'	+60'	85°	17°45'	+60'	86°	17°49'	+60'	86°	17°53'	+60'	86°	17°57'	+60'	87°	18°00'	+60'	90°	18
19	18°35'	+60'	85°	18°40'	+60'	85°	18°45'	+60'	86°	18°49'	+60'	86°	18°53'	+60'	86°	18°57'	+60'	87°	19°00'	+60'	90°	19
20	19°34'	+60'	85°	19°40'	+60'	85°	19°44'	+60'	86°	19°49'	+60'	86°	19°53'	+60'	86°	19°57'	+60'	87°	20°00'	+60'	90°	20
21	20°34'	+60'	85°	20°39'	+60'	85°	20°44'	+60'	85°	20°49'	+60'	86°	20°53'	+60'	86°	20°57'	+60'	87°	21°00'	+60'	90°	21
22	21°34'	+60'	85°	21°39'	+60'	85°	21°44'	+60'	85°	21°49'	+60'	86°	21°53'	+60'	86°	21°57'	+60'	87°	22°00'	+60'	90°	22
23	22°33'	+60'	84°	22°39'	+60'	85°	22°44'	+60'	85°	22°49'	+60'	86°	22°53'	+60'	86°	22°57'	+60'	87°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

93° 267° LHA — Latitude SAME as DECLINATION — 93° 267° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

86° 274° LHA — Latitude CONTRARY to Declination — 86° 274° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°25'	-60'	94°	0°21'	-60'	94°	0°17'	-60'	94°	0°13'	-60'	94°	0°08'	-60'	94°	0°04'	-60'	94°	0°00'	-60'	94°	0
1	0°35'	+60'	86°	0°39'	+60'	86°	0°43'	+60'	86°	0°47'	+60'	86°	0°52'	+60'	86°	0°56'	+60'	86°	1°00'	+60'	87°	1
2	1°34'	+60'	86°	1°39'	+60'	86°	1°43'	+60'	86°	1°47'	+60'	86°	1°52'	+60'	86°	1°56'	+60'	86°	2°00'	+60'	83°	2
3	2°34'	+60'	86°	2°38'	+60'	86°	2°43'	+60'	86°	2°47'	+60'	86°	2°52'	+60'	86°	2°56'	+60'	86°	3°00'	+60'	83°	3
4	3°34'	+60'	86°	3°38'	+60'	86°	3°43'	+60'	86°	3°47'	+60'	86°	3°51'	+60'	86°	3°56'	+60'	86°	4°00'	+60'	90°	4
5	4°33'	+60'	85°	4°38'	+60'	86°	4°43'	+60'	86°	4°47'	+60'	86°	4°51'	+60'	86°	4°56'	+60'	86°	5°00'	+60'	77°	5
6	5°33'	+60'	85°	5°38'	+60'	85°	5°42'	+60'	86°	5°47'	+60'	86°	5°51'	+60'	86°	5°56'	+60'	86°	6°00'	+60'	77°	6
7	6°33'	+60'	85°	6°38'	+60'	85°	6°42'	+60'	86°	6°47'	+60'	86°	6°51'	+60'	86°	6°56'	+60'	86°	7°00'	+60'	77°	7
8	7°32'	+60'	85°	7°37'	+60'	85°	7°42'	+60'	85°	7°47'	+60'	86°	7°51'	+60'	86°	7°56'	+60'	86°	8°00'	+60'	63°	8
9	8°32'	+60'	85°	8°37'	+60'	85°	8°42'	+60'	85°	8°47'	+60'	86°	8°51'	+60'	86°	8°56'	+60'	86°	9°00'	+60'	117°	9
10	9°32'	+60'	85°	9°37'	+60'	85°	9°42'	+60'	85°	9°47'	+60'	85°	9°51'	+60'	86°	9°56'	+60'	86°	10°00'	+60'	90°	10
11	10°31'	+60'	85°	10°37'	+60'	85°	10°42'	+60'	85°	10°47'	+60'	85°	10°51'	+60'	86°	10°56'	+60'	86°	11°00'	+60'	90°	11
12	11°31'	+60'	85°	11°36'	+60'	85°	11°42'	+60'	85°	11°46'	+60'	85°	11°51'	+60'	86°	11°56'	+60'	86°	12°00'	+60'	118°	12
13	12°31'	+60'	85°	12°36'	+60'	85°	12°41'	+60'	85°	12°46'	+60'	85°	12°51'	+60'	86°	12°56'	+60'	86°	13°00'	+60'	118°	13
14	13°30'	+60'	85°	13°36'	+60'	85°	13°41'	+60'	85°	13°46'	+60'	85°	13°51'	+60'	86°	13°56'	+60'	86°	14°00'	+60'	62°	14
15	14°30'	+60'	84°	14°36'	+60'	85°	14°41'	+60'	85°	14°46'	+60'	85°	14°51'	+60'	85°	14°56'	+60'	86°	15°00'	+60'	90°	15
16	15°30'	+60'	84°	15°35'	+60'	85°	15°41'	+60'	85°	15°46'	+60'	85°	15°51'	+60'	85°	15°56'	+60'	86°	16°00'	+60'	90°	16
17	16°29'	+60'	84°	16°35'	+60'	84°	16°41'	+60'	85°	16°46'	+60'	85°	16°51'	+60'	85°	16°56'	+60'	86°	17°00'	+60'	90°	17
18	17°29'	+60'	84°	17°35'	+60'	84°	17°41'	+60'	85°	17°46'	+60'	85°	17°51'	+60'	85°	17°56'	+60'	86°	18°00'	+60'	90°	18
19	18°28'	+60'	84°	18°35'	+60'	84°	18°40'	+60'	85°	18°46'	+60'	85°	18°51'	+60'	85°	18°56'	+60'	86°	19°00'	+60'	90°	19
20	19°28'	+60'	84°	19°34'	+60'	84°	19°40'	+60'	85°	19°46'	+60'	85°	19°51'	+60'	85°	19°56'	+60'	86°	20°00'	+60'	90°	20
21	20°28'	+60'	84°	20°34'	+60'	84°	20°40'	+60'	84°	20°46'	+60'	85°	20°51'	+60'	85°	20°56'	+60'	86°	21°00'	+60'	90°	21
22	21°27'	+60'	84°	21°34'	+60'	84°	21°40'	+60'	84°	21°46'	+60'	85°	21°51'	+60'	85°	21°56'	+60'	86°	22°00'	+60'	90°	22
23	22°27'	+60'	83°	22°34'	+60'	84°	22°40'	+60'	84°	22°45'	+60'	85°	22°51'	+60'	85°	22°56'	+60'	86°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

94° 266° LHA — Latitude SAME as DECLINATION — 94° 266° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

85° 275° LHA — Latitude CONTRARY to Declination — 85° 275° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°31'	-60'	95°	0°26'	-60'	95°	0°21'	-60'	95°	0°16'	-60'	95°	0°10'	-60'	95°	0°05'	-60'	95°	0°00'	-60'	95°	0
1	0°28'	+60'	85°	0°34'	+60'	85°	0°39'	+60'	85°	0°44'	+60'	85°	0°50'	+60'	85°	0°55'	+60'	85°	1°00'	+60'	83°	1
2	1°28'	+60'	85°	1°33'	+60'	85°	1°39'	+60'	85°	1°44'	+60'	85°	1°49'	+60'	85°	1°55'	+60'	85°	2°00'	+60'	83°	2
3	2°28'	+60'	85°	2°33'	+60'	85°	2°39'	+60'	85°	2°44'	+60'	85°	2°49'	+60'	85°	2°55'	+60'	85°	3°00'	+60'	83°	3
4	3°27'	+60'	85°	3°33'	+60'	85°	3°39'	+60'	85°	3°44'	+60'	85°	3°49'	+60'	85°	3°55'	+60'	85°	4°00'	+60'	90°	4
5	4°27'	+60'	85°	4°33'	+60'	85°	4°38'	+60'	85°	4°44'	+60'	85°	4°49'	+60'	85°	4°55'	+60'	85°	5°00'	+60'	77°	5
6	5°27'	+60'	84°	5°33'	+60'	84°	5°38'	+60'	85°	5°44'	+60'	85°	5°49'	+60'	85°	5°55'	+60'	85°	6°00'	+60'	77°	6
7	6°26'	+60'	84°	6°32'	+60'	84°	6°38'	+60'	85°	6°44'	+60'	85°	6°49'	+60'	85°	6°55'	+60'	85°	7°00'	+60'	77°	7
8	7°26'	+60'	84°	7°32'	+60'	84°	7°38'	+60'	84°	7°44'	+60'	85°	7°49'	+60'	85°	7°55'	+60'	85°	8°00'	+60'	63°	8
9	8°26'	+60'	84°	8°32'	+60'	84°	8°38'	+60'	84°	8°44'	+60'	85°	8°49'	+60'	85°	8°55'	+60'	85°	9°00'	+60'	117°	9
10	9°25'	+60'	84°	9°32'	+60'	84°	9°38'	+60'	84°	9°43'	+60'	84°	9°49'	+60'	85°	9°55'	+60'	85°	10°00'	+60'	90°	10
11	10°25'	+60'	84°	10°31'	+60'	84°	10°37'	+60'	84°	10°43'	+60'	84°	10°49'	+60'	85°	10°55'	+60'	85°	11°00'	+60'	90°	11
12	11°25'	+60'	84°	11°31'	+60'	84°	11°37'	+60'	84°	11°43'	+60'	84°	11°49'	+60'	85°	11°55'	+60'	85°	12°00'	+60'	118°	12
13	12°24'	+60'	84°	12°31'	+60'	84°	12°37'	+60'	84°	12°43'	+60'	84°	12°49'	+60'	85°	12°55'	+60'	85°	13°00'	+60'	118°	13
14	13°24'	+60'	84°	13°31'	+60'	84°	13°37'	+60'	84°	13°43'	+60'	84°	13°49'	+60'	85°	13°55'	+60'	85°	14°00'	+60'	62°	14
15	14°24'	+60'	83°	14°30'	+60'	84°	14°37'	+60'	84°	14°43'	+60'	84°	14°49'	+60'	84°	14°55'	+60'	85°	15°00'	+60'	90°	15
16	15°23'	+60'	83°	15°30'	+60'	84°	15°37'	+60'	84°	15°43'	+60'	84°	15°49'	+60'	84°	15°55'	+60'	85°	16°00'	+60'	90°	16
17	16°23'	+60'	83°	16°30'	+60'	84°	16°37'	+60'	84°	16°43'	+60'	84°	16°49'	+60'	84°	16°55'	+60'	85°	17°00'	+60'	90°	17
18	17°23'	+60'	83°	17°30'	+60'	83°	17°36'	+60'	84°	17°43'	+60'	84°	17°49'	+60'	84°	17°55'	+60'	85°	18°00'	+60'	90°	18
19	18°22'	+60'	83°	18°29'	+60'	83°	18°36'	+60'	84°	18°43'	+60'	84°	18°49'	+60'	84°	18°55'	+60'	85°	19°00'	+60'	90°	19
20	19°22'	+60'	83°	19°29'	+60'	83°	19°36'	+60'	84°	19°43'	+60'	84°	19°49'	+60'	84°	19°55'	+60'	85°	20°00'	+60'	90°	20
21	20°22'	+60'	83°	20°29'	+60'	83°	20°36'	+60'	83°	20°43'	+60'	84°	20°49'	+60'	84°	20°55'	+60'	85°	21°00'	+60'	90°	21
22	21°21'	+60'	83°	21°29'	+60'	83°	21°36'	+60'	83°	21°42'	+60'	84°	21°49'	+60'	84°	21°55'	+60'	85°	22°00'	+60'	90°	22
23	22°21'	+60'	83°	22°28'	+60'	83°	22°36'	+60'	83°	22°42'	+60'	84°	22°49'	+60'	84°	22°55'	+60'	85°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

95° 265° LHA — Latitude SAME as DECLINATION — 95° 265° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

84° 276° LHA — Latitude CONTRARY to Declination — 84° 276° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	0°38'	-60'	96°	0°31'	-60'	96°	0°25'	-60'	96°	0°19'	-60'	96°	0°13'	-60'	96°	0°06'	-60'	96°	0°00'	-60'	96°	0
1	0°22'	+60'	84°	0°28'	+60'	84°	0°35'	+60'	84°	0°41'	+60'	84°	0°47'	+60'	84°	0°54'	+60'	84°	1°00'	+60'	83°	1
2	1°22'	+60'	84°	1°28'	+60'	84°	1°35'	+60'	84°	1°41'	+60'	84°	1°47'	+60'	84°	1°54'	+60'	84°	2°00'	+60'	83°	2
3	2°21'	+60'	84°	2°28'	+60'	84°	2°34'	+60'	84°	2°41'	+60'	84°	2°47'	+60'	84°	2°54'	+60'	84°	3°00'	+60'	83°	3
4	3°21'	+60'	84°	3°28'	+60'	84°	3°34'	+60'	84°	3°41'	+60'	84°	3°47'	+60'	84°	3°54'	+60'	84°	4°00'	+60'	90°	4
5	4°21'	+60'	84°	4°28'	+60'	84°	4°34'	+60'	84°	4°41'	+60'	84°	4°47'	+60'	84°	4°54'	+60'	84°	5°00'	+60'	77°	5
6	5°20'	+60'	83°	5°27'	+60'	84°	5°34'	+60'	84°	5°41'	+60'	84°	5°47'	+60'	84°	5°54'	+60'	84°	6°00'	+60'	77°	6
7	6°20'	+60'	83°	6°27'	+60'	83°	6°34'	+60'	84°	6°41'	+60'	84°	6°47'	+60'	84°	6°54'	+60'	84°	7°00'	+60'	77°	7
8	7°20'	+60'	83°	7°27'	+60'	83°	7°34'	+60'	83°	7°41'	+60'	84°	7°47'	+60'	84°	7°54'	+60'	84°	8°00'	+60'	63°	8
9	8°19'	+60'	83°	8°27'	+60'	83°	8°34'	+60'	83°	8°40'	+60'	84°	8°47'	+60'	84°	8°54'	+60'	84°	9°00'	+60'	117°	9
10	9°19'	+60'	83°	9°26'	+60'	83°	9°33'	+60'	83°	9°40'	+60'	83°	9°47'	+60'	84°	9°54'	+60'	84°	10°00'	+60'	90°	10
11	10°19'	+60'	83°	10°26'	+60'	83°	10°33'	+60'	83°	10°40'	+60'	83°	10°47'	+60'	84°	10°54'	+60'	84°	11°00'	+60'	90°	11
12	11°18'	+60'	83°	11°26'	+60'	83°	11°33'	+60'	83°	11°40'	+60'	83°	11°47'	+60'	84°	11°54'	+60'	84°	12°00'	+60'	118°	12
13	12°18'	+60'	83°	12°26'	+60'	83°	12°33'	+60'	83°	12°40'	+60'	83°	12°47'	+60'	84°	12°54'	+60'	84°	13°00'	+60'	118°	13
14	13°18'	+60'	83°	13°25'	+60'	83°	13°33'	+60'	83°	13°40'	+60'	83°	13°47'	+60'	84°	13°54'	+60'	84°	14°00'	+60'	62°	14
15	14°17'	+60'	82°	14°25'	+60'	83°	14°33'	+60'	83°	14°40'	+60'	83°	14°47'	+60'	83°	14°54'	+60'	84°	15°00'	+60'	90°	15
16	15°17'	+60'	82°	15°25'	+60'	83°	15°33'	+60'	83°	15°40'	+60'	83°	15°47'	+60'	83°	15°54'	+60'	84°	16°00'	+60'	90°	16
17	16°17'	+60'	82°	16°25'	+60'	83°	16°32'	+60'	83°	16°40'	+60'	83°	16°47'	+60'	83°	16°54'	+60'	84°	17°00'	+60'	90°	17
18	17°16'	+60'	82°	17°24'	+60'	82°	17°32'	+60'	83°	17°40'	+60'	83°	17°47'	+60'	83°	17°54'	+60'	84°	18°00'	+60'	90°	18
19	18°16'	+60'	82°	18°24'	+60'	82°	18°32'	+60'	83°	18°40'	+60'	83°	18°47'	+60'	83°	18°54'	+60'	84°	19°00'	+60'	90°	19
20	19°16'	+60'	82°	19°24'	+60'	82°	19°32'	+60'	83°	19°40'	+60'	83°	19°47'	+60'	83°	19°54'	+60'	84°	20°00'	+60'	90°	20
21	20°15'	+60'	82°	20°24'	+60'	82°	20°32'	+60'	82°	20°39'	+60'	83°	20°47'	+60'	83°	20°54'	+60'	84°	21°00'	+60'	90°	21
22	21°15'	+60'	82°	21°23'	+60'	82°	21°32'	+60'	82°	21°39'	+60'	83°	21°47'	+60'	83°	21°54'	+60'	84°	22°00'	+60'	90°	22
23	22°15'	+60'	82°	22°23'	+60'	82°	22°31'	+60'	82°	22°39'	+60'	83°	22°47'	+60'	83°	22°54'	+60'	84°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

96° 264° LHA — Latitude SAME as DECLINATION — 96° 264° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

83° 277° LHA — Latitude CONTRARY to Declination — 83° 277° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	0°44'	-60'	97°	0°37'	-60'	97°	0°29'	-60'	97°	0°22'	-60'	97°	0°15'	-60'	97°	0°07'	-60'	97°	0°00'	-60'	97°	0
1	0°16'	+60'	83°	0°23'	+60'	83°	0°31'	+60'	83°	0°38'	+60'	83°	0°45'	+60'	83°	0°53'	+60'	83°	1°00'	+60'	83°	1
2	1°16'	+60'	83°	1°23'	+60'	83°	1°30'	+60'	83°	1°38'	+60'	83°	1°45'	+60'	83°	1°53'	+60'	83°	2°00'	+60'	83°	2
3	2°15'	+60'	83°	2°23'	+60'	83°	2°30'	+60'	83°	2°38'	+60'	83°	2°45'	+60'	83°	2°53'	+60'	83°	3°00'	+60'	83°	3
4	3°15'	+60'	83°	3°23'	+60'	83°	3°30'	+60'	83°	3°38'	+60'	83°	3°45'	+60'	83°	3°53'	+60'	83°	4°00'	+60'	77°	4
5	4°15'	+60'	83°	4°22'	+60'	83°	4°30'	+60'	83°	4°38'	+60'	83°	4°45'	+60'	83°	4°53'	+60'	83°	5°00'	+60'	63°	5
6	5°14'	+60'	82°	5°22'	+60'	83°	5°30'	+60'	83°	5°38'	+60'	83°	5°45'	+60'	83°	5°53'	+60'	83°	6°00'	+60'	77°	6
7	6°14'	+60'	82°	6°22'	+60'	82°	6°30'	+60'	83°	6°38'	+60'	83°	6°45'	+60'	83°	6°53'	+60'	83°	7°00'	+60'	77°	7
8	7°14'	+60'	82°	7°22'	+60'	82°	7°30'	+60'	82°	7°37'	+60'	83°	7°45'	+60'	83°	7°53'	+60'	83°	8°00'	+60'	63°	8
9	8°13'	+60'	82°	8°21'	+60'	82°	8°29'	+60'	82°	8°37'	+60'	83°	8°45'	+60'	83°	8°53'	+60'	83°	9°00'	+60'	117°	9
10	9°13'	+60'	82°	9°21'	+60'	82°	9°29'	+60'	82°	9°37'	+60'	82°	9°45'	+60'	83°	9°53'	+60'	83°	10°00'	+60'	90°	10
11	10°13'	+60'	82°	10°21'	+60'	82°	10°29'	+60'	82°	10°37'	+60'	82°	10°45'	+60'	83°	10°53'	+60'	83°	11°00'	+60'	90°	11
12	11°12'	+60'	82°	11°21'	+60'	82°	11°29'	+60'	82°	11°37'	+60'	82°	11°45'	+60'	83°	11°53'	+60'	83°	12°00'	+60'	118°	12
13	12°12'	+60'	82°	12°21'	+60'	82°	12°29'	+60'	82°	12°37'	+60'	82°	12°45'	+60'	83°	12°53'	+60'	83°	13°00'	+60'	118°	13
14	13°12'	+60'	82°	13°20'	+60'	82°	13°29'	+60'	82°	13°37'	+60'	82°	13°45'	+60'	83°	13°53'	+60'	83°	14°00'	+60'	62°	14
15	14°11'	+60'	81°	14°20'	+60'	82°	14°29'	+60'	82°	14°37'	+60'	82°	14°45'	+60'	82°	14°53'	+60'	83°	15°00'	+60'	90°	15
16	15°11'	+60'	81°	15°20'	+60'	82°	15°28'	+60'	82°	15°37'	+60'	82°	15°45'	+60'	82°	15°53'	+60'	83°	16°00'	+60'	90°	16
17	16°11'	+60'	81°	16°20'	+60'	82°	16°28'	+60'	82°	16°37'	+60'	82°	16°45'	+60'	82°	16°53'	+60'	83°	17°00'	+60'	90°	17
18	17°10'	+60'	81°	17°19'	+60'	81°	17°28'	+60'	82°	17°37'	+60'	82°	17°45'	+60'	82°	17°53'	+60'	83°	18°00'	+60'	90°	18
19	18°10'	+60'	81°	18°19'	+60'	81°	18°28'	+60'	82°	18°36'	+60'	82°	18°45'	+60'	82°	18°53'	+60'	83°	19°00'	+60'	90°	19
20	19°09'	+60'	81°	19°19'	+60'	81°	19°28'	+60'	82°	19°36'	+60'	82°	19°45'	+60'	82°	19°53'	+60'	83°	20°00'	+60'	90°	20
21	20°09'	+60'	81°	20°19'	+60'	81°	20°28'	+60'	81°	20°36'	+60'	82°	20°45'	+60'	82°	20°52'	+60'	83°	21°00'	+60'	90°	21
22	21°09'	+60'	81°	21°18'	+60'	81°	21°27'	+60'	81°	21°36'	+60'	82°	21°45'	+60'	82°	21°52'	+60'	83°	22°00'	+60'	90°	22
23	22°08'	+60'	81°	22°18'	+60'	81°	22°27'	+60'	81°	22°36'	+60'	82°	22°45'	+60'	82°	22°52'	+60'	83°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

97° 263° LHA — Latitude SAME as DECLINATION — 97° 263° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

82° 278° LHA — Latitude CONTRARY to Declination — 82° 278° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°50'	-60'	98°	0°42'	-60'	98°	0°33'	-60'	98°	0°25'	-60'	98°	0°17'	-60'	98°	0°08'	-60'	98°	0°00'	-60'	98°	0
1	0°10'	+60'	82°	0°18'	+60'	82°	0°26'	+60'	82°	0°35'	+60'	82°	0°43'	+60'	82°	0°52'	+60'	82°	1°00'	+60'	83°	1
2	1°09'	+60'	82°	1°18'	+60'	82°	1°26'	+60'	82°	1°35'	+60'	82°	1°43'	+60'	82°	1°52'	+60'	82°	2°00'	+60'	83°	2
3	2°09'	+60'	82°	2°18'	+60'	82°	2°26'	+60'	82°	2°35'	+60'	82°	2°43'	+60'	82°	2°52'	+60'	82°	3°00'	+60'	83°	3
4	3°09'	+60'	82°	3°17'	+60'	82°	3°26'	+60'	82°	3°35'	+60'	82°	3°43'	+60'	82°	3°52'	+60'	82°	4°00'	+60'	77°	4
5	4°08'	+60'	82°	4°17'	+60'	82°	4°26'	+60'	82°	4°35'	+60'	82°	4°43'	+60'	82°	4°52'	+60'	82°	5°00'	+60'	63°	5
6	5°08'	+60'	81°	5°17'	+60'	82°	5°26'	+60'	82°	5°34'	+60'	82°	5°43'	+60'	82°	5°52'	+60'	82°	6°00'	+60'	77°	6
7	6°08'	+60'	81°	6°17'	+60'	81°	6°26'	+60'	82°	6°34'	+60'	82°	6°43'	+60'	82°	6°52'	+60'	82°	7°00'	+60'	77°	7
8	7°07'	+60'	81°	7°17'	+60'	81°	7°25'	+60'	81°	7°34'	+60'	82°	7°43'	+60'	82°	7°52'	+60'	82°	8°00'	+60'	63°	8
9	8°07'	+60'	81°	8°16'	+60'	81°	8°25'	+60'	81°	8°34'	+60'	82°	8°43'	+60'	82°	8°52'	+60'	82°	9°00'	+60'	117°	9
10	9°07'	+60'	81°	9°16'	+60'	81°	9°25'	+60'	81°	9°34'	+60'	81°	9°43'	+60'	82°	9°52'	+60'	82°	10°00'	+60'	90°	10
11	10°06'	+60'	81°	10°16'	+60'	81°	10°25'	+60'	81°	10°34'	+60'	81°	10°43'	+60'	82°	10°52'	+60'	82°	11°00'	+60'	90°	11
12	11°06'	+60'	81°	11°16'	+60'	81°	11°25'	+60'	81°	11°34'	+60'	81°	11°43'	+60'	82°	11°52'	+60'	82°	12°00'	+60'	118°	12
13	12°06'	+60'	81°	12°15'	+60'	81°	12°25'	+60'	81°	12°34'	+60'	81°	12°43'	+60'	82°	12°52'	+60'	82°	13°00'	+60'	118°	13
14	13°05'	+60'	81°	13°15'	+60'	81°	13°25'	+60'	81°	13°34'	+60'	81°	13°43'	+60'	82°	13°52'	+60'	82°	14°00'	+60'	62°	14
15	14°05'	+60'	80°	14°15'	+60'	81°	14°24'	+60'	81°	14°34'	+60'	81°	14°43'	+60'	81°	14°52'	+60'	82°	15°00'	+60'	90°	15
16	15°05'	+60'	80°	15°15'	+60'	81°	15°24'	+60'	81°	15°34'	+60'	81°	15°43'	+60'	81°	15°52'	+60'	82°	16°00'	+60'	90°	16
17	16°04'	+60'	80°	16°14'	+60'	81°	16°24'	+60'	81°	16°34'	+60'	81°	16°43'	+60'	81°	16°51'	+60'	82°	17°00'	+60'	90°	17
18	17°04'	+60'	80°	17°14'	+60'	80°	17°24'	+60'	81°	17°33'	+60'	81°	17°43'	+60'	81°	17°51'	+60'	82°	18°00'	+60'	90°	18
19	18°04'	+60'	80°	18°14'	+60'	80°	18°24'	+60'	81°	18°33'	+60'	81°	18°43'	+60'	81°	18°51'	+60'	82°	19°00'	+60'	90°	19
20	19°03'	+60'	80°	19°14'	+60'	80°	19°24'	+60'	81°	19°33'	+60'	81°	19°43'	+60'	81°	19°51'	+60'	82°	20°00'	+60'	90°	20
21	20°03'	+60'	80°	20°13'	+60'	80°	20°23'	+60'	81°	20°33'	+60'	81°	20°43'	+60'	81°	20°51'	+60'	82°	21°00'	+60'	90°	21
22	21°03'	+60'	80°	21°13'	+60'	80°	21°23'	+60'	80°	21°33'	+60'	81°	21°42'	+60'	81°	21°51'	+60'	82°	22°00'	+60'	90°	22
23	22°02'	+60'	80°	22°13'	+60'	80°	22°23'	+60'	80°	22°33'	+60'	81°	22°42'	+60'	81°	22°51'	+60'	82°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

98° 262° LHA — Latitude SAME as DECLINATION — 98° 262° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

81° 279° LHA — Latitude CONTRARY to Declination — 81° 279° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°56'	-60'	99°	0°47'	-60'	99°	0°38'	-60'	99°	0°28'	-60'	99°	0°19'	-60'	99°	0°09'	-60'	99°	0°00'	-60'	99°	0
1	0°03'	+60'	81°	0°13'	+60'	81°	0°22'	+60'	81°	0°32'	+60'	81°	0°41'	+60'	81°	0°51'	+60'	81°	1°00'	+60'	80°	1
2	1°03'	+60'	81°	1°13'	+60'	81°	1°22'	+60'	81°	1°32'	+60'	81°	1°41'	+60'	81°	1°51'	+60'	81°	2°00'	+60'	83°	2
3	2°03'	+60'	81°	2°12'	+60'	81°	2°22'	+60'	81°	2°32'	+60'	81°	2°41'	+60'	81°	2°51'	+60'	81°	3°00'	+60'	83°	3
4	3°03'	+60'	81°	3°12'	+60'	81°	3°22'	+60'	81°	3°32'	+60'	81°	3°41'	+60'	81°	3°51'	+60'	81°	4°00'	+60'	77°	4
5	4°02'	+60'	81°	4°12'	+60'	81°	4°22'	+60'	81°	4°31'	+60'	81°	4°41'	+60'	81°	4°51'	+60'	81°	5°00'	+60'	63°	5
6	5°02'	+60'	80°	5°12'	+60'	81°	5°22'	+60'	81°	5°31'	+60'	81°	5°41'	+60'	81°	5°51'	+60'	81°	6°00'	+60'	77°	6
7	6°02'	+60'	80°	6°12'	+60'	80°	6°21'	+60'	81°	6°31'	+60'	81°	6°41'	+60'	81°	6°51'	+60'	81°	7°00'	+60'	77°	7
8	7°01'	+60'	80°	7°11'	+60'	80°	7°21'	+60'	80°	7°31'	+60'	81°	7°41'	+60'	81°	7°51'	+60'	81°	8°00'	+60'	63°	8
9	8°01'	+60'	80°	8°11'	+60'	80°	8°21'	+60'	80°	8°31'	+60'	81°	8°41'	+60'	81°	8°51'	+60'	81°	9°00'	+60'	117°	9
10	9°01'	+60'	80°	9°11'	+60'	80°	9°21'	+60'	80°	9°31'	+60'	80°	9°41'	+60'	81°	9°51'	+60'	81°	10°00'	+60'	90°	10
11	10°00'	+60'	80°	10°11'	+60'	80°	10°21'	+60'	80°	10°31'	+60'	80°	10°41'	+60'	81°	10°51'	+60'	81°	11°00'	+60'	90°	11
12	11°00'	+60'	80°	11°10'	+60'	80°	11°21'	+60'	80°	11°31'	+60'	80°	11°41'	+60'	81°	11°51'	+60'	81°	12°00'	+60'	118°	12
13	12°00'	+60'	80°	12°10'	+60'	80°	12°21'	+60'	80°	12°31'	+60'	80°	12°41'	+60'	81°	12°50'	+60'	81°	13°00'	+60'	118°	13
14	12°59'	+60'	80°	13°10'	+60'	80°	13°20'	+60'	80°	13°31'	+60'	80°	13°41'	+60'	81°	13°50'	+60'	81°	14°00'	+60'	62°	14
15	13°59'	+60'	79°	14°10'	+60'	80°	14°20'	+60'	80°	14°31'	+60'	80°	14°41'	+60'	80°	14°50'	+60'	81°	15°00'	+60'	90°	15
16	14°59'	+60'	79°	15°09'	+60'	80°	15°20'	+60'	80°	15°31'	+60'	80°	15°41'	+60'	80°	15°50'	+60'	81°	16°00'	+60'	90°	16
17	15°58'	+60'	79°	16°09'	+60'	80°	16°20'	+60'	80°	16°30'	+60'	80°	16°41'	+60'	80°	16°50'	+60'	81°	17°00'	+60'	90°	17
18	16°58'	+60'	79°	17°09'	+60'	79°	17°20'	+60'	80°	17°30'	+60'	80°	17°41'	+60'	80°	17°50'	+60'	81°	18°00'	+60'	90°	18
19	17°57'	+60'	79°	18°09'	+60'	79°	18°20'	+60'	80°	18°30'	+60'	80°	18°41'	+60'	80°	18°50'	+60'	81°	19°00'	+60'	90°	19
20	18°57'	+60'	79°	19°09'	+60'	79°	19°20'	+60'	80°	19°30'	+60'	80°	19°40'	+60'	80°	19°50'	+60'	81°	20°00'	+60'	90°	20
21	19°57'	+60'	79°	20°08'	+60'	79°	20°19'	+60'	80°	20°30'	+60'	80°	20°40'	+60'	80°	20°50'	+60'	81°	21°00'	+60'	90°	21
22	20°56'	+60'	79°	21°08'	+60'	79°	21°19'	+60'	79°	21°30'	+60'	80°	21°40'	+60'	80°	21°50'	+60'	81°	22°00'	+60'	90°	22
23	21°56'	+60'	79°	22°08'	+60'	79°	22°19'	+60'	79°	22°30'	+60'	80°	22°40'	+60'	80°	22°50'	+60'	81°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

99° 261° LHA — Latitude SAME as DECLINATION — 99° 261° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

80° 280° LHA — Latitude CONTRARY to Declination — 80° 280° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°02'	-60'	100°	0°52'	-60'	100°	0°42'	-60'	100°	0°31'	-60'	100°	0°21'	-60'	100°	0°10'	-60'	100°	0°00'	-60'	100°	0
1	0°03'	-60'	100°	0°08'	+60'	80°	0°18'	+60'	80°	0°29'	+60'	80°	0°39'	+60'	80°	0°50'	+60'	80°	1°00'	+60'	80°	1
2	0°57'	+60'	80°	1°08'	+60'	80°	1°18'	+60'	80°	1°29'	+60'	80°	1°39'	+60'	80°	1°50'	+60'	80°	2°00'	+60'	77°	2
3	1°57'	+60'	80°	2°07'	+60'	80°	2°18'	+60'	80°	2°29'	+60'	80°	2°39'	+60'	80°	2°50'	+60'	80°	3°00'	+60'	83°	3
4	2°56'	+60'	80°	3°07'	+60'	80°	3°18'	+60'	80°	3°28'	+60'	80°	3°39'	+60'	80°	3°50'	+60'	80°	4°00'	+60'	77°	4
5	3°56'	+60'	80°	4°07'	+60'	80°	4°18'	+60'	80°	4°28'	+60'	80°	4°39'	+60'	80°	4°50'	+60'	80°	5°00'	+60'	63°	5
6	4°56'	+60'	79°	5°07'	+60'	80°	5°18'	+60'	80°	5°28'	+60'	80°	5°39'	+60'	80°	5°50'	+60'	80°	6°00'	+60'	77°	6
7	5°55'	+60'	79°	6°06'	+60'	79°	6°17'	+60'	80°	6°28'	+60'	80°	6°39'	+60'	80°	6°50'	+60'	80°	7°00'	+60'	77°	7
8	6°55'	+60'	79°	7°06'	+60'	79°	7°17'	+60'	79°	7°28'	+60'	80°	7°39'	+60'	80°	7°50'	+60'	80°	8°00'	+60'	63°	8
9	7°55'	+60'	79°	8°06'	+60'	79°	8°17'	+60'	79°	8°28'	+60'	80°	8°39'	+60'	80°	8°50'	+60'	80°	9°00'	+60'	117°	9
10	8°54'	+60'	79°	9°06'	+60'	79°	9°17'	+60'	79°	9°28'	+60'	79°	9°39'	+60'	80°	9°49'	+60'	80°	10°00'	+60'	90°	10
11	9°54'	+60'	79°	10°06'	+60'	79°	10°17'	+60'	79°	10°28'	+60'	79°	10°39'	+60'	80°	10°49'	+60'	80°	11°00'	+60'	90°	11
12	10°54'	+60'	79°	11°05'	+60'	79°	11°17'	+60'	79°	11°28'	+60'	79°	11°39'	+60'	80°	11°49'	+60'	80°	12°00'	+60'	118°	12
13	11°53'	+60'	79°	12°05'	+60'	79°	12°16'	+60'	79°	12°28'	+60'	79°	12°39'	+60'	80°	12°49'	+60'	80°	13°00'	+60'	118°	13
14	12°53'	+60'	79°	13°05'	+60'	79°	13°16'	+60'	79°	13°28'	+60'	79°	13°39'	+60'	80°	13°49'	+60'	80°	14°00'	+60'	62°	14
15	13°53'	+60'	78°	14°05'	+60'	79°	14°16'	+60'	79°	14°28'	+60'	79°	14°39'	+60'	79°	14°49'	+60'	80°	15°00'	+60'	90°	15
16	14°52'	+60'	78°	15°04'	+60'	79°	15°16'	+60'	79°	15°27'	+60'	79°	15°39'	+60'	79°	15°49'	+60'	80°	16°00'	+60'	90°	16
17	15°52'	+60'	78°	16°04'	+60'	79°	16°16'	+60'	79°	16°27'	+60'	79°	16°39'	+60'	79°	16°49'	+60'	80°	17°00'	+60'	90°	17
18	16°52'	+60'	78°	17°04'	+60'	78°	17°16'	+60'	79°	17°27'	+60'	79°	17°39'	+60'	79°	17°49'	+60'	80°	18°00'	+60'	90°	18
19	17°51'	+60'	78°	18°04'	+60'	78°	18°16'	+60'	79°	18°27'	+60'	79°	18°38'	+60'	79°	18°49'	+60'	80°	19°00'	+60'	90°	19
20	18°51'	+60'	78°	19°03'	+60'	78°	19°15'	+60'	79°	19°27'	+60'	79°	19°38'	+60'	79°	19°49'	+60'	80°	20°00'	+60'	90°	20
21	19°51'	+60'	78°	20°03'	+60'	78°	20°15'	+60'	79°	20°27'	+60'	79°	20°38'	+60'	79°	20°49'	+60'	80°	21°00'	+60'	90°	21
22	20°50'	+60'	78°	21°03'	+60'	78°	21°15'	+60'	78°	21°27'	+60'	79°	21°38'	+60'	79°	21°49'	+60'	80°	22°00'	+60'	90°	22
23	21°50'	+60'	78°	22°03'	+60'	78°	22°15'	+60'	78°	22°27'	+60'	79°	22°38'	+60'	79°	22°49'	+60'	80°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

100° 260° LHA — Latitude SAME as DECLINATION — 100° 260° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

79° 281° LHA — Latitude CONTRARY to Declination — 79° 281° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°09'	-60'	101°	0°57'	-60'	101°	0°46'	-60'	101°	0°34'	-60'	101°	0°23'	-60'	101°	0°11'	-60'	101°	0°00'	-60'	101°	0
1	0°09'	-60'	101°	0°03'	+60'	79°	0°14'	+60'	79°	0°26'	+60'	79°	0°37'	+60'	79°	0°49'	+60'	79°	1°00'	+60'	80°	1
2	0°51'	+60'	79°	1°02'	+60'	79°	1°14'	+60'	79°	1°26'	+60'	79°	1°37'	+60'	79°	1°49'	+60'	79°	2°00'	+60'	77°	2
3	1°50'	+60'	79°	2°02'	+60'	79°	2°14'	+60'	79°	2°25'	+60'	79°	2°37'	+60'	79°	2°49'	+60'	79°	3°00'	+60'	83°	3
4	2°50'	+60'	79°	3°02'	+60'	79°	3°14'	+60'	79°	3°25'	+60'	79°	3°37'	+60'	79°	3°49'	+60'	79°	4°00'	+60'	77°	4
5	3°50'	+60'	79°	4°02'	+60'	79°	4°14'	+60'	79°	4°25'	+60'	79°	4°37'	+60'	79°	4°49'	+60'	79°	5°00'	+60'	63°	5
6	4°50'	+60'	78°	5°02'	+60'	79°	5°13'	+60'	79°	5°25'	+60'	79°	5°37'	+60'	79°	5°48'	+60'	79°	6°00'	+60'	77°	6
7	5°49'	+60'	78°	6°01'	+60'	78°	6°13'	+60'	79°	6°25'	+60'	79°	6°37'	+60'	79°	6°48'	+60'	79°	7°00'	+60'	77°	7
8	6°49'	+60'	78°	7°01'	+60'	78°	7°13'	+60'	78°	7°25'	+60'	79°	7°37'	+60'	79°	7°48'	+60'	79°	8°00'	+60'	63°	8
9	7°49'	+60'	78°	8°01'	+60'	78°	8°13'	+60'	78°	8°25'	+60'	79°	8°37'	+60'	79°	8°48'	+60'	79°	9°00'	+60'	117°	9
10	8°48'	+60'	78°	9°01'	+60'	78°	9°13'	+60'	78°	9°25'	+60'	78°	9°37'	+60'	79°	9°48'	+60'	79°	10°00'	+60'	90°	10
11	9°48'	+60'	78°	10°00'	+60'	78°	10°13'	+60'	78°	10°25'	+60'	78°	10°37'	+60'	79°	10°48'	+60'	79°	11°00'	+60'	90°	11
12	10°48'	+60'	78°	11°00'	+60'	78°	11°13'	+60'	78°	11°25'	+60'	78°	11°37'	+60'	79°	11°48'	+60'	79°	12°00'	+60'	118°	12
13	11°47'	+60'	78°	12°00'	+60'	78°	12°12'	+60'	78°	12°25'	+60'	78°	12°37'	+60'	79°	12°48'	+60'	79°	13°00'	+60'	118°	13
14	12°47'	+60'	78°	13°00'	+60'	78°	13°12'	+60'	78°	13°25'	+60'	78°	13°37'	+60'	79°	13°48'	+60'	79°	14°00'	+60'	62°	14
15	13°47'	+60'	77°	13°59'	+60'	78°	14°12'	+60'	78°	14°24'	+60'	78°	14°37'	+60'	78°	14°48'	+60'	79°	15°00'	+60'	90°	15
16	14°46'	+60'	77°	14°59'	+60'	78°	15°12'	+60'	78°	15°24'	+60'	78°	15°37'	+60'	78°	15°48'	+60'	79°	16°00'	+60'	90°	16
17	15°46'	+60'	77°	15°59'	+60'	78°	16°12'	+60'	78°	16°24'	+60'	78°	16°36'	+60'	78°	16°48'	+60'	79°	17°00'	+60'	90°	17
18	16°46'	+60'	77°	16°59'	+60'	77°	17°12'	+60'	78°	17°24'	+60'	78°	17°36'	+60'	78°	17°48'	+60'	79°	18°00'	+60'	90°	18
19	17°45'	+60'	77°	17°59'	+60'	77°	18°11'	+60'	78°	18°24'	+60'	78°	18°36'	+60'	78°	18°48'	+60'	79°	19°00'	+60'	90°	19
20	18°45'	+60'	77°	18°58'	+60'	77°	19°11'	+60'	78°	19°24'	+60'	78°	19°36'	+60'	78°	19°48'	+60'	79°	20°00'	+60'	90°	20
21	19°45'	+60'	77°	19°58'	+60'	77°	20°11'	+60'	78°	20°24'	+60'	78°	20°36'	+60'	78°	20°48'	+60'	79°	21°00'	+60'	90°	21
22	20°44'	+60'	77°	20°58'	+60'	77°	21°11'	+60'	77°	21°24'	+60'	78°	21°36'	+60'	78°	21°48'	+60'	79°	22°00'	+60'	90°	22
23	21°44'	+60'	77°	21°58'	+60'	77°	22°11'	+60'	77°	22°24'	+60'	78°	22°36'	+60'	78°	22°48'	+60'	79°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

101° 259° LHA — Latitude SAME as DECLINATION — 101° 259° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

78° 282° LHA — Latitude CONTRARY to Declination — 78° 282° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°15'	-60'	102°	1°02'	-60'	102°	0°50'	-60'	102°	0°37'	-60'	102°	0°25'	-60'	102°	0°12'	-60'	102°	0°00'	-60'	102°	0
1	0°15'	-60'	102°	0°03'	-60'	102°	0°10'	+60'	78°	0°23'	+60'	78°	0°35'	+60'	78°	0°48'	+60'	78°	1°00'	+60'	77°	1
2	0°45'	+60'	78°	0°57'	+60'	78°	1°10'	+60'	78°	1°22'	+60'	78°	1°35'	+60'	78°	1°48'	+60'	78°	2°00'	+60'	77°	2
3	1°44'	+60'	78°	1°57'	+60'	78°	2°10'	+60'	78°	2°22'	+60'	78°	2°35'	+60'	78°	2°47'	+60'	78°	3°00'	+60'	83°	3
4	2°44'	+60'	78°	2°57'	+60'	78°	3°10'	+60'	78°	3°22'	+60'	78°	3°35'	+60'	78°	3°47'	+60'	78°	4°00'	+60'	77°	4
5	3°44'	+60'	78°	3°57'	+60'	78°	4°09'	+60'	78°	4°22'	+60'	78°	4°35'	+60'	78°	4°47'	+60'	78°	5°00'	+60'	63°	5
6	4°43'	+60'	77°	4°56'	+60'	78°	5°09'	+60'	78°	5°22'	+60'	78°	5°35'	+60'	78°	5°47'	+60'	78°	6°00'	+60'	77°	6
7	5°43'	+60'	77°	5°56'	+60'	77°	6°09'	+60'	78°	6°22'	+60'	78°	6°35'	+60'	78°	6°47'	+60'	78°	7°00'	+60'	77°	7
8	6°43'	+60'	77°	6°56'	+60'	77°	7°09'	+60'	77°	7°22'	+60'	78°	7°35'	+60'	78°	7°47'	+60'	78°	8°00'	+60'	63°	8
9	7°42'	+60'	77°	7°56'	+60'	77°	8°09'	+60'	77°	8°22'	+60'	78°	8°35'	+60'	78°	8°47'	+60'	78°	9°00'	+60'	117°	9
10	8°42'	+60'	77°	8°56'	+60'	77°	9°09'	+60'	77°	9°22'	+60'	77°	9°35'	+60'	78°	9°47'	+60'	78°	10°00'	+60'	90°	10
11	9°42'	+60'	77°	9°55'	+60'	77°	10°09'	+60'	77°	10°22'	+60'	77°	10°35'	+60'	78°	10°47'	+60'	78°	11°00'	+60'	90°	11
12	10°41'	+60'	77°	10°55'	+60'	77°	11°08'	+60'	77°	11°22'	+60'	77°	11°35'	+60'	78°	11°47'	+60'	78°	12°00'	+60'	118°	12
13	11°41'	+60'	77°	11°55'	+60'	77°	12°08'	+60'	77°	12°22'	+60'	77°	12°35'	+60'	78°	12°47'	+60'	78°	13°00'	+60'	118°	13
14	12°41'	+60'	77°	12°55'	+60'	77°	13°08'	+60'	77°	13°21'	+60'	77°	13°35'	+60'	78°	13°47'	+60'	78°	14°00'	+60'	62°	14
15	13°40'	+60'	77°	13°54'	+60'	77°	14°08'	+60'	77°	14°21'	+60'	77°	14°35'	+60'	77°	14°47'	+60'	78°	15°00'	+60'	90°	15
16	14°40'	+60'	76°	14°54'	+60'	77°	15°08'	+60'	77°	15°21'	+60'	77°	15°34'	+60'	77°	15°47'	+60'	78°	16°00'	+60'	90°	16
17	15°40'	+60'	76°	15°54'	+60'	77°	16°08'	+60'	77°	16°21'	+60'	77°	16°34'	+60'	77°	16°47'	+60'	78°	17°00'	+60'	90°	17
18	16°39'	+60'	76°	16°54'	+60'	76°	17°08'	+60'	77°	17°21'	+60'	77°	17°34'	+60'	77°	17°47'	+60'	78°	18°00'	+60'	90°	18
19	17°39'	+60'	76°	17°53'	+60'	76°	18°07'	+60'	77°	18°21'	+60'	77°	18°34'	+60'	77°	18°47'	+60'	78°	19°00'	+60'	90°	19
20	18°39'	+60'	76°	18°53'	+60'	76°	19°07'	+60'	77°	19°21'	+60'	77°	19°34'	+60'	77°	19°47'	+60'	78°	20°00'	+60'	90°	20
21	19°38'	+60'	76°	19°53'	+60'	76°	20°07'	+60'	77°	20°21'	+60'	77°	20°34'	+60'	77°	20°47'	+60'	78°	21°00'	+60'	90°	21
22	20°38'	+60'	76°	20°53'	+60'	76°	21°07'	+60'	76°	21°21'	+60'	77°	21°34'	+60'	77°	21°47'	+60'	78°	22°00'	+60'	90°	22
23	21°38'	+60'	76°	21°52'	+60'	76°	22°07'	+60'	76°	22°21'	+60'	77°	22°34'	+60'	77°	22°47'	+60'	78°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

102° 258° LHA — Latitude SAME as DECLINATION — 102° 258° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

77° 283° LHA — Latitude CONTRARY to Declination — 77° 283° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°21'	-60'	103°	1°07'	-60'	103°	0°54'	-60'	103°	0°40'	-60'	103°	0°27'	-60'	103°	0°13'	-60'	103°	0°00'	-60'	103°	0
1	0°21'	-60'	103°	0°08'	-60'	103°	0°06'	+60'	77°	0°19'	+60'	77°	0°33'	+60'	77°	0°46'	+60'	77°	1°00'	+60'	77°	1
2	0°39'	+60'	77°	0°52'	+60'	77°	1°06'	+60'	77°	1°19'	+60'	77°	1°33'	+60'	77°	1°46'	+60'	77°	2°00'	+60'	77°	2
3	1°38'	+60'	77°	1°52'	+60'	77°	2°06'	+60'	77°	2°19'	+60'	77°	2°33'	+60'	77°	2°46'	+60'	77°	3°00'	+60'	83°	3
4	2°38'	+60'	77°	2°52'	+60'	77°	3°05'	+60'	77°	3°19'	+60'	77°	3°33'	+60'	77°	3°46'	+60'	77°	4°00'	+60'	77°	4
5	3°38'	+60'	77°	3°52'	+60'	77°	4°05'	+60'	77°	4°19'	+60'	77°	4°33'	+60'	77°	4°46'	+60'	77°	5°00'	+60'	63°	5
6	4°37'	+60'	76°	4°51'	+60'	77°	5°05'	+60'	77°	5°19'	+60'	77°	5°33'	+60'	77°	5°46'	+60'	77°	6°00'	+60'	77°	6
7	5°37'	+60'	76°	5°51'	+60'	76°	6°05'	+60'	77°	6°19'	+60'	77°	6°33'	+60'	77°	6°46'	+60'	77°	7°00'	+60'	77°	7
8	6°37'	+60'	76°	6°51'	+60'	76°	7°05'	+60'	76°	7°19'	+60'	77°	7°33'	+60'	77°	7°46'	+60'	77°	8°00'	+60'	63°	8
9	7°36'	+60'	76°	7°51'	+60'	76°	8°05'	+60'	76°	8°19'	+60'	77°	8°33'	+60'	77°	8°46'	+60'	77°	9°00'	+60'	117°	9
10	8°36'	+60'	76°	8°50'	+60'	76°	9°05'	+60'	76°	9°19'	+60'	77°	9°33'	+60'	77°	9°46'	+60'	77°	10°00'	+60'	90°	10
11	9°36'	+60'	76°	9°50'	+60'	76°	10°05'	+60'	76°	10°19'	+60'	76°	10°33'	+60'	77°	10°46'	+60'	77°	11°00'	+60'	90°	11
12	10°35'	+60'	76°	10°50'	+60'	76°	11°04'	+60'	76°	11°19'	+60'	76°	11°33'	+60'	77°	11°46'	+60'	77°	12°00'	+60'	118°	12
13	11°35'	+60'	76°	11°50'	+60'	76°	12°04'	+60'	76°	12°18'	+60'	76°	12°33'	+60'	77°	12°46'	+60'	77°	13°00'	+60'	118°	13
14	12°35'	+60'	76°	12°50'	+60'	76°	13°04'	+60'	76°	13°18'	+60'	76°	13°33'	+60'	77°	13°46'	+60'	77°	14°00'	+60'	62°	14
15	13°34'	+60'	76°	13°49'	+60'	76°	14°04'	+60'	76°	14°18'	+60'	76°	14°32'	+60'	76°	14°46'	+60'	77°	15°00'	+60'	90°	15
16	14°34'	+60'	75°	14°49'	+60'	76°	15°04'	+60'	76°	15°18'	+60'	76°	15°32'	+60'	76°	15°46'	+60'	77°	16°00'	+60'	90°	16
17	15°34'	+60'	75°	15°49'	+60'	76°	16°04'	+60'	76°	16°18'	+60'	76°	16°32'	+60'	76°	16°46'	+60'	77°	17°00'	+60'	90°	17
18	16°33'	+60'	75°	16°49'	+60'	75°	17°03'	+60'	76°	17°18'	+60'	76°	17°32'	+60'	76°	17°46'	+60'	77°	18°00'	+60'	90°	18
19	17°33'	+60'	75°	17°48'	+60'	75°	18°03'	+60'	76°	18°18'	+60'	76°	18°32'	+60'	76°	18°46'	+60'	77°	19°00'	+60'	90°	19
20	18°33'	+60'	75°	18°48'	+60'	75°	19°03'	+60'	76°	19°18'	+60'	76°	19°32'	+60'	76°	19°46'	+60'	77°	20°00'	+60'	90°	20
21	19°32'	+60'	75°	19°48'	+60'	75°	20°03'	+60'	76°	20°18'	+60'	76°	20°32'	+60'	76°	20°46'	+60'	77°	21°00'	+60'	90°	21
22	20°32'	+60'	75°	20°48'	+60'	75°	21°03'	+60'	75°	21°18'	+60'	76°	21°32'	+60'	76°	21°46'	+60'	77°	22°00'	+60'	90°	22
23	21°32'	+60'	75°	21°47'	+60'	75°	22°03'	+60'	75°	22°18'	+60'	76°	22°32'	+60'	76°	22°46'	+60'	77°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

103° 257° LHA — Latitude SAME as DECLINATION — 103° 257° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

76° 284° LHA — Latitude CONTRARY to Declination — 76° 284° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°27'	-60'	104°	1°12'	-60'	104°	0°58'	-60'	104°	0°44'	-60'	104°	0°29'	-60'	104°	0°15'	-60'	104°	0°00'	-60'	104°	0
1	0°27'	-60'	104°	0°13'	-60'	104°	0°02'	+60'	76°	0°16'	+60'	76°	0°31'	+60'	76°	0°45'	+60'	76°	1°00'	+60'	77°	1
2	0°32'	+60'	76°	0°47'	+60'	76°	1°02'	+60'	76°	1°16'	+60'	76°	1°31'	+60'	76°	1°45'	+60'	76°	2°00'	+60'	77°	2
3	1°32'	+60'	76°	1°47'	+60'	76°	2°02'	+60'	76°	2°16'	+60'	76°	2°31'	+60'	76°	2°45'	+60'	76°	3°00'	+60'	83°	3
4	2°32'	+60'	76°	2°47'	+60'	76°	3°01'	+60'	76°	3°16'	+60'	76°	3°31'	+60'	76°	3°45'	+60'	76°	4°00'	+60'	77°	4
5	3°32'	+60'	76°	3°46'	+60'	76°	4°01'	+60'	76°	4°16'	+60'	76°	4°31'	+60'	76°	4°45'	+60'	76°	5°00'	+60'	63°	5
6	4°31'	+60'	75°	4°46'	+60'	76°	5°01'	+60'	76°	5°16'	+60'	76°	5°31'	+60'	76°	5°45'	+60'	76°	6°00'	+60'	77°	6
7	5°31'	+60'	75°	5°46'	+60'	75°	6°01'	+60'	76°	6°16'	+60'	76°	6°31'	+60'	76°	6°45'	+60'	76°	7°00'	+60'	77°	7
8	6°31'	+60'	75°	6°46'	+60'	75°	7°01'	+60'	75°	7°16'	+60'	76°	7°31'	+60'	76°	7°45'	+60'	76°	8°00'	+60'	24°	8
9	7°30'	+60'	75°	7°46'	+60'	75°	8°01'	+60'	75°	8°16'	+60'	76°	8°31'	+60'	76°	8°45'	+60'	76°	9°00'	+60'	90°	9
10	8°30'	+60'	75°	8°45'	+60'	75°	9°01'	+60'	75°	9°16'	+60'	76°	9°31'	+60'	76°	9°45'	+60'	76°	10°00'	+60'	63°	10
11	9°30'	+60'	75°	9°45'	+60'	75°	10°00'	+60'	75°	10°16'	+60'	75°	10°31'	+60'	76°	10°45'	+60'	76°	11°00'	+60'	63°	11
12	10°29'	+60'	75°	10°45'	+60'	75°	11°00'	+60'	75°	11°16'	+60'	75°	11°31'	+60'	76°	11°45'	+60'	76°	12°00'	+60'	90°	12
13	11°29'	+60'	75°	11°45'	+60'	75°	12°00'	+60'	75°	12°15'	+60'	75°	12°31'	+60'	76°	12°45'	+60'	76°	13°00'	+60'	90°	13
14	12°29'	+60'	75°	12°44'	+60'	75°	13°00'	+60'	75°	13°15'	+60'	75°	13°30'	+60'	76°	13°45'	+60'	76°	14°00'	+60'	21°	14
15	13°28'	+60'	75°	13°44'	+60'	75°	14°00'	+60'	75°	14°15'	+60'	75°	14°30'	+60'	75°	14°45'	+60'	76°	15°00'	+60'	90°	15
16	14°28'	+60'	74°	14°44'	+60'	75°	15°00'	+60'	75°	15°15'	+60'	75°	15°30'	+60'	75°	15°45'	+60'	76°	16°00'	+60'	90°	16
17	15°28'	+60'	74°	15°44'	+60'	75°	16°00'	+60'	75°	16°15'	+60'	75°	16°30'	+60'	75°	16°45'	+60'	76°	17°00'	+60'	90°	17
18	16°27'	+60'	74°	16°44'	+60'	74°	16°59'	+60'	75°	17°15'	+60'	75°	17°30'	+60'	75°	17°45'	+60'	76°	18°00'	+60'	90°	18
19	17°27'	+60'	74°	17°43'	+60'	74°	17°59'	+60'	75°	18°15'	+60'	75°	18°30'	+60'	75°	18°45'	+60'	76°	19°00'	+60'	90°	19
20	18°27'	+60'	74°	18°43'	+60'	74°	18°59'	+60'	75°	19°15'	+60'	75°	19°30'	+60'	75°	19°45'	+60'	76°	20°00'	+60'	90°	20
21	19°26'	+60'	74°	19°43'	+60'	74°	19°59'	+60'	75°	20°15'	+60'	75°	20°30'	+60'	75°	20°45'	+60'	76°	21°00'	+60'	90°	21
22	20°26'	+60'	74°	20°43'	+60'	74°	20°59'	+60'	74°	21°15'	+60'	75°	21°30'	+60'	75°	21°45'	+60'	76°	22°00'	+60'	90°	22
23	21°26'	+60'	74°	21°42'	+60'	74°	21°59'	+60'	74°	22°15'	+60'	75°	22°30'	+60'	75°	22°45'	+60'	76°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

104° 256° LHA — Latitude SAME as DECLINATION — 104° 256° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

75° 285° LHA — Latitude CONTRARY to Declination — 75° 285° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°33'	-60'	105°	1°18'	-60'	105°	1°02'	-60'	105°	0°47'	-60'	105°	0°31'	-60'	105°	0°16'	-60'	105°	0°00'	-60'	105°	0
1	0°33'	-60'	105°	0°18'	-60'	105°	0°02'	-60'	105°	0°13'	+60'	75°	0°29'	+60'	75°	0°44'	+60'	75°	1°00'	+60'	74°	1
2	0°26'	+60'	75°	0°42'	+60'	75°	0°58'	+60'	75°	1°13'	+60'	75°	1°29'	+60'	75°	1°44'	+60'	75°	2°00'	+60'	77°	2
3	1°26'	+60'	75°	1°42'	+60'	75°	1°58'	+60'	75°	2°13'	+60'	75°	2°29'	+60'	75°	2°44'	+60'	75°	3°00'	+60'	83°	3
4	2°26'	+60'	75°	2°42'	+60'	75°	2°57'	+60'	75°	3°13'	+60'	75°	3°29'	+60'	75°	3°44'	+60'	75°	4°00'	+60'	77°	4
5	3°25'	+60'	75°	3°41'	+60'	75°	3°57'	+60'	75°	4°13'	+60'	75°	4°29'	+60'	75°	4°44'	+60'	75°	5°00'	+60'	63°	5
6	4°25'	+60'	74°	4°41'	+60'	75°	4°57'	+60'	75°	5°13'	+60'	75°	5°29'	+60'	75°	5°44'	+60'	75°	6°00'	+60'	77°	6
7	5°25'	+60'	74°	5°41'	+60'	74°	5°57'	+60'	75°	6°13'	+60'	75°	6°29'	+60'	75°	6°44'	+60'	75°	7°00'	+60'	77°	7
8	6°25'	+60'	74°	6°41'	+60'	74°	6°57'	+60'	74°	7°13'	+60'	75°	7°29'	+60'	75°	7°44'	+60'	75°	8°00'	+60'	24°	8
9	7°24'	+60'	74°	7°41'	+60'	74°	7°57'	+60'	74°	8°13'	+60'	75°	8°29'	+60'	75°	8°44'	+60'	75°	9°00'	+60'	90°	9
10	8°24'	+60'	74°	8°40'	+60'	74°	8°57'	+60'	74°	9°13'	+60'	75°	9°29'	+60'	75°	9°44'	+60'	75°	10°00'	+60'	63°	10
11	9°24'	+60'	74°	9°40'	+60'	74°	9°56'	+60'	74°	10°13'	+60'	74°	10°29'	+60'	75°	10°44'	+60'	75°	11°00'	+60'	63°	11
12	10°23'	+60'	74°	10°40'	+60'	74°	10°56'	+60'	74°	11°13'	+60'	74°	11°29'	+60'	75°	11°44'	+60'	75°	12°00'	+60'	90°	12
13	11°23'	+60'	74°	11°40'	+60'	74°	11°56'	+60'	74°	12°12'	+60'	74°	12°28'	+60'	75°	12°44'	+60'	75°	13°00'	+60'	90°	13
14	12°23'	+60'	74°	12°39'	+60'	74°	12°56'	+60'	74°	13°12'	+60'	74°	13°28'	+60'	75°	13°44'	+60'	75°	14°00'	+60'	21°	14
15	13°22'	+60'	74°	13°39'	+60'	74°	13°56'	+60'	74°	14°12'	+60'	74°	14°28'	+60'	74°	14°44'	+60'	75°	15°00'	+60'	90°	15
16	14°22'	+60'	73°	14°39'	+60'	74°	14°56'	+60'	74°	15°12'	+60'	74°	15°28'	+60'	74°	15°44'	+60'	75°	16°00'	+60'	90°	16
17	15°22'	+60'	73°	15°39'	+60'	74°	15°56'	+60'	74°	16°12'	+60'	74°	16°28'	+60'	74°	16°44'	+60'	75°	17°00'	+60'	90°	17
18	16°21'	+60'	73°	16°39'	+60'	73°	16°55'	+60'	74°	17°12'	+60'	74°	17°28'	+60'	74°	17°44'	+60'	75°	18°00'	+60'	90°	18
19	17°21'	+60'	73°	17°38'	+60'	73°	17°55'	+60'	74°	18°12'	+60'	74°	18°28'	+60'	74°	18°44'	+60'	75°	19°00'	+60'	90°	19
20	18°21'	+60'	73°	18°38'	+60'	73°	18°55'	+60'	74°	19°12'	+60'	74°	19°28'	+60'	74°	19°44'	+60'	75°	20°00'	+60'	90°	20
21	19°20'	+60'	73°	19°38'	+60'	73°	19°55'	+60'	74°	20°12'	+60'	74°	20°28'	+60'	74°	20°44'	+60'	75°	21°00'	+60'	90°	21
22	20°20'	+60'	73°	20°38'	+60'	73°	20°55'	+60'	73°	21°12'	+60'	74°	21°28'	+60'	74°	21°44'	+60'	75°	22°00'	+60'	90°	22
23	21°20'	+60'	73°	21°37'	+60'	73°	21°55'	+60'	73°	22°12'	+60'	74°	22°28'	+60'	74°	22°44'	+60'	75°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

105° 255° LHA — Latitude SAME as DECLINATION — 105° 255° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

74° 286° LHA — Latitude CONTRARY to Declination — 74° 286° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°39'	-60'	106°	1°23'	-60'	106°	1°06'	-60'	106°	0°50'	-60'	106°	0°33'	-60'	106°	0°17'	-60'	106°	0°00'	-60'	106°	0
1	0°39'	-60'	106°	0°23'	-60'	106°	0°06'	-60'	106°	0°10'	+60'	74°	0°27'	+60'	74°	0°43'	+60'	74°	1°00'	+60'	74°	1
2	0°20'	+60'	74°	0°37'	+60'	74°	0°54'	+60'	74°	1°10'	+60'	74°	1°27'	+60'	74°	1°43'	+60'	74°	2°00'	+60'	77°	2
3	1°20'	+60'	74°	1°37'	+60'	74°	1°53'	+60'	74°	2°10'	+60'	74°	2°27'	+60'	74°	2°43'	+60'	74°	3°00'	+60'	83°	3
4	2°20'	+60'	74°	2°37'	+60'	74°	2°53'	+60'	74°	3°10'	+60'	74°	3°27'	+60'	74°	3°43'	+60'	74°	4°00'	+60'	77°	4
5	3°19'	+60'	74°	3°36'	+60'	74°	3°53'	+60'	74°	4°10'	+60'	74°	4°27'	+60'	74°	4°43'	+60'	74°	5°00'	+60'	63°	5
6	4°19'	+60'	73°	4°36'	+60'	74°	4°53'	+60'	74°	5°10'	+60'	74°	5°27'	+60'	74°	5°43'	+60'	74°	6°00'	+60'	77°	6
7	5°19'	+60'	73°	5°36'	+60'	73°	5°53'	+60'	74°	6°10'	+60'	74°	6°27'	+60'	74°	6°43'	+60'	74°	7°00'	+60'	77°	7
8	6°19'	+60'	73°	6°36'	+60'	73°	6°53'	+60'	73°	7°10'	+60'	74°	7°27'	+60'	74°	7°43'	+60'	74°	8°00'	+60'	24°	8
9	7°18'	+60'	73°	7°35'	+60'	73°	7°53'	+60'	73°	8°10'	+60'	74°	8°27'	+60'	74°	8°43'	+60'	74°	9°00'	+60'	90°	9
10	8°18'	+60'	73°	8°35'	+60'	73°	8°53'	+60'	73°	9°10'	+60'	74°	9°27'	+60'	74°	9°43'	+60'	74°	10°00'	+60'	63°	10
11	9°18'	+60'	73°	9°35'	+60'	73°	9°52'	+60'	73°	10°10'	+60'	73°	10°27'	+60'	74°	10°43'	+60'	74°	11°00'	+60'	63°	11
12	10°17'	+60'	73°	10°35'	+60'	73°	10°52'	+60'	73°	11°09'	+60'	73°	11°27'	+60'	74°	11°43'	+60'	74°	12°00'	+60'	90°	12
13	11°17'	+60'	73°	11°35'	+60'	73°	11°52'	+60'	73°	12°09'	+60'	73°	12°26'	+60'	74°	12°43'	+60'	74°	13°00'	+60'	90°	13
14	12°17'	+60'	73°	12°34'	+60'	73°	12°52'	+60'	73°	13°09'	+60'	73°	13°26'	+60'	74°	13°43'	+60'	74°	14°00'	+60'	21°	14
15	13°16'	+60'	73°	13°34'	+60'	73°	13°52'	+60'	73°	14°09'	+60'	73°	14°26'	+60'	73°	14°43'	+60'	74°	15°00'	+60'	90°	15
16	14°16'	+60'	72°	14°34'	+60'	73°	14°52'	+60'	73°	15°09'	+60'	73°	15°26'	+60'	73°	15°43'	+60'	74°	16°00'	+60'	90°	16
17	15°16'	+60'	72°	15°34'	+60'	73°	15°52'	+60'	73°	16°09'	+60'	73°	16°26'	+60'	73°	16°43'	+60'	74°	17°00'	+60'	90°	17
18	16°15'	+60'	72°	16°34'	+60'	73°	16°51'	+60'	73°	17°09'	+60'	73°	17°26'	+60'	73°	17°43'	+60'	74°	18°00'	+60'	90°	18
19	17°15'	+60'	72°	17°33'	+60'	72°	17°51'	+60'	73°	18°09'	+60'	73°	18°26'	+60'	73°	18°43'	+60'	74°	19°00'	+60'	90°	19
20	18°15'	+60'	72°	18°33'	+60'	72°	18°51'	+60'	73°	19°09'	+60'	73°	19°26'	+60'	73°	19°43'	+60'	74°	20°00'	+60'	90°	20
21	19°14'	+60'	72°	19°33'	+60'	72°	19°51'	+60'	73°	20°09'	+60'	73°	20°26'	+60'	73°	20°43'	+60'	74°	21°00'	+60'	90°	21
22	20°14'	+60'	72°	20°33'	+60'	72°	20°51'	+60'	72°	21°09'	+60'	73°	21°26'	+60'	73°	21°43'	+60'	74°	22°00'	+60'	90°	22
23	21°14'	+60'	72°	21°32'	+60'	72°	21°51'	+60'	72°	22°09'	+60'	73°	22°26'	+60'	73°	22°43'	+60'	74°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

106° 254° LHA — Latitude SAME as DECLINATION — 106° 254° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

73° 287° LHA — Latitude CONTRARY to Declination — 73° 287° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°45'	-60'	107°	1°28'	-60'	107°	1°10'	-60'	107°	0°53'	-60'	107°	0°35'	-60'	107°	0°18'	-60'	107°	0°00'	-60'	107°	0
1	0°45'	-60'	107°	0°28'	-60'	107°	0°10'	-60'	107°	0°07'	+60'	73°	0°25'	+60'	73°	0°42'	+60'	73°	1°00'	+60'	74°	1
2	0°14'	+60'	73°	0°32'	+60'	73°	0°50'	+60'	73°	1°07'	+60'	73°	1°25'	+60'	73°	1°42'	+60'	73°	2°00'	+60'	70°	2
3	1°14'	+60'	73°	1°32'	+60'	73°	1°49'	+60'	73°	2°07'	+60'	73°	2°25'	+60'	73°	2°42'	+60'	73°	3°00'	+60'	77°	3
4	2°14'	+60'	73°	2°32'	+60'	73°	2°49'	+60'	73°	3°07'	+60'	73°	3°25'	+60'	73°	3°42'	+60'	73°	4°00'	+60'	77°	4
5	3°13'	+60'	73°	3°31'	+60'	73°	3°49'	+60'	73°	4°07'	+60'	73°	4°25'	+60'	73°	4°42'	+60'	73°	5°00'	+60'	63°	5
6	4°13'	+60'	72°	4°31'	+60'	73°	4°49'	+60'	73°	5°07'	+60'	73°	5°25'	+60'	73°	5°42'	+60'	73°	6°00'	+60'	77°	6
7	5°13'	+60'	72°	5°31'	+60'	72°	5°49'	+60'	73°	6°07'	+60'	73°	6°25'	+60'	73°	6°42'	+60'	73°	7°00'	+60'	77°	7
8	6°13'	+60'	72°	6°31'	+60'	72°	6°49'	+60'	73°	7°07'	+60'	73°	7°25'	+60'	73°	7°42'	+60'	73°	8°00'	+60'	24°	8
9	7°12'	+60'	72°	7°31'	+60'	72°	7°49'	+60'	72°	8°07'	+60'	73°	8°25'	+60'	73°	8°42'	+60'	73°	9°00'	+60'	90°	9
10	8°12'	+60'	72°	8°30'	+60'	72°	8°49'	+60'	72°	9°07'	+60'	73°	9°25'	+60'	73°	9°42'	+60'	73°	10°00'	+60'	63°	10
11	9°12'	+60'	72°	9°30'	+60'	72°	9°48'	+60'	72°	10°07'	+60'	72°	10°25'	+60'	73°	10°42'	+60'	73°	11°00'	+60'	63°	11
12	10°11'	+60'	72°	10°30'	+60'	72°	10°48'	+60'	72°	11°06'	+60'	72°	11°25'	+60'	73°	11°42'	+60'	73°	12°00'	+60'	90°	12
13	11°11'	+60'	72°	11°30'	+60'	72°	11°48'	+60'	72°	12°06'	+60'	72°	12°24'	+60'	73°	12°42'	+60'	73°	13°00'	+60'	90°	13
14	12°11'	+60'	72°	12°29'	+60'	72°	12°48'	+60'	72°	13°06'	+60'	72°	13°24'	+60'	73°	13°42'	+60'	73°	14°00'	+60'	21°	14
15	13°10'	+60'	72°	13°29'	+60'	72°	13°48'	+60'	72°	14°06'	+60'	72°	14°24'	+60'	72°	14°42'	+60'	73°	15°00'	+60'	90°	15
16	14°10'	+60'	71°	14°29'	+60'	72°	14°48'	+60'	72°	15°06'	+60'	72°	15°24'	+60'	72°	15°42'	+60'	73°	16°00'	+60'	90°	16
17	15°10'	+60'	71°	15°29'	+60'	72°	15°48'	+60'	72°	16°06'	+60'	72°	16°24'	+60'	72°	16°42'	+60'	73°	17°00'	+60'	90°	17
18	16°09'	+60'	71°	16°29'	+60'	72°	16°47'	+60'	72°	17°06'	+60'	72°	17°24'	+60'	72°	17°42'	+60'	73°	18°00'	+60'	90°	18
19	17°09'	+60'	71°	17°28'	+60'	71°	17°47'	+60'	72°	18°06'	+60'	72°	18°24'	+60'	72°	18°42'	+60'	73°	19°00'	+60'	90°	19
20	18°09'	+60'	71°	18°28'	+60'	71°	18°47'	+60'	72°	19°06'	+60'	72°	19°24'	+60'	72°	19°42'	+60'	73°	20°00'	+60'	90°	20
21	19°08'	+60'	71°	19°28'	+60'	71°	19°47'	+60'	72°	20°06'	+60'	72°	20°24'	+60'	72°	20°42'	+60'	73°	21°00'	+60'	90°	21
22	20°08'	+60'	71°	20°28'	+60'	71°	20°47'	+60'	72°	21°06'	+60'	72°	21°24'	+60'	72°	21°42'	+60'	73°	22°00'	+60'	90°	22
23	21°08'	+60'	71°	21°27'	+60'	71°	21°47'	+60'	71°	22°06'	+60'	72°	22°24'	+60'	72°	22°42'	+60'	73°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

107° 253° LHA — Latitude SAME as DECLINATION — 107° 253° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

72° 288° LHA — Latitude CONTRARY to Declination — 72° 288° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°51'	-60'	108°	1°33'	-60'	108°	1°14'	-60'	108°	0°56'	-60'	108°	0°37'	-60'	108°	0°19'	-60'	108°	0°00'	-60'	108°	0
1	0°51'	-60'	108°	0°33'	-60'	108°	0°14'	-60'	108°	0°04'	+60'	72°	0°23'	+60'	72°	0°41'	+60'	72°	1°00'	+60'	74°	1
2	0°08'	+60'	72°	0°27'	+60'	72°	0°46'	+60'	72°	1°04'	+60'	72°	1°23'	+60'	72°	1°41'	+60'	72°	2°00'	+60'	70°	2
3	1°08'	+60'	72°	1°27'	+60'	72°	1°45'	+60'	72°	2°04'	+60'	72°	2°23'	+60'	72°	2°41'	+60'	72°	3°00'	+60'	77°	3
4	2°08'	+60'	72°	2°27'	+60'	72°	2°45'	+60'	72°	3°04'	+60'	72°	3°23'	+60'	72°	3°41'	+60'	72°	4°00'	+60'	77°	4
5	3°07'	+60'	72°	3°26'	+60'	72°	3°45'	+60'	72°	4°04'	+60'	72°	4°23'	+60'	72°	4°41'	+60'	72°	5°00'	+60'	63°	5
6	4°07'	+60'	71°	4°26'	+60'	72°	4°45'	+60'	72°	5°04'	+60'	72°	5°23'	+60'	72°	5°41'	+60'	72°	6°00'	+60'	77°	6
7	5°07'	+60'	71°	5°26'	+60'	71°	5°45'	+60'	72°	6°04'	+60'	72°	6°23'	+60'	72°	6°41'	+60'	72°	7°00'	+60'	77°	7
8	6°07'	+60'	71°	6°26'	+60'	71°	6°45'	+60'	72°	7°04'	+60'	72°	7°23'	+60'	72°	7°41'	+60'	72°	8°00'	+60'	24°	8
9	7°06'	+60'	71°	7°26'	+60'	71°	7°45'	+60'	71°	8°04'	+60'	72°	8°23'	+60'	72°	8°41'	+60'	72°	9°00'	+60'	90°	9
10	8°06'	+60'	71°	8°25'	+60'	71°	8°45'	+60'	71°	9°04'	+60'	72°	9°23'	+60'	72°	9°41'	+60'	72°	10°00'	+60'	63°	10
11	9°06'	+60'	71°	9°25'	+60'	71°	9°44'	+60'	71°	10°04'	+60'	71°	10°23'	+60'	72°	10°41'	+60'	72°	11°00'	+60'	63°	11
12	10°05'	+60'	71°	10°25'	+60'	71°	10°44'	+60'	71°	11°03'	+60'	71°	11°23'	+60'	72°	11°41'	+60'	72°	12°00'	+60'	90°	12
13	11°05'	+60'	71°	11°25'	+60'	71°	11°44'	+60'	71°	12°03'	+60'	71°	12°22'	+60'	72°	12°41'	+60'	72°	13°00'	+60'	90°	13
14	12°05'	+60'	71°	12°24'	+60'	71°	12°44'	+60'	71°	13°03'	+60'	71°	13°22'	+60'	72°	13°41'	+60'	72°	14°00'	+60'	21°	14
15	13°04'	+60'	71°	13°24'	+60'	71°	13°44'	+60'	71°	14°03'	+60'	71°	14°22'	+60'	72°	14°41'	+60'	72°	15°00'	+60'	90°	15
16	14°04'	+60'	70°	14°24'	+60'	71°	14°44'	+60'	71°	15°03'	+60'	71°	15°22'	+60'	71°	15°41'	+60'	72°	16°00'	+60'	90°	16
17	15°04'	+60'	70°	15°24'	+60'	71°	15°44'	+60'	71°	16°03'	+60'	71°	16°22'	+60'	71°	16°41'	+60'	72°	17°00'	+60'	90°	17
18	16°03'	+60'	70°	16°24'	+60'	71°	16°43'	+60'	71°	17°03'	+60'	71°	17°22'	+60'	71°	17°41'	+60'	72°	18°00'	+60'	90°	18
19	17°03'	+60'	70°	17°23'	+60'	70°	17°43'	+60'	71°	18°03'	+60'	71°	18°22'	+60'	71°	18°41'	+60'	72°	19°00'	+60'	90°	19
20	18°03'	+60'	70°	18°23'	+60'	70°	18°43'	+60'	71°	19°03'	+60'	71°	19°22'	+60'	71°	19°41'	+60'	72°	20°00'	+60'	90°	20
21	19°02'	+60'	70°	19°23'	+60'	70°	19°43'	+60'	71°	20°03'	+60'	71°	20°22'	+60'	71°	20°41'	+60'	72°	21°00'	+60'	90°	21
22	20°02'	+60'	70°	20°23'	+60'	70°	20°43'	+60'	71°	21°03'	+60'	71°	21°22'	+60'	71°	21°41'	+60'	72°	22°00'	+60'	90°	22
23	21°02'	+60'	70°	21°22'	+60'	70°	21°43'	+60'	70°	22°03'	+60'	71°	22°22'	+60'	71°	22°41'	+60'	72°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

108° 252° LHA — Latitude SAME as DECLINATION — 108° 252° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

71° 289° LHA — Latitude CONTRARY to Declination — 71° 289° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1°57'	-60'	109°	1°38'	-60'	109°	1°18'	-60'	109°	0°59'	-60'	109°	0°39'	-60'	109°	0°20'	-60'	109°	0°00'	-60'	109°	0
1	0°57'	-60'	109°	0°38'	-60'	109°	0°18'	-60'	109°	0°01'	+60'	71°	0°21'	+60'	71°	0°40'	+60'	71°	1°00'	+60'	70°	1
2	0°02'	+60'	71°	0°22'	+60'	71°	0°42'	+60'	71°	1°01'	+60'	71°	1°21'	+60'	71°	1°40'	+60'	71°	2°00'	+60'	70°	2
3	1°02'	+60'	71°	1°22'	+60'	71°	1°42'	+60'	71°	2°01'	+60'	71°	2°21'	+60'	71°	2°40'	+60'	71°	3°00'	+60'	77°	3
4	2°02'	+60'	71°	2°22'	+60'	71°	2°41'	+60'	71°	3°01'	+60'	71°	3°21'	+60'	71°	3°40'	+60'	71°	4°00'	+60'	77°	4
5	3°02'	+60'	71°	3°21'	+60'	71°	3°41'	+60'	71°	4°01'	+60'	71°	4°21'	+60'	71°	4°40'	+60'	71°	5°00'	+60'	63°	5
6	4°01'	+60'	71°	4°21'	+60'	71°	4°41'	+60'	71°	5°01'	+60'	71°	5°21'	+60'	71°	5°40'	+60'	71°	6°00'	+60'	77°	6
7	5°01'	+60'	70°	5°21'	+60'	70°	5°41'	+60'	71°	6°01'	+60'	71°	6°21'	+60'	71°	6°40'	+60'	71°	7°00'	+60'	77°	7
8	6°01'	+60'	70°	6°21'	+60'	70°	6°41'	+60'	71°	7°01'	+60'	71°	7°21'	+60'	71°	7°40'	+60'	71°	8°00'	+60'	24°	8
9	7°00'	+60'	70°	7°21'	+60'	70°	7°41'	+60'	70°	8°01'	+60'	71°	8°21'	+60'	71°	8°40'	+60'	71°	9°00'	+60'	90°	9
10	8°00'	+60'	70°	8°20'	+60'	70°	8°41'	+60'	70°	9°01'	+60'	71°	9°21'	+60'	71°	9°40'	+60'	71°	10°00'	+60'	63°	10
11	9°00'	+60'	70°	9°20'	+60'	70°	9°40'	+60'	70°	10°01'	+60'	70°	10°21'	+60'	71°	10°40'	+60'	71°	11°00'	+60'	63°	11
12	9°59'	+60'	70°	10°20'	+60'	70°	10°40'	+60'	70°	11°01'	+60'	70°	11°21'	+60'	71°	11°40'	+60'	71°	12°00'	+60'	90°	12
13	10°59'	+60'	70°	11°20'	+60'	70°	11°40'	+60'	70°	12°00'	+60'	70°	12°21'	+60'	71°	12°40'	+60'	71°	13°00'	+60'	90°	13
14	11°59'	+60'	70°	12°20'	+60'	70°	12°40'	+60'	70°	13°00'	+60'	70°	13°20'	+60'	71°	13°40'	+60'	71°	14°00'	+60'	21°	14
15	12°59'	+60'	70°	13°19'	+60'	70°	13°40'	+60'	70°	14°00'	+60'	70°	14°20'	+60'	71°	14°40'	+60'	71°	15°00'	+60'	90°	15
16	13°58'	+60'	69°	14°19'	+60'	70°	14°40'	+60'	70°	15°00'	+60'	70°	15°20'	+60'	70°	15°40'	+60'	71°	16°00'	+60'	90°	16
17	14°58'	+60'	69°	15°19'	+60'	70°	15°40'	+60'	70°	16°00'	+60'	70°	16°20'	+60'	70°	16°40'	+60'	71°	17°00'	+60'	90°	17
18	15°58'	+60'	69°	16°19'	+60'	70°	16°40'	+60'	70°	17°00'	+60'	70°	17°20'	+60'	70°	17°40'	+60'	71°	18°00'	+60'	90°	18
19	16°57'	+60'	69°	17°18'	+60'	69°	17°39'	+60'	70°	18°00'	+60'	70°	18°20'	+60'	70°	18°40'	+60'	71°	19°00'	+60'	90°	19
20	17°57'	+60'	69°	18°18'	+60'	69°	18°39'	+60'	70°	19°00'	+60'	70°	19°20'	+60'	70°	19°40'	+60'	71°	20°00'	+60'	90°	20
21	18°57'	+60'	69°	19°18'	+60'	69°	19°39'	+60'	70°	20°00'	+60'	70°	20°20'	+60'	70°	20°40'	+60'	71°	21°00'	+60'	90°	21
22	19°56'	+60'	69°	20°18'	+60'	69°	20°39'	+60'	70°	21°00'	+60'	70°	21°20'	+60'	70°	21°40'	+60'	71°	22°00'	+60'	90°	22
23	20°56'	+60'	69°	21°18'	+60'	69°	21°39'	+60'	69°	22°00'	+60'	70°	22°20'	+60'	70°	22°40'	+60'	71°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

109° 251° LHA — Latitude SAME as DECLINATION — 109° 251° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

70° 290° LHA — Latitude CONTRARY to Declination — 70° 290° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°03'	-60'	110°	1°42'	-60'	110°	1°22'	-60'	110°	1°02'	-60'	110°	0°41'	-60'	110°	0°21'	-60'	110°	0°00'	-60'	110°	0
1	1°03'	-60'	110°	0°43'	-60'	110°	0°22'	-60'	110°	0°02'	-60'	110°	0°19'	+60'	70°	0°39'	+60'	70°	1°00'	+60'	70°	1
2	0°04'	-60'	110°	0°17'	+60'	70°	0°38'	+60'	70°	0°58'	+60'	70°	1°19'	+60'	70°	1°39'	+60'	70°	2°00'	+60'	70°	2
3	0°56'	+60'	70°	1°17'	+60'	70°	1°38'	+60'	70°	1°58'	+60'	70°	2°19'	+60'	70°	2°39'	+60'	70°	3°00'	+60'	77°	3
4	1°56'	+60'	70°	2°17'	+60'	70°	2°37'	+60'	70°	2°58'	+60'	70°	3°19'	+60'	70°	3°39'	+60'	70°	4°00'	+60'	63°	4
5	2°56'	+60'	70°	3°17'	+60'	70°	3°37'	+60'	70°	3°58'	+60'	70°	4°19'	+60'	70°	4°39'	+60'	70°	5°00'	+60'	63°	5
6	3°55'	+60'	70°	4°16'	+60'	70°	4°37'	+60'	70°	4°58'	+60'	70°	5°19'	+60'	70°	5°39'	+60'	70°	6°00'	+60'	63°	6
7	4°55'	+60'	69°	5°16'	+60'	69°	5°37'	+60'	70°	5°58'	+60'	70°	6°19'	+60'	70°	6°39'	+60'	70°	7°00'	+60'	77°	7
8	5°55'	+60'	69°	6°16'	+60'	69°	6°37'	+60'	70°	6°58'	+60'	70°	7°19'	+60'	70°	7°39'	+60'	70°	8°00'	+60'	24°	8
9	6°54'	+60'	69°	7°16'	+60'	69°	7°37'	+60'	69°	7°58'	+60'	70°	8°19'	+60'	70°	8°39'	+60'	70°	9°00'	+60'	90°	9
10	7°54'	+60'	69°	8°15'	+60'	69°	8°37'	+60'	69°	8°58'	+60'	70°	9°19'	+60'	70°	9°39'	+60'	70°	10°00'	+60'	63°	10
11	8°54'	+60'	69°	9°15'	+60'	69°	9°37'	+60'	69°	9°58'	+60'	69°	10°19'	+60'	70°	10°39'	+60'	70°	11°00'	+60'	63°	11
12	9°54'	+60'	69°	10°15'	+60'	69°	10°36'	+60'	69°	10°58'	+60'	69°	11°19'	+60'	70°	11°39'	+60'	70°	12°00'	+60'	90°	12
13	10°53'	+60'	69°	11°15'	+60'	69°	11°36'	+60'	69°	11°58'	+60'	69°	12°19'	+60'	70°	12°39'	+60'	70°	13°00'	+60'	90°	13
14	11°53'	+60'	69°	12°15'	+60'	69°	12°36'	+60'	69°	12°57'	+60'	69°	13°19'	+60'	70°	13°39'	+60'	70°	14°00'	+60'	21°	14
15	12°53'	+60'	69°	13°14'	+60'	69°	13°36'	+60'	69°	13°57'	+60'	69°	14°18'	+60'	70°	14°39'	+60'	70°	15°00'	+60'	90°	15
16	13°52'	+60'	69°	14°14'	+60'	69°	14°36'	+60'	69°	14°57'	+60'	69°	15°18'	+60'	69°	15°39'	+60'	70°	16°00'	+60'	90°	16
17	14°52'	+60'	68°	15°14'	+60'	69°	15°36'	+60'	69°	15°57'	+60'	69°	16°18'	+60'	69°	16°39'	+60'	70°	17°00'	+60'	90°	17
18	15°52'	+60'	68°	16°14'	+60'	69°	16°36'	+60'	69°	16°57'	+60'	69°	17°18'	+60'	69°	17°39'	+60'	70°	18°00'	+60'	90°	18
19	16°51'	+60'	68°	17°14'	+60'	68°	17°35'	+60'	69°	17°57'	+60'	69°	18°18'	+60'	69°	18°39'	+60'	70°	19°00'	+60'	90°	19
20	17°51'	+60'	68°	18°13'	+60'	68°	18°35'	+60'	69°	18°57'	+60'	69°	19°18'	+60'	69°	19°39'	+60'	70°	20°00'	+60'	90°	20
21	18°51'	+60'	68°	19°13'	+60'	68°	19°35'	+60'	69°	19°57'	+60'	69°	20°18'	+60'	69°	20°39'	+60'	70°	21°00'	+60'	90°	21
22	19°50'	+60'	68°	20°13'	+60'	68°	20°35'	+60'	69°	20°57'	+60'	69°	21°18'	+60'	69°	21°39'	+60'	70°	22°00'	+60'	90°	22
23	20°50'	+60'	68°	21°13'	+60'	68°	21°35'	+60'	68°	21°57'	+60'	69°	22°18'	+60'	69°	22°39'	+60'	70°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

110° 250° LHA — Latitude SAME as DECLINATION — 110° 250° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

69° 291° LHA — Latitude CONTRARY to Declination — 69° 291° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°09'	-60'	111°	1°47'	-60'	111°	1°26'	-60'	111°	1°04'	-60'	111°	0°43'	-60'	111°	0°22'	-60'	111°	0°00'	-60'	111°	0
1	1°09'	-60'	111°	0°48'	-60'	111°	0°26'	-60'	111°	0°05'	-60'	111°	0°17'	+60'	69°	0°38'	+60'	69°	1°00'	+60'	70°	1
2	0°09'	-60'	111°	0°12'	+60'	69°	0°34'	+60'	69°	0°55'	+60'	69°	1°17'	+60'	69°	1°38'	+60'	69°	2°00'	+60'	70°	2
3	0°50'	+60'	69°	1°12'	+60'	69°	1°34'	+60'	69°	1°55'	+60'	69°	2°17'	+60'	69°	2°38'	+60'	69°	3°00'	+60'	77°	3
4	1°50'	+60'	69°	2°12'	+60'	69°	2°34'	+60'	69°	2°55'	+60'	69°	3°17'	+60'	69°	3°38'	+60'	69°	4°00'	+60'	63°	4
5	2°50'	+60'	69°	3°12'	+60'	69°	3°33'	+60'	69°	3°55'	+60'	69°	4°17'	+60'	69°	4°38'	+60'	69°	5°00'	+60'	63°	5
6	3°49'	+60'	69°	4°11'	+60'	69°	4°33'	+60'	69°	4°55'	+60'	69°	5°17'	+60'	69°	5°38'	+60'	69°	6°00'	+60'	63°	6
7	4°49'	+60'	68°	5°11'	+60'	69°	5°33'	+60'	69°	5°55'	+60'	69°	6°17'	+60'	69°	6°38'	+60'	69°	7°00'	+60'	63°	7
8	5°49'	+60'	68°	6°11'	+60'	68°	6°33'	+60'	69°	6°55'	+60'	69°	7°17'	+60'	69°	7°38'	+60'	69°	8°00'	+60'	24°	8
9	6°49'	+60'	68°	7°11'	+60'	68°	7°33'	+60'	68°	7°55'	+60'	69°	8°17'	+60'	69°	8°38'	+60'	69°	9°00'	+60'	90°	9
10	7°48'	+60'	68°	8°11'	+60'	68°	8°33'	+60'	68°	8°55'	+60'	69°	9°17'	+60'	69°	9°38'	+60'	69°	10°00'	+60'	63°	10
11	8°48'	+60'	68°	9°10'	+60'	68°	9°33'	+60'	68°	9°55'	+60'	68°	10°17'	+60'	69°	10°38'	+60'	69°	11°00'	+60'	63°	11
12	9°48'	+60'	68°	10°10'	+60'	68°	10°33'	+60'	68°	10°55'	+60'	68°	11°17'	+60'	69°	11°38'	+60'	69°	12°00'	+60'	90°	12
13	10°47'	+60'	68°	11°10'	+60'	68°	11°32'	+60'	68°	11°55'	+60'	68°	12°17'	+60'	69°	12°38'	+60'	69°	13°00'	+60'	90°	13
14	11°47'	+60'	68°	12°10'	+60'	68°	12°32'	+60'	68°	12°55'	+60'	68°	13°17'	+60'	69°	13°38'	+60'	69°	14°00'	+60'	21°	14
15	12°47'	+60'	68°	13°10'	+60'	68°	13°32'	+60'	68°	13°54'	+60'	68°	14°17'	+60'	69°	14°38'	+60'	69°	15°00'	+60'	90°	15
16	13°47'	+60'	68°	14°09'	+60'	68°	14°32'	+60'	68°	14°54'	+60'	68°	15°16'	+60'	68°	15°38'	+60'	69°	16°00'	+60'	90°	16
17	14°46'	+60'	67°	15°09'	+60'	68°	15°32'	+60'	68°	15°54'	+60'	68°	16°16'	+60'	68°	16°38'	+60'	69°	17°00'	+60'	90°	17
18	15°46'	+60'	67°	16°09'	+60'	68°	16°32'	+60'	68°	16°54'	+60'	68°	17°16'	+60'	68°	17°38'	+60'	69°	18°00'	+60'	90°	18
19	16°46'	+60'	67°	17°09'	+60'	67°	17°32'	+60'	68°	17°54'	+60'	68°	18°16'	+60'	68°	18°38'	+60'	69°	19°00'	+60'	90°	19
20	17°45'	+60'	67°	18°09'	+60'	67°	18°31'	+60'	68°	18°54'	+60'	68°	19°16'	+60'	68°	19°38'	+60'	69°	20°00'	+60'	90°	20
21	18°45'	+60'	67°	19°08'	+60'	67°	19°31'	+60'	68°	19°54'	+60'	68°	20°16'	+60'	68°	20°38'	+60'	69°	21°00'	+60'	90°	21
22	19°45'	+60'	67°	20°08'	+60'	67°	20°31'	+60'	68°	20°54'	+60'	68°	21°16'	+60'	68°	21°38'	+60'	69°	22°00'	+60'	90°	22
23	20°44'	+60'	67°	21°08'	+60'	67°	21°31'	+60'	67°	21°54'	+60'	68°	22°16'	+60'	68°	22°38'	+60'	69°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

111° 249° LHA — Latitude SAME as DECLINATION — 111° 249° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

68° 292° LHA — **Latitude CONTRARY to Declination** — **68° 292° LHA**

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°15'	-60'	112°	1°52'	-60'	112°	1°30'	-60'	112°	1°07'	-60'	112°	0°45'	-60'	112°	0°22'	-60'	112°	0°00'	-60'	112°	0
1	1°15'	-60'	112°	0°52'	-60'	112°	0°30'	-60'	112°	0°07'	-60'	112°	0°15'	+60'	68°	0°38'	+60'	68°	1°00'	+60'	67°	1
2	0°15'	-60'	112°	0°07'	+60'	68°	0°30'	+60'	68°	0°52'	+60'	68°	1°15'	+60'	68°	1°38'	+60'	68°	2°00'	+60'	70°	2
3	0°45'	+60'	68°	1°07'	+60'	68°	1°30'	+60'	68°	1°52'	+60'	68°	2°15'	+60'	68°	2°38'	+60'	68°	3°00'	+60'	77°	3
4	1°44'	+60'	68°	2°07'	+60'	68°	2°30'	+60'	68°	2°52'	+60'	68°	3°15'	+60'	68°	3°37'	+60'	68°	4°00'	+60'	63°	4
5	2°44'	+60'	68°	3°07'	+60'	68°	3°30'	+60'	68°	3°52'	+60'	68°	4°15'	+60'	68°	4°37'	+60'	68°	5°00'	+60'	63°	5
6	3°44'	+60'	68°	4°07'	+60'	68°	4°29'	+60'	68°	4°52'	+60'	68°	5°15'	+60'	68°	5°37'	+60'	68°	6°00'	+60'	63°	6
7	4°43'	+60'	67°	5°06'	+60'	68°	5°29'	+60'	68°	5°52'	+60'	68°	6°15'	+60'	68°	6°37'	+60'	68°	7°00'	+60'	63°	7
8	5°43'	+60'	67°	6°06'	+60'	67°	6°29'	+60'	68°	6°52'	+60'	68°	7°15'	+60'	68°	7°37'	+60'	68°	8°00'	+60'	24°	8
9	6°43'	+60'	67°	7°06'	+60'	67°	7°29'	+60'	67°	7°52'	+60'	68°	8°15'	+60'	68°	8°37'	+60'	68°	9°00'	+60'	90°	9
10	7°43'	+60'	67°	8°06'	+60'	67°	8°29'	+60'	67°	8°52'	+60'	68°	9°15'	+60'	68°	9°37'	+60'	68°	10°00'	+60'	63°	10
11	8°42'	+60'	67°	9°06'	+60'	67°	9°29'	+60'	67°	9°52'	+60'	67°	10°15'	+60'	68°	10°37'	+60'	68°	11°00'	+60'	63°	11
12	9°42'	+60'	67°	10°05'	+60'	67°	10°29'	+60'	67°	10°52'	+60'	67°	11°15'	+60'	68°	11°37'	+60'	68°	12°00'	+60'	90°	12
13	10°42'	+60'	67°	11°05'	+60'	67°	11°29'	+60'	67°	11°52'	+60'	67°	12°15'	+60'	68°	12°37'	+60'	68°	13°00'	+60'	90°	13
14	11°41'	+60'	67°	12°05'	+60'	67°	12°28'	+60'	67°	12°52'	+60'	67°	13°15'	+60'	68°	13°37'	+60'	68°	14°00'	+60'	21°	14
15	12°41'	+60'	67°	13°05'	+60'	67°	13°28'	+60'	67°	13°52'	+60'	67°	14°15'	+60'	68°	14°37'	+60'	68°	15°00'	+60'	90°	15
16	13°41'	+60'	67°	14°05'	+60'	67°	14°28'	+60'	67°	14°51'	+60'	67°	15°15'	+60'	67°	15°37'	+60'	68°	16°00'	+60'	90°	16
17	14°40'	+60'	66°	15°04'	+60'	67°	15°28'	+60'	67°	15°51'	+60'	67°	16°15'	+60'	67°	16°37'	+60'	68°	17°00'	+60'	90°	17
18	15°40'	+60'	66°	16°04'	+60'	67°	16°28'	+60'	67°	16°51'	+60'	67°	17°14'	+60'	67°	17°37'	+60'	68°	18°00'	+60'	90°	18
19	16°40'	+60'	66°	17°04'	+60'	66°	17°28'	+60'	67°	17°51'	+60'	67°	18°14'	+60'	67°	18°37'	+60'	68°	19°00'	+60'	90°	19
20	17°40'	+60'	66°	18°04'	+60'	66°	18°28'	+60'	67°	18°51'	+60'	67°	19°14'	+60'	67°	19°37'	+60'	68°	20°00'	+60'	90°	20
21	18°39'	+60'	66°	19°03'	+60'	66°	19°27'	+60'	67°	19°51'	+60'	67°	20°14'	+60'	67°	20°37'	+60'	68°	21°00'	+60'	90°	21
22	19°39'	+60'	66°	20°03'	+60'	66°	20°27'	+60'	67°	20°51'	+60'	67°	21°14'	+60'	67°	21°37'	+60'	68°	22°00'	+60'	90°	22
23	20°39'	+60'	66°	21°03'	+60'	66°	21°27'	+60'	66°	21°51'	+60'	67°	22°14'	+60'	67°	22°37'	+60'	68°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

112° 248° LHA — **Latitude SAME as DECLINATION** — **112° 248° LHA**

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

67° 293° LHA — **Latitude CONTRARY to Declination** — **67° 293° LHA**

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°20'	-60'	113°	1°57'	-60'	113°	1°34'	-60'	113°	1°10'	-60'	113°	0°47'	-60'	113°	0°23'	-60'	113°	0°00'	-60'	113°	0
1	1°21'	-60'	113°	0°57'	-60'	113°	0°34'	-60'	113°	0°10'	-60'	113°	0°13'	+60'	67°	0°37'	+60'	67°	1°00'	+60'	67°	1
2	0°21'	-60'	113°	0°03'	+60'	67°	0°26'	+60'	67°	0°50'	+60'	67°	1°13'	+60'	67°	1°37'	+60'	67°	2°00'	+60'	70°	2
3	0°39'	+60'	67°	1°02'	+60'	67°	1°26'	+60'	67°	1°49'	+60'	67°	2°13'	+60'	67°	2°37'	+60'	67°	3°00'	+60'	77°	3
4	1°38'	+60'	67°	2°02'	+60'	67°	2°26'	+60'	67°	2°49'	+60'	67°	3°13'	+60'	67°	3°37'	+60'	67°	4°00'	+60'	63°	4
5	2°38'	+60'	67°	3°02'	+60'	67°	3°26'	+60'	67°	3°49'	+60'	67°	4°13'	+60'	67°	4°37'	+60'	67°	5°00'	+60'	63°	5
6	3°38'	+60'	67°	4°02'	+60'	67°	4°26'	+60'	67°	4°49'	+60'	67°	5°13'	+60'	67°	5°37'	+60'	67°	6°00'	+60'	63°	6
7	4°38'	+60'	66°	5°02'	+60'	67°	5°25'	+60'	67°	5°49'	+60'	67°	6°13'	+60'	67°	6°37'	+60'	67°	7°00'	+60'	63°	7
8	5°37'	+60'	66°	6°01'	+60'	66°	6°25'	+60'	67°	6°49'	+60'	67°	7°13'	+60'	67°	7°36'	+60'	67°	8°00'	+60'	24°	8
9	6°37'	+60'	66°	7°01'	+60'	66°	7°25'	+60'	66°	7°49'	+60'	67°	8°13'	+60'	67°	8°36'	+60'	67°	9°00'	+60'	90°	9
10	7°37'	+60'	66°	8°01'	+60'	66°	8°25'	+60'	66°	8°49'	+60'	67°	9°13'	+60'	67°	9°36'	+60'	67°	10°00'	+60'	63°	10
11	8°36'	+60'	66°	9°01'	+60'	66°	9°25'	+60'	66°	9°49'	+60'	66°	10°13'	+60'	67°	10°36'	+60'	67°	11°00'	+60'	63°	11
12	9°36'	+60'	66°	10°01'	+60'	66°	10°25'	+60'	66°	10°49'	+60'	66°	11°13'	+60'	67°	11°36'	+60'	67°	12°00'	+60'	90°	12
13	10°36'	+60'	66°	11°00'	+60'	66°	11°25'	+60'	66°	11°49'	+60'	66°	12°13'	+60'	67°	12°36'	+60'	67°	13°00'	+60'	90°	13
14	11°36'	+60'	66°	12°00'	+60'	66°	12°25'	+60'	66°	12°49'	+60'	66°	13°13'	+60'	67°	13°36'	+60'	67°	14°00'	+60'	21°	14
15	12°35'	+60'	66°	13°00'	+60'	66°	13°24'	+60'	66°	13°49'	+60'	66°	14°13'	+60'	67°	14°36'	+60'	67°	15°00'	+60'	90°	15
16	13°35'	+60'	66°	14°00'	+60'	66°	14°24'	+60'	66°	14°49'	+60'	66°	15°13'	+60'	66°	15°36'	+60'	67°	16°00'	+60'	90°	16
17	14°35'	+60'	65°	15°00'	+60'	66°	15°24'	+60'	66°	15°48'	+60'	66°	16°13'	+60'	66°	16°36'	+60'	67°	17°00'	+60'	90°	17
18	15°34'	+60'	65°	15°59'	+60'	66°	16°24'	+60'	66°	16°48'	+60'	66°	17°13'	+60'	66°	17°36'	+60'	67°	18°00'	+60'	90°	18
19	16°34'	+60'	65°	16°59'	+60'	66°	17°24'	+60'	66°	17°48'	+60'	66°	18°13'	+60'	66°	18°36'	+60'	67°	19°00'	+60'	90°	19
20	17°34'	+60'	65°	17°59'	+60'	65°	18°24'	+60'	66°	18°48'	+60'	66°	19°12'	+60'	66°	19°36'	+60'	67°	20°00'	+60'	90°	20
21	18°34'	+60'	65°	18°59'	+60'	65°	19°24'	+60'	66°	19°48'	+60'	66°	20°12'	+60'	66°	20°36'	+60'	67°	21°00'	+60'	90°	21
22	19°33'	+60'	65°	19°58'	+60'	65°	20°23'	+60'	66°	20°48'	+60'	66°	21°12'	+60'	66°	21°36'	+60'	67°	22°00'	+60'	90°	22
23	20°33'	+60'	65°	20°58'	+60'	65°	21°23'	+60'	66°	21°48'	+60'	66°	22°12'	+60'	66°	22°36'	+60'	67°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

113° 247° LHA — **Latitude SAME as DECLINATION** — **113° 247° LHA**

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

66° 294° LHA — Latitude CONTRARY to Declination — 66° 294° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°26'	-60'	114°	2°02'	-60'	114°	1°38'	-60'	114°	1°13'	-60'	114°	0°49'	-60'	114°	0°24'	-60'	114°	0°00'	-60'	114°	0
1	1°26'	-60'	114°	1°02'	-60'	114°	0°38'	-60'	114°	0°13'	-60'	114°	0°11'	+60'	66°	0°36'	+60'	66°	1°00'	+60'	67°	1
2	0°27'	-60'	114°	0°02'	-60'	114°	0°22'	+60'	66°	0°47'	+60'	66°	1°11'	+60'	66°	1°36'	+60'	66°	2°00'	+60'	63°	2
3	0°33'	+60'	66°	0°58'	+60'	66°	1°22'	+60'	66°	1°47'	+60'	66°	2°11'	+60'	66°	2°36'	+60'	66°	3°00'	+60'	70°	3
4	1°33'	+60'	66°	1°57'	+60'	66°	2°22'	+60'	66°	2°47'	+60'	66°	3°11'	+60'	66°	3°36'	+60'	66°	4°00'	+60'	63°	4
5	2°32'	+60'	66°	2°57'	+60'	66°	3°22'	+60'	66°	3°46'	+60'	66°	4°11'	+60'	66°	4°36'	+60'	66°	5°00'	+60'	63°	5
6	3°32'	+60'	66°	3°57'	+60'	66°	4°22'	+60'	66°	4°46'	+60'	66°	5°11'	+60'	66°	5°36'	+60'	66°	6°00'	+60'	63°	6
7	4°32'	+60'	65°	4°57'	+60'	66°	5°22'	+60'	66°	5°46'	+60'	66°	6°11'	+60'	66°	6°36'	+60'	66°	7°00'	+60'	63°	7
8	5°32'	+60'	65°	5°57'	+60'	65°	6°21'	+60'	66°	6°46'	+60'	66°	7°11'	+60'	66°	7°36'	+60'	66°	8°00'	+60'	24°	8
9	6°31'	+60'	65°	6°56'	+60'	65°	7°21'	+60'	65°	7°46'	+60'	66°	8°11'	+60'	66°	8°36'	+60'	66°	9°00'	+60'	90°	9
10	7°31'	+60'	65°	7°56'	+60'	65°	8°21'	+60'	65°	8°46'	+60'	66°	9°11'	+60'	66°	9°36'	+60'	66°	10°00'	+60'	63°	10
11	8°31'	+60'	65°	8°56'	+60'	65°	9°21'	+60'	65°	9°46'	+60'	65°	10°11'	+60'	66°	10°36'	+60'	66°	11°00'	+60'	63°	11
12	9°30'	+60'	65°	9°56'	+60'	65°	10°21'	+60'	65°	10°46'	+60'	65°	11°11'	+60'	66°	11°36'	+60'	66°	12°00'	+60'	90°	12
13	10°30'	+60'	65°	10°56'	+60'	65°	11°21'	+60'	65°	11°46'	+60'	65°	12°11'	+60'	66°	12°35'	+60'	66°	13°00'	+60'	90°	13
14	11°30'	+60'	65°	11°55'	+60'	65°	12°21'	+60'	65°	12°46'	+60'	65°	13°11'	+60'	66°	13°35'	+60'	66°	14°00'	+60'	21°	14
15	12°30'	+60'	65°	12°55'	+60'	65°	13°21'	+60'	65°	13°46'	+60'	65°	14°11'	+60'	66°	14°35'	+60'	66°	15°00'	+60'	90°	15
16	13°29'	+60'	65°	13°55'	+60'	65°	14°20'	+60'	65°	14°46'	+60'	65°	15°11'	+60'	65°	15°35'	+60'	66°	16°00'	+60'	90°	16
17	14°29'	+60'	64°	14°55'	+60'	65°	15°20'	+60'	65°	15°46'	+60'	65°	16°11'	+60'	65°	16°35'	+60'	66°	17°00'	+60'	90°	17
18	15°29'	+60'	64°	15°55'	+60'	65°	16°20'	+60'	65°	16°46'	+60'	65°	17°11'	+60'	65°	17°35'	+60'	66°	18°00'	+60'	90°	18
19	16°28'	+60'	64°	16°54'	+60'	65°	17°20'	+60'	65°	17°45'	+60'	65°	18°11'	+60'	65°	18°35'	+60'	66°	19°00'	+60'	90°	19
20	17°28'	+60'	64°	17°54'	+60'	64°	18°20'	+60'	65°	18°45'	+60'	65°	19°11'	+60'	65°	19°35'	+60'	66°	20°00'	+60'	90°	20
21	18°28'	+60'	64°	18°54'	+60'	64°	19°20'	+60'	65°	19°45'	+60'	65°	20°11'	+60'	65°	20°35'	+60'	66°	21°00'	+60'	90°	21
22	19°28'	+60'	64°	19°54'	+60'	64°	20°20'	+60'	65°	20°45'	+60'	65°	21°10'	+60'	65°	21°35'	+60'	66°	22°00'	+60'	90°	22
23	20°27'	+60'	64°	20°54'	+60'	64°	21°20'	+60'	65°	21°45'	+60'	65°	22°10'	+60'	65°	22°35'	+60'	66°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

114° 246° LHA — Latitude SAME as DECLINATION — 114° 246° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

65° 295° LHA — Latitude CONTRARY to Declination — 65° 295° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°32'	-60'	115°	2°07'	-60'	115°	1°41'	-60'	115°	1°16'	-60'	115°	0°51'	-60'	115°	0°25'	-60'	115°	0°00'	-60'	115°	0
1	1°32'	-60'	115°	1°07'	-60'	115°	0°41'	-60'	115°	0°16'	-60'	115°	0°09'	+60'	65°	0°35'	+60'	65°	1°00'	+60'	67°	1
2	0°32'	-60'	115°	0°07'	-60'	115°	0°18'	+60'	65°	0°44'	+60'	65°	1°09'	+60'	65°	1°35'	+60'	65°	2°00'	+60'	63°	2
3	0°27'	+60'	65°	0°53'	+60'	65°	1°18'	+60'	65°	1°44'	+60'	65°	2°09'	+60'	65°	2°35'	+60'	65°	3°00'	+60'	70°	3
4	1°27'	+60'	65°	1°53'	+60'	65°	2°18'	+60'	65°	2°44'	+60'	65°	3°09'	+60'	65°	3°35'	+60'	65°	4°00'	+60'	63°	4
5	2°27'	+60'	65°	2°52'	+60'	65°	3°18'	+60'	65°	3°44'	+60'	65°	4°09'	+60'	65°	4°35'	+60'	65°	5°00'	+60'	63°	5
6	3°26'	+60'	65°	3°52'	+60'	65°	4°18'	+60'	65°	4°44'	+60'	65°	5°09'	+60'	65°	5°35'	+60'	65°	6°00'	+60'	63°	6
7	4°26'	+60'	64°	4°52'	+60'	65°	5°18'	+60'	65°	5°43'	+60'	65°	6°09'	+60'	65°	6°35'	+60'	65°	7°00'	+60'	63°	7
8	5°26'	+60'	64°	5°52'	+60'	64°	6°18'	+60'	65°	6°43'	+60'	65°	7°09'	+60'	65°	7°35'	+60'	65°	8°00'	+60'	24°	8
9	6°26'	+60'	64°	6°52'	+60'	64°	7°18'	+60'	64°	7°43'	+60'	65°	8°09'	+60'	65°	8°35'	+60'	65°	9°00'	+60'	90°	9
10	7°25'	+60'	64°	7°51'	+60'	64°	8°17'	+60'	64°	8°43'	+60'	65°	9°09'	+60'	65°	9°35'	+60'	65°	10°00'	+60'	63°	10
11	8°25'	+60'	64°	8°51'	+60'	64°	9°17'	+60'	64°	9°43'	+60'	65°	10°09'	+60'	65°	10°35'	+60'	65°	11°00'	+60'	63°	11
12	9°25'	+60'	64°	9°51'	+60'	64°	10°17'	+60'	64°	10°43'	+60'	64°	11°09'	+60'	65°	11°35'	+60'	65°	12°00'	+60'	90°	12
13	10°25'	+60'	64°	10°51'	+60'	64°	11°17'	+60'	64°	11°43'	+60'	64°	12°09'	+60'	65°	12°35'	+60'	65°	13°00'	+60'	90°	13
14	11°24'	+60'	64°	11°51'	+60'	64°	12°17'	+60'	64°	12°43'	+60'	64°	13°09'	+60'	65°	13°35'	+60'	65°	14°00'	+60'	21°	14
15	12°24'	+60'	64°	12°50'	+60'	64°	13°17'	+60'	64°	13°43'	+60'	64°	14°09'	+60'	65°	14°35'	+60'	65°	15°00'	+60'	90°	15
16	13°24'	+60'	64°	13°50'	+60'	64°	14°17'	+60'	64°	14°43'	+60'	64°	15°09'	+60'	64°	15°35'	+60'	65°	16°00'	+60'	90°	16
17	14°23'	+60'	63°	14°50'	+60'	64°	15°17'	+60'	64°	15°43'	+60'	64°	16°09'	+60'	64°	16°35'	+60'	65°	17°00'	+60'	90°	17
18	15°23'	+60'	63°	15°50'	+60'	64°	16°16'	+60'	64°	16°43'	+60'	64°	17°09'	+60'	64°	17°35'	+60'	65°	18°00'	+60'	90°	18
19	16°23'	+60'	63°	16°50'	+60'	64°	17°16'	+60'	64°	17°43'	+60'	64°	18°09'	+60'	64°	18°34'	+60'	65°	19°00'	+60'	90°	19
20	17°23'	+60'	63°	17°49'	+60'	63°	18°16'	+60'	64°	18°43'	+60'	64°	19°09'	+60'	64°	19°34'	+60'	65°	20°00'	+60'	90°	20
21	18°22'	+60'	63°	18°49'	+60'	63°	19°16'	+60'	64°	19°42'	+60'	64°	20°09'	+60'	64°	20°34'	+60'	65°	21°00'	+60'	90°	21
22	19°22'	+60'	63°	19°49'	+60'	63°	20°16'	+60'	64°	20°42'	+60'	64°	21°09'	+60'	64°	21°34'	+60'	65°	22°00'	+60'	90°	22
23	20°22'	+60'	63°	20°49'	+60'	63°	21°16'	+60'	64°	21°42'	+60'	64°	22°09'	+60'	64°	22°34'	+60'	65°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

115° 245° LHA — Latitude SAME as DECLINATION — 115° 245° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

64° 296° LHA — Latitude CONTRARY to Declination — 64° 296° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°38'	-60'	116°	2°11'	-60'	116°	1°45'	-60'	116°	1°19'	-60'	116°	0°53'	-60'	116°	0°26'	-60'	116°	0°00'	-60'	116°	0
1	1°38'	-60'	116°	1°12'	-60'	116°	0°45'	-60'	116°	0°19'	-60'	116°	0°07'	+60'	64°	0°34'	+60'	64°	1°00'	+60'	63°	1
2	0°38'	-60'	116°	0°12'	-60'	116°	0°15'	+60'	64°	0°41'	+60'	64°	1°07'	+60'	64°	1°34'	+60'	64°	2°00'	+60'	63°	2
3	0°22'	+60'	64°	0°48'	+60'	64°	1°15'	+60'	64°	1°41'	+60'	64°	2°07'	+60'	64°	2°34'	+60'	64°	3°00'	+60'	70°	3
4	1°21'	+60'	64°	1°48'	+60'	64°	2°14'	+60'	64°	2°41'	+60'	64°	3°07'	+60'	64°	3°34'	+60'	64°	4°00'	+60'	63°	4
5	2°21'	+60'	64°	2°48'	+60'	64°	3°14'	+60'	64°	3°41'	+60'	64°	4°07'	+60'	64°	4°34'	+60'	64°	5°00'	+60'	63°	5
6	3°21'	+60'	64°	3°48'	+60'	64°	4°14'	+60'	64°	4°41'	+60'	64°	5°07'	+60'	64°	5°34'	+60'	64°	6°00'	+60'	63°	6
7	4°21'	+60'	63°	4°47'	+60'	64°	5°14'	+60'	64°	5°41'	+60'	64°	6°07'	+60'	64°	6°34'	+60'	64°	7°00'	+60'	63°	7
8	5°20'	+60'	63°	5°47'	+60'	63°	6°14'	+60'	64°	6°41'	+60'	64°	7°07'	+60'	64°	7°34'	+60'	64°	8°00'	+60'	24°	8
9	6°20'	+60'	63°	6°47'	+60'	63°	7°14'	+60'	63°	7°41'	+60'	64°	8°07'	+60'	64°	8°34'	+60'	64°	9°00'	+60'	90°	9
10	7°20'	+60'	63°	7°47'	+60'	63°	8°14'	+60'	63°	8°40'	+60'	64°	9°07'	+60'	64°	9°34'	+60'	64°	10°00'	+60'	63°	10
11	8°19'	+60'	63°	8°47'	+60'	63°	9°14'	+60'	63°	9°40'	+60'	64°	10°07'	+60'	64°	10°34'	+60'	64°	11°00'	+60'	63°	11
12	9°19'	+60'	63°	9°46'	+60'	63°	10°13'	+60'	63°	10°40'	+60'	63°	11°07'	+60'	64°	11°34'	+60'	64°	12°00'	+60'	90°	12
13	10°19'	+60'	63°	10°46'	+60'	63°	11°13'	+60'	63°	11°40'	+60'	63°	12°07'	+60'	64°	12°34'	+60'	64°	13°00'	+60'	90°	13
14	11°19'	+60'	63°	11°46'	+60'	63°	12°13'	+60'	63°	12°40'	+60'	63°	13°07'	+60'	64°	13°34'	+60'	64°	14°00'	+60'	21°	14
15	12°18'	+60'	63°	12°46'	+60'	63°	13°13'	+60'	63°	13°40'	+60'	63°	14°07'	+60'	64°	14°34'	+60'	64°	15°00'	+60'	90°	15
16	13°18'	+60'	63°	13°46'	+60'	63°	14°13'	+60'	63°	14°40'	+60'	63°	15°07'	+60'	64°	15°34'	+60'	64°	16°00'	+60'	90°	16
17	14°18'	+60'	62°	14°45'	+60'	63°	15°13'	+60'	63°	15°40'	+60'	63°	16°07'	+60'	63°	16°34'	+60'	64°	17°00'	+60'	90°	17
18	15°18'	+60'	62°	15°45'	+60'	63°	16°13'	+60'	63°	16°40'	+60'	63°	17°07'	+60'	63°	17°34'	+60'	64°	18°00'	+60'	90°	18
19	16°17'	+60'	62°	16°45'	+60'	63°	17°13'	+60'	63°	17°40'	+60'	63°	18°07'	+60'	63°	18°34'	+60'	64°	19°00'	+60'	90°	19
20	17°17'	+60'	62°	17°45'	+60'	62°	18°12'	+60'	63°	18°40'	+60'	63°	19°07'	+60'	63°	19°34'	+60'	64°	20°00'	+60'	90°	20
21	18°17'	+60'	62°	18°45'	+60'	62°	19°12'	+60'	63°	19°40'	+60'	63°	20°07'	+60'	63°	20°34'	+60'	64°	21°00'	+60'	90°	21
22	19°16'	+60'	62°	19°44'	+60'	62°	20°12'	+60'	63°	20°40'	+60'	63°	21°07'	+60'	63°	21°34'	+60'	64°	22°00'	+60'	90°	22
23	20°16'	+60'	62°	20°44'	+60'	62°	21°12'	+60'	63°	21°40'	+60'	63°	22°07'	+60'	63°	22°34'	+60'	64°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

116° 244° LHA — Latitude SAME as DECLINATION — 116° 244° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

63° 297° LHA — Latitude CONTRARY to Declination — 63° 297° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°43'	-60'	117°	2°16'	-60'	117°	1°49'	-60'	117°	1°22'	-60'	117°	0°54'	-60'	117°	0°27'	-60'	117°	0°00'	-60'	117°	0
1	1°43'	-60'	117°	1°16'	-60'	117°	0°49'	-60'	117°	0°22'	-60'	117°	0°06'	+60'	63°	0°33'	+60'	63°	1°00'	+60'	63°	1
2	0°44'	-60'	117°	0°16'	-60'	117°	0°11'	+60'	63°	0°38'	+60'	63°	1°05'	+60'	63°	1°33'	+60'	63°	2°00'	+60'	63°	2
3	0°16'	+60'	63°	0°43'	+60'	63°	1°11'	+60'	63°	1°38'	+60'	63°	2°05'	+60'	63°	2°33'	+60'	63°	3°00'	+60'	70°	3
4	1°16'	+60'	63°	1°43'	+60'	63°	2°11'	+60'	63°	2°38'	+60'	63°	3°05'	+60'	63°	3°33'	+60'	63°	4°00'	+60'	63°	4
5	2°15'	+60'	63°	2°43'	+60'	63°	3°11'	+60'	63°	3°38'	+60'	63°	4°05'	+60'	63°	4°33'	+60'	63°	5°00'	+60'	63°	5
6	3°15'	+60'	63°	3°43'	+60'	63°	4°10'	+60'	63°	4°38'	+60'	63°	5°05'	+60'	63°	5°33'	+60'	63°	6°00'	+60'	63°	6
7	4°15'	+60'	62°	4°43'	+60'	63°	5°10'	+60'	63°	5°38'	+60'	63°	6°05'	+60'	63°	6°33'	+60'	63°	7°00'	+60'	63°	7
8	5°15'	+60'	62°	5°42'	+60'	62°	6°10'	+60'	63°	6°38'	+60'	63°	7°05'	+60'	63°	7°33'	+60'	63°	8°00'	+60'	24°	8
9	6°14'	+60'	62°	6°42'	+60'	62°	7°10'	+60'	62°	7°38'	+60'	63°	8°05'	+60'	63°	8°33'	+60'	63°	9°00'	+60'	90°	9
10	7°14'	+60'	62°	7°42'	+60'	62°	8°10'	+60'	62°	8°38'	+60'	63°	9°05'	+60'	63°	9°33'	+60'	63°	10°00'	+60'	63°	10
11	8°14'	+60'	62°	8°42'	+60'	62°	9°10'	+60'	62°	9°38'	+60'	63°	10°05'	+60'	63°	10°33'	+60'	63°	11°00'	+60'	63°	11
12	9°14'	+60'	62°	9°42'	+60'	62°	10°10'	+60'	62°	10°38'	+60'	62°	11°05'	+60'	63°	11°33'	+60'	63°	12°00'	+60'	90°	12
13	10°13'	+60'	62°	10°42'	+60'	62°	11°10'	+60'	62°	11°37'	+60'	62°	12°05'	+60'	63°	12°33'	+60'	63°	13°00'	+60'	90°	13
14	11°13'	+60'	62°	11°41'	+60'	62°	12°09'	+60'	62°	12°37'	+60'	62°	13°05'	+60'	63°	13°33'	+60'	63°	14°00'	+60'	21°	14
15	12°13'	+60'	62°	12°41'	+60'	62°	13°09'	+60'	62°	13°37'	+60'	62°	14°05'	+60'	63°	14°33'	+60'	63°	15°00'	+60'	90°	15
16	13°13'	+60'	62°	13°41'	+60'	62°	14°09'	+60'	62°	14°37'	+60'	62°	15°05'	+60'	63°	15°33'	+60'	63°	16°00'	+60'	90°	16
17	14°12'	+60'	62°	14°41'	+60'	62°	15°09'	+60'	62°	15°37'	+60'	62°	16°05'	+60'	62°	16°33'	+60'	63°	17°00'	+60'	90°	17
18	15°12'	+60'	61°	15°41'	+60'	62°	16°09'	+60'	62°	16°37'	+60'	62°	17°05'	+60'	62°	17°33'	+60'	63°	18°00'	+60'	90°	18
19	16°12'	+60'	61°	16°40'	+60'	62°	17°09'	+60'	62°	17°37'	+60'	62°	18°05'	+60'	62°	18°33'	+60'	63°	19°00'	+60'	90°	19
20	17°11'	+60'	61°	17°40'	+60'	61°	18°09'	+60'	62°	18°37'	+60'	62°	19°05'	+60'	62°	19°33'	+60'	63°	20°00'	+60'	90°	20
21	18°11'	+60'	61°	18°40'	+60'	61°	19°09'	+60'	62°	19°37'	+60'	62°	20°05'	+60'	62°	20°33'	+60'	63°	21°00'	+60'	90°	21
22	19°11'	+60'	61°	19°40'	+60'	61°	20°08'	+60'	62°	20°37'	+60'	62°	21°05'	+60'	62°	21°33'	+60'	63°	22°00'	+60'	90°	22
23	20°11'	+60'	61°	20°40'	+60'	61°	21°08'	+60'	62°	21°37'	+60'	62°	22°05'	+60'	62°	22°33'	+60'	63°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

117° 243° LHA — Latitude SAME as DECLINATION — 117° 243° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

62° 298° LHA — Latitude CONTRARY to Declination — 62° 298° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°49'	-60'	118°	2°21'	-60'	118°	1°53'	-60'	118°	1°24'	-60'	118°	0°56'	-60'	118°	0°28'	-60'	118°	0°00'	-60'	118°	0
1	1°49'	-60'	118°	1°21'	-60'	118°	0°53'	-60'	118°	0°25'	-60'	118°	0°04'	+60'	62°	0°32'	+60'	62°	1°00'	+60'	63°	1
2	0°49'	-60'	118°	0°21'	-60'	118°	0°07'	+60'	62°	0°35'	+60'	62°	1°04'	+60'	62°	1°32'	+60'	62°	2°00'	+60'	63°	2
3	0°10'	+60'	62°	0°39'	+60'	62°	1°07'	+60'	62°	1°35'	+60'	62°	2°04'	+60'	62°	2°32'	+60'	62°	3°00'	+60'	70°	3
4	1°10'	+60'	62°	1°39'	+60'	62°	2°07'	+60'	62°	2°35'	+60'	62°	3°04'	+60'	62°	3°32'	+60'	62°	4°00'	+60'	63°	4
5	2°10'	+60'	62°	2°38'	+60'	62°	3°07'	+60'	62°	3°35'	+60'	62°	4°04'	+60'	62°	4°32'	+60'	62°	5°00'	+60'	63°	5
6	3°10'	+60'	62°	3°38'	+60'	62°	4°07'	+60'	62°	4°35'	+60'	62°	5°04'	+60'	62°	5°32'	+60'	62°	6°00'	+60'	63°	6
7	4°09'	+60'	61°	4°38'	+60'	62°	5°07'	+60'	62°	5°35'	+60'	62°	6°03'	+60'	62°	6°32'	+60'	62°	7°00'	+60'	63°	7
8	5°09'	+60'	61°	5°38'	+60'	61°	6°06'	+60'	62°	6°35'	+60'	62°	7°03'	+60'	62°	7°32'	+60'	62°	8°00'	+60'	24°	8
9	6°09'	+60'	61°	6°38'	+60'	61°	7°06'	+60'	62°	7°35'	+60'	62°	8°03'	+60'	62°	8°32'	+60'	62°	9°00'	+60'	90°	9
10	7°09'	+60'	61°	7°38'	+60'	61°	8°06'	+60'	61°	8°35'	+60'	62°	9°03'	+60'	62°	9°32'	+60'	62°	10°00'	+60'	63°	10
11	8°08'	+60'	61°	8°37'	+60'	61°	9°06'	+60'	61°	9°35'	+60'	62°	10°03'	+60'	62°	10°32'	+60'	62°	11°00'	+60'	63°	11
12	9°08'	+60'	61°	9°37'	+60'	61°	10°06'	+60'	61°	10°35'	+60'	61°	11°03'	+60'	62°	11°32'	+60'	62°	12°00'	+60'	90°	12
13	10°08'	+60'	61°	10°37'	+60'	61°	11°06'	+60'	61°	11°35'	+60'	61°	12°03'	+60'	62°	12°32'	+60'	62°	13°00'	+60'	90°	13
14	11°08'	+60'	61°	11°37'	+60'	61°	12°06'	+60'	61°	12°35'	+60'	61°	13°03'	+60'	62°	13°32'	+60'	62°	14°00'	+60'	21°	14
15	12°07'	+60'	61°	12°37'	+60'	61°	13°06'	+60'	61°	13°35'	+60'	61°	14°03'	+60'	62°	14°32'	+60'	62°	15°00'	+60'	20°	15
16	13°07'	+60'	61°	13°36'	+60'	61°	14°06'	+60'	61°	14°34'	+60'	61°	15°03'	+60'	62°	15°32'	+60'	62°	16°00'	+60'	90°	16
17	14°07'	+60'	61°	14°36'	+60'	61°	15°05'	+60'	61°	15°34'	+60'	61°	16°03'	+60'	61°	16°32'	+60'	62°	17°00'	+60'	90°	17
18	15°07'	+60'	60°	15°36'	+60'	61°	16°05'	+60'	61°	16°34'	+60'	61°	17°03'	+60'	61°	17°32'	+60'	62°	18°00'	+60'	90°	18
19	16°06'	+60'	60°	16°36'	+60'	61°	17°05'	+60'	61°	17°34'	+60'	61°	18°03'	+60'	61°	18°32'	+60'	62°	19°00'	+60'	90°	19
20	17°06'	+60'	60°	17°36'	+60'	61°	18°05'	+60'	61°	18°34'	+60'	61°	19°03'	+60'	61°	19°32'	+60'	62°	20°00'	+60'	90°	20
21	18°06'	+60'	60°	18°35'	+60'	60°	19°05'	+60'	61°	19°34'	+60'	61°	20°03'	+60'	61°	20°32'	+60'	62°	21°00'	+60'	90°	21
22	19°05'	+60'	60°	19°35'	+60'	60°	20°05'	+60'	61°	20°34'	+60'	61°	21°03'	+60'	61°	21°32'	+60'	62°	22°00'	+60'	90°	22
23	20°05'	+60'	60°	20°35'	+60'	60°	21°05'	+60'	61°	21°34'	+60'	61°	22°03'	+60'	61°	22°32'	+60'	62°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

118° 242° LHA — Latitude SAME as DECLINATION — 118° 242° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

61° 299° LHA — Latitude CONTRARY to Declination — 61° 299° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	2°54'	-60'	119°	2°25'	-60'	119°	1°56'	-60'	119°	1°27'	-60'	119°	0°58'	-60'	119°	0°29'	-60'	119°	0°00'	-60'	119°	0
1	1°55'	-60'	119°	1°25'	-60'	119°	0°56'	-60'	119°	0°27'	-60'	119°	0°02'	+60'	61°	0°31'	+60'	61°	1°00'	+60'	59°	1
2	0°55'	-60'	119°	0°26'	-60'	119°	0°03'	+60'	61°	0°33'	+60'	61°	1°02'	+60'	61°	1°31'	+60'	61°	2°00'	+60'	63°	2
3	0°05'	+60'	61°	0°34'	+60'	61°	1°03'	+60'	61°	1°33'	+60'	61°	2°02'	+60'	61°	2°31'	+60'	61°	3°00'	+60'	70°	3
4	1°05'	+60'	61°	1°34'	+60'	61°	2°03'	+60'	61°	2°33'	+60'	61°	3°02'	+60'	61°	3°31'	+60'	61°	4°00'	+60'	63°	4
5	2°04'	+60'	61°	2°34'	+60'	61°	3°03'	+60'	61°	3°32'	+60'	61°	4°02'	+60'	61°	4°31'	+60'	61°	5°00'	+60'	63°	5
6	3°04'	+60'	61°	3°34'	+60'	61°	4°03'	+60'	61°	4°32'	+60'	61°	5°02'	+60'	61°	5°31'	+60'	61°	6°00'	+60'	63°	6
7	4°04'	+60'	60°	4°33'	+60'	61°	5°03'	+60'	61°	5°32'	+60'	61°	6°02'	+60'	61°	6°31'	+60'	61°	7°00'	+60'	63°	7
8	5°04'	+60'	60°	5°33'	+60'	60°	6°03'	+60'	61°	6°32'	+60'	61°	7°02'	+60'	61°	7°31'	+60'	61°	8°00'	+60'	24°	8
9	6°03'	+60'	60°	6°33'	+60'	60°	7°03'	+60'	61°	7°32'	+60'	61°	8°02'	+60'	61°	8°31'	+60'	61°	9°00'	+60'	90°	9
10	7°03'	+60'	60°	7°33'	+60'	60°	8°03'	+60'	60°	8°32'	+60'	61°	9°02'	+60'	61°	9°31'	+60'	61°	10°00'	+60'	63°	10
11	8°03'	+60'	60°	8°33'	+60'	60°	9°02'	+60'	60°	9°32'	+60'	61°	10°02'	+60'	61°	10°31'	+60'	61°	11°00'	+60'	63°	11
12	9°03'	+60'	60°	9°33'	+60'	60°	10°02'	+60'	60°	10°32'	+60'	60°	11°01'	+60'	61°	11°31'	+60'	61°	12°00'	+60'	90°	12
13	10°02'	+60'	60°	10°32'	+60'	60°	11°02'	+60'	60°	11°32'	+60'	60°	12°01'	+60'	61°	12°31'	+60'	61°	13°00'	+60'	90°	13
14	11°02'	+60'	60°	11°32'	+60'	60°	12°02'	+60'	60°	12°32'	+60'	60°	13°01'	+60'	61°	13°31'	+60'	61°	14°00'	+60'	21°	14
15	12°02'	+60'	60°	12°32'	+60'	60°	13°02'	+60'	60°	13°32'	+60'	60°	14°01'	+60'	61°	14°31'	+60'	61°	15°00'	+60'	20°	15
16	13°02'	+60'	60°	13°32'	+60'	60°	14°02'	+60'	60°	14°32'	+60'	60°	15°01'	+60'	61°	15°31'	+60'	61°	16°00'	+60'	19°	16
17	14°01'	+60'	60°	14°32'	+60'	60°	15°02'	+60'	60°	15°32'	+60'	60°	16°01'	+60'	60°	16°31'	+60'	61°	17°00'	+60'	19°	17
18	15°01'	+60'	59°	15°31'	+60'	60°	16°02'	+60'	60°	16°32'	+60'	60°	17°01'	+60'	60°	17°31'	+60'	61°	18°00'	+60'	18°	18
19	16°01'	+60'	59°	16°31'	+60'	60°	17°02'	+60'	60°	17°32'	+60'	60°	18°01'	+60'	60°	18°31'	+60'	61°	19°00'	+60'	17°	19
20	17°01'	+60'	59°	17°31'	+60'	60°	18°01'	+60'	60°	18°31'	+60'	60°	19°01'	+60'	60°	19°31'	+60'	61°	20°00'	+60'	15°	20
21	18°00'	+60'	59°	18°31'	+60'	59°	19°01'	+60'	60°	19°31'	+60'	60°	20°01'	+60'	60°	20°31'	+60'	61°	21°00'	+60'	90°	21
22	19°00'	+60'	59°	19°31'	+60'	59°	20°01'	+60'	60°	20°31'	+60'	60°	21°01'	+60'	60°	21°31'	+60'	61°	22°00'	+60'	90°	22
23	20°00'	+60'	59°	20°31'	+60'	59°	21°01'	+60'	60°	21°31'	+60'	60°	22°01'	+60'	60°	22°31'	+60'	61°	23°00'	+60'	170°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

119° 241° LHA — Latitude SAME as DECLINATION — 119° 241° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

60° 300° LHA — Latitude CONTRARY to Declination — 60° 300° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°00'	-60'	120°	2°30'	-60'	120°	2°00'	-60'	120°	1°30'	-60'	120°	1°00'	-60'	120°	0°30'	-60'	120°	0°00'	-60'	120°	0
1	2°00'	-60'	120°	1°30'	-60'	120°	1°00'	-60'	120°	0°30'	-60'	120°	0°00'	-60'	120°	0°30'	+60'	60°	1°00'	+60'	59°	1
2	1°00'	-60'	120°	0°30'	-60'	120°	0°00'	-60'	120°	0°30'	+60'	60°	1°00'	+60'	60°	1°30'	+60'	60°	2°00'	+60'	63°	2
3	0°00'	-60'	120°	0°30'	+60'	60°	1°00'	+60'	60°	1°30'	+60'	60°	2°00'	+60'	60°	2°30'	+60'	60°	3°00'	+60'	70°	3
4	0°59'	+60'	60°	1°29'	+60'	60°	2°00'	+60'	60°	2°30'	+60'	60°	3°00'	+60'	60°	3°30'	+60'	60°	4°00'	+60'	63°	4
5	1°59'	+60'	60°	2°29'	+60'	60°	3°00'	+60'	60°	3°30'	+60'	60°	4°00'	+60'	60°	4°30'	+60'	60°	5°00'	+60'	63°	5
6	2°59'	+60'	60°	3°29'	+60'	60°	3°59'	+60'	60°	4°30'	+60'	60°	5°00'	+60'	60°	5°30'	+60'	60°	6°00'	+60'	63°	6
7	3°59'	+60'	60°	4°29'	+60'	60°	4°59'	+60'	60°	5°30'	+60'	60°	6°00'	+60'	60°	6°30'	+60'	60°	7°00'	+60'	63°	7
8	4°58'	+60'	59°	5°29'	+60'	59°	5°59'	+60'	60°	6°30'	+60'	60°	7°00'	+60'	60°	7°30'	+60'	60°	8°00'	+60'	24°	8
9	5°58'	+60'	59°	6°29'	+60'	59°	6°59'	+60'	60°	7°29'	+60'	60°	8°00'	+60'	60°	8°30'	+60'	60°	9°00'	+60'	90°	9
10	6°58'	+60'	59°	7°28'	+60'	59°	7°59'	+60'	59°	8°29'	+60'	60°	9°00'	+60'	60°	9°30'	+60'	60°	10°00'	+60'	63°	10
11	7°58'	+60'	59°	8°28'	+60'	59°	8°59'	+60'	59°	9°29'	+60'	60°	10°00'	+60'	60°	10°30'	+60'	60°	11°00'	+60'	63°	11
12	8°57'	+60'	59°	9°28'	+60'	59°	9°59'	+60'	59°	10°29'	+60'	59°	11°00'	+60'	60°	11°30'	+60'	60°	12°00'	+60'	90°	12
13	9°57'	+60'	59°	10°28'	+60'	59°	10°59'	+60'	59°	11°29'	+60'	59°	12°00'	+60'	60°	12°30'	+60'	60°	13°00'	+60'	90°	13
14	10°57'	+60'	59°	11°28'	+60'	59°	11°59'	+60'	59°	12°29'	+60'	59°	13°00'	+60'	60°	13°30'	+60'	60°	14°00'	+60'	21°	14
15	11°57'	+60'	59°	12°28'	+60'	59°	12°58'	+60'	59°	13°29'	+60'	59°	14°00'	+60'	60°	14°30'	+60'	60°	15°00'	+60'	20°	15
16	12°56'	+60'	59°	13°27'	+60'	59°	13°58'	+60'	59°	14°29'	+60'	59°	15°00'	+60'	60°	15°30'	+60'	60°	16°00'	+60'	19°	16
17	13°56'	+60'	59°	14°27'	+60'	59°	14°58'	+60'	59°	15°29'	+60'	59°	16°00'	+60'	59°	16°30'	+60'	60°	17°00'	+60'	19°	17
18	14°56'	+60'	58°	15°27'	+60'	59°	15°58'	+60'	59°	16°29'	+60'	59°	17°00'	+60'	59°	17°30'	+60'	60°	18°00'	+60'	18°	18
19	15°55'	+60'	58°	16°27'	+60'	59°	16°58'	+60'	59°	17°29'	+60'	59°	17°59'	+60'	59°	18°30'	+60'	60°	19°00'	+60'	17°	19
20	16°55'	+60'	58°	17°27'	+60'	59°	17°58'	+60'	59°	18°29'	+60'	59°	18°59'	+60'	59°	19°30'	+60'	60°	20°00'	+60'	15°	20
21	17°55'	+60'	58°	18°26'	+60'	58°	18°58'	+60'	59°	19°29'	+60'	59°	19°59'	+60'	59°	20°30'	+60'	60°	21°00'	+60'	14°	21
22	18°55'	+60'	58°	19°26'	+60'	58°	19°58'	+60'	59°	20°29'	+60'	59°	20°59'	+60'	59°	21°30'	+60'	60°	22°00'	+60'	12°	22
23	19°54'	+60'	58°	20°26'	+60'	58°	20°57'	+60'	59°	21°29'	+60'	59°	21°59'	+60'	59°	22°30'	+60'	60°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

120° 240° LHA — Latitude SAME as DECLINATION — 120° 240° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

59° 301° LHA — Latitude CONTRARY to Declination — 59° 301° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°05'	-60'	121°	2°34'	-60'	121°	2°04'	-60'	121°	1°33'	-60'	121°	1°02'	-60'	121°	0°31'	-60'	121°	0°00'	-60'	121°	0
1	2°05'	-60'	121°	1°35'	-60'	121°	1°04'	-60'	121°	0°33'	-60'	121°	0°02'	-60'	121°	0°29'	+60'	59°	1°00'	+60'	59°	1
2	1°06'	-60'	121°	0°35'	-60'	121°	0°04'	-60'	121°	0°27'	+60'	59°	0°58'	+60'	59°	1°29'	+60'	59°	2°00'	+60'	55°	2
3	0°06'	-60'	121°	0°25'	+60'	59°	0°56'	+60'	59°	1°27'	+60'	59°	1°58'	+60'	59°	2°29'	+60'	59°	3°00'	+60'	63°	3
4	0°54'	+60'	59°	1°25'	+60'	59°	1°56'	+60'	59°	2°27'	+60'	59°	2°58'	+60'	59°	3°29'	+60'	59°	4°00'	+60'	63°	4
5	1°54'	+60'	59°	2°25'	+60'	59°	2°56'	+60'	59°	3°27'	+60'	59°	3°58'	+60'	59°	4°29'	+60'	59°	5°00'	+60'	63°	5
6	2°53'	+60'	59°	3°25'	+60'	59°	3°56'	+60'	59°	4°27'	+60'	59°	4°58'	+60'	59°	5°29'	+60'	59°	6°00'	+60'	63°	6
7	3°53'	+60'	59°	4°24'	+60'	59°	4°56'	+60'	59°	5°27'	+60'	59°	5°58'	+60'	59°	6°29'	+60'	59°	7°00'	+60'	63°	7
8	4°53'	+60'	58°	5°24'	+60'	58°	5°56'	+60'	59°	6°27'	+60'	59°	6°58'	+60'	59°	7°29'	+60'	59°	8°00'	+60'	24°	8
9	5°53'	+60'	58°	6°24'	+60'	58°	6°55'	+60'	59°	7°27'	+60'	59°	7°58'	+60'	59°	8°29'	+60'	59°	9°00'	+60'	90°	9
10	6°52'	+60'	58°	7°24'	+60'	58°	7°55'	+60'	58°	8°27'	+60'	59°	8°58'	+60'	59°	9°29'	+60'	59°	10°00'	+60'	63°	10
11	7°52'	+60'	58°	8°24'	+60'	58°	8°55'	+60'	58°	9°27'	+60'	59°	9°58'	+60'	59°	10°29'	+60'	59°	11°00'	+60'	63°	11
12	8°52'	+60'	58°	9°24'	+60'	58°	9°55'	+60'	58°	10°27'	+60'	58°	10°58'	+60'	59°	11°29'	+60'	59°	12°00'	+60'	90°	12
13	9°52'	+60'	58°	10°23'	+60'	58°	10°55'	+60'	58°	11°27'	+60'	58°	11°58'	+60'	59°	12°29'	+60'	59°	13°00'	+60'	90°	13
14	10°51'	+60'	58°	11°23'	+60'	58°	11°55'	+60'	58°	12°26'	+60'	58°	12°58'	+60'	59°	13°29'	+60'	59°	14°00'	+60'	21°	14
15	11°51'	+60'	58°	12°23'	+60'	58°	12°55'	+60'	58°	13°26'	+60'	58°	13°58'	+60'	59°	14°29'	+60'	59°	15°00'	+60'	20°	15
16	12°51'	+60'	58°	13°23'	+60'	58°	13°55'	+60'	58°	14°26'	+60'	58°	14°58'	+60'	59°	15°29'	+60'	59°	16°00'	+60'	19°	16
17	13°51'	+60'	58°	14°23'	+60'	58°	14°55'	+60'	58°	15°26'	+60'	58°	15°58'	+60'	58°	16°29'	+60'	59°	17°00'	+60'	19°	17
18	14°50'	+60'	57°	15°23'	+60'	58°	15°54'	+60'	58°	16°26'	+60'	58°	16°58'	+60'	58°	17°29'	+60'	59°	18°00'	+60'	18°	18
19	15°50'	+60'	57°	16°22'	+60'	58°	16°54'	+60'	58°	17°26'	+60'	58°	17°58'	+60'	58°	18°29'	+60'	59°	19°00'	+60'	17°	19
20	16°50'	+60'	57°	17°22'	+60'	58°	17°54'	+60'	58°	18°26'	+60'	58°	18°58'	+60'	58°	19°29'	+60'	59°	20°00'	+60'	15°	20
21	17°50'	+60'	57°	18°22'	+60'	57°	18°54'	+60'	58°	19°26'	+60'	58°	19°58'	+60'	58°	20°29'	+60'	59°	21°00'	+60'	14°	21
22	18°49'	+60'	57°	19°22'	+60'	57°	19°54'	+60'	58°	20°26'	+60'	58°	20°58'	+60'	58°	21°29'	+60'	59°	22°00'	+60'	12°	22
23	19°49'	+60'	57°	20°22'	+60'	57°	20°54'	+60'	58°	21°26'	+60'	58°	21°58'	+60'	58°	22°29'	+60'	59°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

121° 239° LHA — Latitude SAME as DECLINATION — 121° 239° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

58° 302° LHA — Latitude CONTRARY to Declination — 58° 302° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°11'	-60'	122°	2°39'	-60'	122°	2°07'	-60'	122°	1°35'	-60'	122°	1°04'	-60'	122°	0°32'	-60'	122°	0°00'	-60'	122°	0
1	2°11'	-60'	122°	1°39'	-60'	122°	1°07'	-60'	122°	0°35'	-60'	122°	0°04'	-60'	122°	0°28'	+60'	58°	1°00'	+60'	59°	1
2	1°11'	-60'	122°	0°39'	-60'	122°	0°07'	-60'	122°	0°25'	+60'	58°	0°56'	+60'	58°	1°28'	+60'	58°	2°00'	+60'	55°	2
3	0°11'	-60'	122°	0°21'	+60'	58°	0°53'	+60'	58°	1°24'	+60'	58°	1°56'	+60'	58°	2°28'	+60'	58°	3°00'	+60'	63°	3
4	0°49'	+60'	58°	1°21'	+60'	58°	1°52'	+60'	58°	2°24'	+60'	58°	2°56'	+60'	58°	3°28'	+60'	58°	4°00'	+60'	63°	4
5	1°48'	+60'	58°	2°20'	+60'	58°	2°52'	+60'	58°	3°24'	+60'	58°	3°56'	+60'	58°	4°28'	+60'	58°	5°00'	+60'	63°	5
6	2°48'	+60'	58°	3°20'	+60'	58°	3°52'	+60'	58°	4°24'	+60'	58°	4°56'	+60'	58°	5°28'	+60'	58°	6°00'	+60'	63°	6
7	3°48'	+60'	58°	4°20'	+60'	58°	4°52'	+60'	58°	5°24'	+60'	58°	5°56'	+60'	58°	6°28'	+60'	58°	7°00'	+60'	63°	7
8	4°48'	+60'	57°	5°20'	+60'	58°	5°52'	+60'	58°	6°24'	+60'	58°	6°56'	+60'	58°	7°28'	+60'	58°	8°00'	+60'	24°	8
9	5°47'	+60'	57°	6°20'	+60'	57°	6°52'	+60'	58°	7°24'	+60'	58°	7°56'	+60'	58°	8°28'	+60'	58°	9°00'	+60'	90°	9
10	6°47'	+60'	57°	7°20'	+60'	57°	7°52'	+60'	57°	8°24'	+60'	58°	8°56'	+60'	58°	9°28'	+60'	58°	10°00'	+60'	63°	10
11	7°47'	+60'	57°	8°19'	+60'	57°	8°52'	+60'	57°	9°24'	+60'	58°	9°56'	+60'	58°	10°28'	+60'	58°	11°00'	+60'	63°	11
12	8°47'	+60'	57°	9°19'	+60'	57°	9°52'	+60'	57°	10°24'	+60'	57°	10°56'	+60'	58°	11°28'	+60'	58°	12°00'	+60'	90°	12
13	9°46'	+60'	57°	10°19'	+60'	57°	10°52'	+60'	57°	11°24'	+60'	57°	11°56'	+60'	58°	12°28'	+60'	58°	13°00'	+60'	90°	13
14	10°46'	+60'	57°	11°19'	+60'	57°	11°51'	+60'	57°	12°24'	+60'	57°	12°56'	+60'	58°	13°28'	+60'	58°	14°00'	+60'	21°	14
15	11°46'	+60'	57°	12°19'	+60'	57°	12°51'	+60'	57°	13°24'	+60'	57°	13°56'	+60'	58°	14°28'	+60'	58°	15°00'	+60'	20°	15
16	12°46'	+60'	57°	13°19'	+60'	57°	13°51'	+60'	57°	14°24'	+60'	57°	14°56'	+60'	58°	15°28'	+60'	58°	16°00'	+60'	19°	16
17	13°45'	+60'	57°	14°18'	+60'	57°	14°51'	+60'	57°	15°24'	+60'	57°	15°56'	+60'	57°	16°28'	+60'	58°	17°00'	+60'	19°	17
18	14°45'	+60'	57°	15°18'	+60'	57°	15°51'	+60'	57°	16°24'	+60'	57°	16°56'	+60'	57°	17°28'	+60'	58°	18°00'	+60'	18°	18
19	15°45'	+60'	56°	16°18'	+60'	57°	16°51'	+60'	57°	17°23'	+60'	57°	17°56'	+60'	57°	18°28'	+60'	58°	19°00'	+60'	17°	19
20	16°45'	+60'	56°	17°18'	+60'	57°	17°51'	+60'	57°	18°23'	+60'	57°	18°56'	+60'	57°	19°28'	+60'	58°	20°00'	+60'	15°	20
21	17°44'	+60'	56°	18°18'	+60'	56°	18°51'	+60'	57°	19°23'	+60'	57°	19°56'	+60'	57°	20°28'	+60'	58°	21°00'	+60'	14°	21
22	18°44'	+60'	56°	19°17'	+60'	56°	19°50'	+60'	57°	20°23'	+60'	57°	20°56'	+60'	57°	21°28'	+60'	58°	22°00'	+60'	12°	22
23	19°44'	+60'	56°	20°17'	+60'	56°	20°50'	+60'	57°	21°23'	+60'	57°	21°56'	+60'	57°	22°28'	+60'	58°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

122° 238° LHA — Latitude SAME as DECLINATION — 122° 238° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

57° 303° LHA — Latitude CONTRARY to Declination — 57° 303° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°16'	-60'	123°	2°43'	-60'	123°	2°11'	-60'	123°	1°38'	-60'	123°	1°05'	-60'	123°	0°33'	-60'	123°	0°00'	-60'	123°	0
1	1°14'	-60'	123°	1°12'	-60'	123°	1°11'	-60'	123°	1°09'	-60'	123°	1°07'	-60'	123°	1°05'	+60'	57°	1°04'	+60'	55°	1
2	1°16'	-60'	123°	0°44'	-60'	123°	0°11'	-60'	123°	0°22'	+60'	57°	0°55'	+60'	57°	1°27'	+60'	57°	2°00'	+60'	55°	2
3	0°17'	-60'	123°	0°16'	+60'	57°	0°49'	+60'	57°	1°22'	+60'	57°	1°55'	+60'	57°	2°27'	+60'	57°	3°00'	+60'	63°	3
4	0°43'	+60'	57°	1°16'	+60'	57°	1°49'	+60'	57°	2°22'	+60'	57°	2°55'	+60'	57°	3°27'	+60'	57°	4°00'	+60'	63°	4
5	1°43'	+60'	57°	2°16'	+60'	57°	2°49'	+60'	57°	3°22'	+60'	57°	3°55'	+60'	57°	4°27'	+60'	57°	5°00'	+60'	63°	5
6	2°43'	+60'	57°	3°16'	+60'	57°	3°49'	+60'	57°	4°22'	+60'	57°	4°54'	+60'	57°	5°27'	+60'	57°	6°00'	+60'	63°	6
7	3°43'	+60'	57°	4°16'	+60'	57°	4°49'	+60'	57°	5°22'	+60'	57°	5°54'	+60'	57°	6°27'	+60'	57°	7°00'	+60'	63°	7
8	4°42'	+60'	56°	5°15'	+60'	57°	5°49'	+60'	57°	6°22'	+60'	57°	6°54'	+60'	57°	7°27'	+60'	57°	8°00'	+60'	24°	8
9	5°42'	+60'	56°	6°15'	+60'	56°	6°48'	+60'	57°	7°21'	+60'	57°	7°54'	+60'	57°	8°27'	+60'	57°	9°00'	+60'	90°	9
10	6°42'	+60'	56°	7°15'	+60'	56°	7°48'	+60'	56°	8°21'	+60'	57°	8°54'	+60'	57°	9°27'	+60'	57°	10°00'	+60'	63°	10
11	7°42'	+60'	56°	8°15'	+60'	56°	8°48'	+60'	56°	9°21'	+60'	57°	9°54'	+60'	57°	10°27'	+60'	57°	11°00'	+60'	63°	11
12	8°41'	+60'	56°	9°15'	+60'	56°	9°48'	+60'	56°	10°21'	+60'	57°	10°54'	+60'	57°	11°27'	+60'	57°	12°00'	+60'	90°	12
13	9°41'	+60'	56°	10°15'	+60'	56°	10°48'	+60'	56°	11°21'	+60'	56°	11°54'	+60'	57°	12°27'	+60'	57°	13°00'	+60'	90°	13
14	10°41'	+60'	56°	11°14'	+60'	56°	11°48'	+60'	56°	12°21'	+60'	56°	12°54'	+60'	57°	13°27'	+60'	57°	14°00'	+60'	21°	14
15	11°41'	+60'	56°	12°14'	+60'	56°	12°48'	+60'	56°	13°21'	+60'	56°	13°54'	+60'	57°	14°27'	+60'	57°	15°00'	+60'	20°	15
16	12°40'	+60'	56°	13°14'	+60'	56°	13°48'	+60'	56°	14°21'	+60'	56°	14°54'	+60'	57°	15°27'	+60'	57°	16°00'	+60'	19°	16
17	13°40'	+60'	56°	14°14'	+60'	56°	14°48'	+60'	56°	15°21'	+60'	56°	15°54'	+60'	57°	16°27'	+60'	57°	17°00'	+60'	19°	17
18	14°40'	+60'	56°	15°14'	+60'	56°	15°47'	+60'	56°	16°21'	+60'	56°	16°54'	+60'	56°	17°27'	+60'	57°	18°00'	+60'	18°	18
19	15°40'	+60'	55°	16°14'	+60'	56°	16°47'	+60'	56°	17°21'	+60'	56°	17°54'	+60'	56°	18°27'	+60'	57°	19°00'	+60'	17°	19
20	16°39'	+60'	55°	17°13'	+60'	56°	17°47'	+60'	56°	18°21'	+60'	56°	18°54'	+60'	56°	19°27'	+60'	57°	20°00'	+60'	15°	20
21	17°39'	+60'	55°	18°13'	+60'	56°	18°47'	+60'	56°	19°21'	+60'	56°	19°54'	+60'	56°	20°27'	+60'	57°	21°00'	+60'	14°	21
22	18°39'	+60'	55°	19°13'	+60'	55°	19°47'	+60'	56°	20°21'	+60'	56°	20°54'	+60'	56°	21°27'	+60'	57°	22°00'	+60'	12°	22
23	19°39'	+60'	55°	20°13'	+60'	55°	20°47'	+60'	56°	21°21'	+60'	56°	21°54'	+60'	56°	22°27'	+60'	57°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

123° 237° LHA — Latitude SAME as DECLINATION — 123° 237° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

56° 304° LHA — Latitude CONTRARY to Declination — 56° 304° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°21'	-60'	124°	2°48'	-60'	124°	2°14'	-60'	124°	1°41'	-60'	124°	1°07'	-60'	124°	0°34'	-60'	124°	0°00'	-60'	124°	0
1	2°21'	-60'	124°	1°48'	-60'	124°	1°14'	-60'	124°	0°41'	-60'	124°	0°07'	-60'	124°	0°26'	+60'	56°	1°00'	+60'	55°	1
2	1°22'	-60'	124°	0°48'	-60'	124°	0°14'	-60'	124°	0°19'	+60'	56°	0°53'	+60'	56°	1°26'	+60'	56°	2°00'	+60'	55°	2
3	0°22'	-60'	124°	0°12'	+60'	56°	0°46'	+60'	56°	1°19'	+60'	56°	1°53'	+60'	56°	2°26'	+60'	56°	3°00'	+60'	63°	3
4	0°38'	+60'	56°	1°12'	+60'	56°	1°45'	+60'	56°	2°19'	+60'	56°	2°53'	+60'	56°	3°26'	+60'	56°	4°00'	+60'	63°	4
5	1°38'	+60'	56°	2°12'	+60'	56°	2°45'	+60'	56°	3°19'	+60'	56°	3°53'	+60'	56°	4°26'	+60'	56°	5°00'	+60'	63°	5
6	2°38'	+60'	56°	3°11'	+60'	56°	3°45'	+60'	56°	4°19'	+60'	56°	4°53'	+60'	56°	5°26'	+60'	56°	6°00'	+60'	63°	6
7	3°37'	+60'	56°	4°11'	+60'	56°	4°45'	+60'	56°	5°19'	+60'	56°	5°53'	+60'	56°	6°26'	+60'	56°	7°00'	+60'	63°	7
8	4°37'	+60'	55°	5°11'	+60'	56°	5°45'	+60'	56°	6°19'	+60'	56°	6°53'	+60'	56°	7°26'	+60'	56°	8°00'	+60'	24°	8
9	5°37'	+60'	55°	6°11'	+60'	55°	6°45'	+60'	56°	7°19'	+60'	56°	7°53'	+60'	56°	8°26'	+60'	56°	9°00'	+60'	90°	9
10	6°37'	+60'	55°	7°11'	+60'	55°	7°45'	+60'	55°	8°19'	+60'	56°	8°53'	+60'	56°	9°26'	+60'	56°	10°00'	+60'	63°	10
11	7°36'	+60'	55°	8°11'	+60'	55°	8°45'	+60'	55°	9°19'	+60'	56°	9°53'	+60'	56°	10°26'	+60'	56°	11°00'	+60'	63°	11
12	8°36'	+60'	55°	9°10'	+60'	55°	9°45'	+60'	55°	10°19'	+60'	56°	10°53'	+60'	56°	11°26'	+60'	56°	12°00'	+60'	90°	12
13	9°36'	+60'	55°	10°10'	+60'	55°	10°45'	+60'	55°	11°19'	+60'	55°	11°53'	+60'	56°	12°26'	+60'	56°	13°00'	+60'	90°	13
14	10°36'	+60'	55°	11°10'	+60'	55°	11°44'	+60'	55°	12°19'	+60'	55°	12°53'	+60'	56°	13°26'	+60'	56°	14°00'	+60'	21°	14
15	11°36'	+60'	55°	12°10'	+60'	55°	12°44'	+60'	55°	13°19'	+60'	55°	13°53'	+60'	56°	14°26'	+60'	56°	15°00'	+60'	20°	15
16	12°35'	+60'	55°	13°10'	+60'	55°	13°44'	+60'	55°	14°18'	+60'	55°	14°52'	+60'	56°	15°26'	+60'	56°	16°00'	+60'	19°	16
17	13°35'	+60'	55°	14°10'	+60'	55°	14°44'	+60'	55°	15°18'	+60'	55°	15°52'	+60'	56°	16°26'	+60'	56°	17°00'	+60'	19°	17
18	14°35'	+60'	55°	15°10'	+60'	55°	15°44'	+60'	55°	16°18'	+60'	55°	16°52'	+60'	55°	17°26'	+60'	56°	18°00'	+60'	18°	18
19	15°35'	+60'	54°	16°09'	+60'	55°	16°44'	+60'	55°	17°18'	+60'	55°	17°52'	+60'	55°	18°26'	+60'	56°	19°00'	+60'	17°	19
20	16°34'	+60'	54°	17°09'	+60'	55°	17°44'	+60'	55°	18°18'	+60'	55°	18°52'	+60'	55°	19°26'	+60'	56°	20°00'	+60'	15°	20
21	17°34'	+60'	54°	18°09'	+60'	55°	18°44'	+60'	55°	19°18'	+60'	55°	19°52'	+60'	55°	20°26'	+60'	56°	21°00'	+60'	14°	21
22	18°34'	+60'	54°	19°09'	+60'	54°	19°44'	+60'	55°	20°18'	+60'	55°	20°52'	+60'	55°	21°26'	+60'	56°	22°00'	+60'	12°	22
23	19°34'	+60'	54°	20°09'	+60'	54°	20°43'	+60'	55°	21°18'	+60'	55°	21°52'	+60'	55°	22°26'	+60'	56°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

124° 236° LHA — Latitude SAME as DECLINATION — 124° 236° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

55° 305° LHA — Latitude CONTRARY to Declination — 55° 305° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°26'	-60'	125°	2°52'	-60'	125°	2°18'	-60'	125°	1°43'	-60'	125°	1°09'	-60'	125°	0°34'	-60'	125°	0°00'	-60'	125°	0
1	2°26'	-60'	125°	1°52'	-60'	125°	1°18'	-60'	125°	0°43'	-60'	125°	0°09'	-60'	125°	0°26'	+60'	55°	1°00'	+60'	55°	1
2	1°27'	-60'	125°	0°52'	-60'	125°	0°18'	-60'	125°	0°17'	+60'	55°	0°51'	+60'	55°	1°26'	+60'	55°	2°00'	+60'	55°	2
3	0°27'	-60'	125°	0°08'	+60'	55°	0°42'	+60'	55°	1°17'	+60'	55°	1°51'	+60'	55°	2°26'	+60'	55°	3°00'	+60'	63°	3
4	0°33'	+60'	55°	1°07'	+60'	55°	1°42'	+60'	55°	2°17'	+60'	55°	2°51'	+60'	55°	3°26'	+60'	55°	4°00'	+60'	47°	4
5	1°33'	+60'	55°	2°07'	+60'	55°	2°42'	+60'	55°	3°17'	+60'	55°	3°51'	+60'	55°	4°26'	+60'	55°	5°00'	+60'	47°	5
6	2°32'	+60'	55°	3°07'	+60'	55°	3°42'	+60'	55°	4°16'	+60'	55°	4°51'	+60'	55°	5°26'	+60'	55°	6°00'	+60'	47°	6
7	3°32'	+60'	55°	4°07'	+60'	55°	4°42'	+60'	55°	5°16'	+60'	55°	5°51'	+60'	55°	6°26'	+60'	55°	7°00'	+60'	47°	7
8	4°32'	+60'	54°	5°07'	+60'	55°	5°42'	+60'	55°	6°16'	+60'	55°	6°51'	+60'	55°	7°26'	+60'	55°	8°00'	+60'	24°	8
9	5°32'	+60'	54°	6°07'	+60'	54°	6°42'	+60'	55°	7°16'	+60'	55°	7°51'	+60'	55°	8°26'	+60'	55°	9°00'	+60'	90°	9
10	6°32'	+60'	54°	7°07'	+60'	54°	7°41'	+60'	54°	8°16'	+60'	55°	8°51'	+60'	55°	9°26'	+60'	55°	10°00'	+60'	63°	10
11	7°31'	+60'	54°	8°06'	+60'	54°	8°41'	+60'	54°	9°16'	+60'	55°	9°51'	+60'	55°	10°26'	+60'	55°	11°00'	+60'	63°	11
12	8°31'	+60'	54°	9°06'	+60'	54°	9°41'	+60'	54°	10°16'	+60'	55°	10°51'	+60'	55°	11°26'	+60'	55°	12°00'	+60'	90°	12
13	9°31'	+60'	54°	10°06'	+60'	54°	10°41'	+60'	54°	11°16'	+60'	54°	11°51'	+60'	55°	12°26'	+60'	55°	13°00'	+60'	90°	13
14	10°31'	+60'	54°	11°06'	+60'	54°	11°41'	+60'	54°	12°16'	+60'	54°	12°51'	+60'	55°	13°25'	+60'	55°	14°00'	+60'	21°	14
15	11°30'	+60'	54°	12°06'	+60'	54°	12°41'	+60'	54°	13°16'	+60'	54°	13°51'	+60'	55°	14°25'	+60'	55°	15°00'	+60'	20°	15
16	12°30'	+60'	54°	13°06'	+60'	54°	13°41'	+60'	54°	14°16'	+60'	54°	14°51'	+60'	55°	15°25'	+60'	55°	16°00'	+60'	19°	16
17	13°30'	+60'	54°	14°05'	+60'	54°	14°41'	+60'	54°	15°16'	+60'	54°	15°51'	+60'	55°	16°25'	+60'	55°	17°00'	+60'	19°	17
18	14°30'	+60'	54°	15°05'	+60'	54°	15°41'	+60'	54°	16°16'	+60'	54°	16°51'	+60'	54°	17°25'	+60'	55°	18°00'	+60'	18°	18
19	15°29'	+60'	53°	16°05'	+60'	54°	16°41'	+60'	54°	17°16'	+60'	54°	17°51'	+60'	54°	18°25'	+60'	55°	19°00'	+60'	17°	19
20	16°29'	+60'	53°	17°05'	+60'	54°	17°40'	+60'	54°	18°16'	+60'	54°	18°51'	+60'	54°	19°25'	+60'	55°	20°00'	+60'	15°	20
21	17°29'	+60'	53°	18°05'	+60'	54°	18°40'	+60'	54°	19°16'	+60'	54°	19°51'	+60'	54°	20°25'	+60'	55°	21°00'	+60'	14°	21
22	18°29'	+60'	53°	19°05'	+60'	53°	19°40'	+60'	54°	20°16'	+60'	54°	20°51'	+60'	54°	21°25'	+60'	55°	22°00'	+60'	12°	22
23	19°29'	+60'	53°	20°04'	+60'	53°	20°40'	+60'	54°	21°15'	+60'	54°	21°51'	+60'	54°	22°25'	+60'	55°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

125° 235° LHA — Latitude SAME as DECLINATION — 125° 235° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

54° 306° LHA — Latitude CONTRARY to Declination — 54° 306° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°31'	-60'	126°	2°56'	-60'	126°	2°21'	-60'	126°	1°46'	-60'	126°	1°11'	-60'	126°	0°35'	-60'	126°	0°00'	-60'	126°	0
1	2°32'	-60'	126°	1°56'	-60'	126°	1°21'	-60'	126°	0°46'	-60'	126°	0°11'	-60'	126°	0°25'	+60'	54°	1°00'	+60'	55°	1
2	1°32'	-60'	126°	0°56'	-60'	126°	0°21'	-60'	126°	0°14'	+60'	54°	0°49'	+60'	54°	1°25'	+60'	54°	2°00'	+60'	55°	2
3	0°32'	-60'	126°	0°03'	+60'	54°	0°39'	+60'	54°	1°14'	+60'	54°	1°49'	+60'	54°	2°25'	+60'	54°	3°00'	+60'	63°	3
4	0°28'	+60'	54°	1°03'	+60'	54°	1°39'	+60'	54°	2°14'	+60'	54°	2°49'	+60'	54°	3°25'	+60'	54°	4°00'	+60'	47°	4
5	1°28'	+60'	54°	2°03'	+60'	54°	2°39'	+60'	54°	3°14'	+60'	54°	3°49'	+60'	54°	4°25'	+60'	54°	5°00'	+60'	47°	5
6	2°27'	+60'	54°	3°03'	+60'	54°	3°38'	+60'	54°	4°14'	+60'	54°	4°49'	+60'	54°	5°25'	+60'	54°	6°00'	+60'	47°	6
7	3°27'	+60'	54°	4°03'	+60'	54°	4°38'	+60'	54°	5°14'	+60'	54°	5°49'	+60'	54°	6°25'	+60'	54°	7°00'	+60'	47°	7
8	4°27'	+60'	53°	5°03'	+60'	54°	5°38'	+60'	54°	6°14'	+60'	54°	6°49'	+60'	54°	7°25'	+60'	54°	8°00'	+60'	24°	8
9	5°27'	+60'	53°	6°02'	+60'	53°	6°38'	+60'	54°	7°14'	+60'	54°	7°49'	+60'	54°	8°25'	+60'	54°	9°00'	+60'	90°	9
10	6°26'	+60'	53°	7°02'	+60'	53°	7°38'	+60'	53°	8°14'	+60'	54°	8°49'	+60'	54°	9°25'	+60'	54°	10°00'	+60'	63°	10
11	7°26'	+60'	53°	8°02'	+60'	53°	8°38'	+60'	53°	9°14'	+60'	54°	9°49'	+60'	54°	10°25'	+60'	54°	11°00'	+60'	63°	11
12	8°26'	+60'	53°	9°02'	+60'	53°	9°38'	+60'	53°	10°14'	+60'	54°	10°49'	+60'	54°	11°25'	+60'	54°	12°00'	+60'	90°	12
13	9°26'	+60'	53°	10°02'	+60'	53°	10°38'	+60'	53°	11°14'	+60'	53°	11°49'	+60'	54°	12°25'	+60'	54°	13°00'	+60'	90°	13
14	10°26'	+60'	53°	11°02'	+60'	53°	11°38'	+60'	53°	12°13'	+60'	53°	12°49'	+60'	54°	13°25'	+60'	54°	14°00'	+60'	21°	14
15	11°25'	+60'	53°	12°02'	+60'	53°	12°38'	+60'	53°	13°13'	+60'	53°	13°49'	+60'	54°	14°25'	+60'	54°	15°00'	+60'	20°	15
16	12°25'	+60'	53°	13°01'	+60'	53°	13°37'	+60'	53°	14°13'	+60'	53°	14°49'	+60'	54°	15°25'	+60'	54°	16°00'	+60'	19°	16
17	13°25'	+60'	53°	14°01'	+60'	53°	14°37'	+60'	53°	15°13'	+60'	53°	15°49'	+60'	54°	16°25'	+60'	54°	17°00'	+60'	19°	17
18	14°25'	+60'	53°	15°01'	+60'	53°	15°37'	+60'	53°	16°13'	+60'	53°	16°49'	+60'	53°	17°25'	+60'	54°	18°00'	+60'	18°	18
19	15°24'	+60'	53°	16°01'	+60'	53°	16°37'	+60'	53°	17°13'	+60'	53°	17°49'	+60'	53°	18°25'	+60'	54°	19°00'	+60'	17°	19
20	16°24'	+60'	52°	17°01'	+60'	53°	17°37'	+60'	53°	18°13'	+60'	53°	18°49'	+60'	53°	19°25'	+60'	54°	20°00'	+60'	15°	20
21	17°24'	+60'	52°	18°01'	+60'	53°	18°37'	+60'	53°	19°13'	+60'	53°	19°49'	+60'	53°	20°25'	+60'	54°	21°00'	+60'	14°	21
22	18°24'	+60'	52°	19°00'	+60'	53°	19°37'	+60'	53°	20°13'	+60'	53°	20°49'	+60'	53°	21°25'	+60'	54°	22°00'	+60'	12°	22
23	19°24'	+60'	52°	20°00'	+60'	52°	20°37'	+60'	53°	21°13'	+60'	53°	21°49'	+60'	53°	22°25'	+60'	54°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

126° 234° LHA — Latitude SAME as DECLINATION — 126° 234° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

53° 307° LHA — Latitude CONTRARY to Declination — 53° 307° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°36'	-60'	127°	3°00'	-60'	127°	2°24'	-60'	127°	1°48'	-60'	127°	1°12'	-60'	127°	0°36'	-60'	127°	0°00'	-60'	127°	0
1	2°37'	-60'	127°	2°01'	-60'	127°	1°24'	-60'	127°	0°48'	-60'	127°	0°12'	-60'	127°	0°24'	+60'	53°	1°00'	+60'	51°	1
2	1°37'	-60'	127°	1°01'	-60'	127°	0°25'	-60'	127°	0°12'	+60'	53°	0°48'	+60'	53°	1°24'	+60'	53°	2°00'	+60'	55°	2
3	0°37'	-60'	127°	0°01'	-60'	127°	0°35'	+60'	53°	1°12'	+60'	53°	1°48'	+60'	53°	2°24'	+60'	53°	3°00'	+60'	63°	3
4	0°23'	+60'	53°	0°59'	+60'	53°	1°35'	+60'	53°	2°11'	+60'	53°	2°48'	+60'	53°	3°24'	+60'	53°	4°00'	+60'	47°	4
5	1°23'	+60'	53°	1°59'	+60'	53°	2°35'	+60'	53°	3°11'	+60'	53°	3°48'	+60'	53°	4°24'	+60'	53°	5°00'	+60'	47°	5
6	2°22'	+60'	53°	2°59'	+60'	53°	3°35'	+60'	53°	4°11'	+60'	53°	4°48'	+60'	53°	5°24'	+60'	53°	6°00'	+60'	47°	6
7	3°22'	+60'	53°	3°59'	+60'	53°	4°35'	+60'	53°	5°11'	+60'	53°	5°48'	+60'	53°	6°24'	+60'	53°	7°00'	+60'	47°	7
8	4°22'	+60'	52°	4°58'	+60'	53°	5°35'	+60'	53°	6°11'	+60'	53°	6°48'	+60'	53°	7°24'	+60'	53°	8°00'	+60'	24°	8
9	5°22'	+60'	52°	5°58'	+60'	52°	6°35'	+60'	53°	7°11'	+60'	53°	7°48'	+60'	53°	8°24'	+60'	53°	9°00'	+60'	90°	9
10	6°21'	+60'	52°	6°58'	+60'	52°	7°35'	+60'	53°	8°11'	+60'	53°	8°48'	+60'	53°	9°24'	+60'	53°	10°00'	+60'	63°	10
11	7°21'	+60'	52°	7°58'	+60'	52°	8°35'	+60'	52°	9°11'	+60'	53°	9°48'	+60'	53°	10°24'	+60'	53°	11°00'	+60'	63°	11
12	8°21'	+60'	52°	8°58'	+60'	52°	9°35'	+60'	52°	10°11'	+60'	53°	10°48'	+60'	53°	11°24'	+60'	53°	12°00'	+60'	90°	12
13	9°21'	+60'	52°	9°58'	+60'	52°	10°34'	+60'	52°	11°11'	+60'	52°	11°47'	+60'	53°	12°24'	+60'	53°	13°00'	+60'	90°	13
14	10°21'	+60'	52°	10°58'	+60'	52°	11°34'	+60'	52°	12°11'	+60'	52°	12°47'	+60'	53°	13°24'	+60'	53°	14°00'	+60'	21°	14
15	11°20'	+60'	52°	11°57'	+60'	52°	12°34'	+60'	52°	13°11'	+60'	52°	13°47'	+60'	53°	14°24'	+60'	53°	15°00'	+60'	20°	15
16	12°20'	+60'	52°	12°57'	+60'	52°	13°34'	+60'	52°	14°11'	+60'	52°	14°47'	+60'	53°	15°24'	+60'	53°	16°00'	+60'	19°	16
17	13°20'	+60'	52°	13°57'	+60'	52°	14°34'	+60'	52°	15°11'	+60'	52°	15°47'	+60'	53°	16°24'	+60'	53°	17°00'	+60'	19°	17
18	14°20'	+60'	52°	14°57'	+60'	52°	15°34'	+60'	52°	16°11'	+60'	52°	16°47'	+60'	53°	17°24'	+60'	53°	18°00'	+60'	18°	18
19	15°20'	+60'	52°	15°57'	+60'	52°	16°34'	+60'	52°	17°11'	+60'	52°	17°47'	+60'	52°	18°24'	+60'	53°	19°00'	+60'	17°	19
20	16°19'	+60'	51°	16°57'	+60'	52°	17°34'	+60'	52°	18°11'	+60'	52°	18°47'	+60'	52°	19°24'	+60'	53°	20°00'	+60'	15°	20
21	17°19'	+60'	51°	17°56'	+60'	52°	18°34'	+60'	52°	19°11'	+60'	52°	19°47'	+60'	52°	20°24'	+60'	53°	21°00'	+60'	14°	21
22	18°19'	+60'	51°	18°56'	+60'	52°	19°34'	+60'	52°	20°11'	+60'	52°	20°47'	+60'	52°	21°24'	+60'	53°	22°00'	+60'	12°	22
23	19°19'	+60'	51°	19°56'	+60'	51°	20°33'	+60'	52°	21°10'	+60'	52°	21°47'	+60'	52°	22°24'	+60'	53°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

127° 233° LHA — Latitude SAME as DECLINATION — 127° 233° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

52° 308° LHA **Latitude CONTRARY to Declination** 52° 308° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°41'	-60'	128°	3°05'	-60'	128°	2°28'	-60'	128°	1°51'	-60'	128°	1°14'	-60'	128°	0°37'	-60'	128°	0°00'	-60'	128°	0
1	2°42'	-60'	128°	2°05'	-60'	128°	1°28'	-60'	128°	0°51'	-60'	128°	0°14'	-60'	128°	0°23'	+60'	52°	1°00'	+60'	51°	1
2	1°42'	-60'	128°	1°05'	-60'	128°	0°28'	-60'	128°	0°09'	+60'	52°	0°46'	+60'	52°	1°23'	+60'	52°	2°00'	+60'	55°	2
3	0°42'	-60'	128°	0°05'	-60'	128°	0°32'	+60'	52°	1°09'	+60'	52°	1°46'	+60'	52°	2°23'	+60'	52°	3°00'	+60'	63°	3
4	0°18'	+60'	52°	0°55'	+60'	52°	1°32'	+60'	52°	2°09'	+60'	52°	2°46'	+60'	52°	3°23'	+60'	52°	4°00'	+60'	47°	4
5	1°18'	+60'	52°	1°55'	+60'	52°	2°32'	+60'	52°	3°09'	+60'	52°	3°46'	+60'	52°	4°23'	+60'	52°	5°00'	+60'	47°	5
6	2°17'	+60'	52°	2°55'	+60'	52°	3°32'	+60'	52°	4°09'	+60'	52°	4°46'	+60'	52°	5°23'	+60'	52°	6°00'	+60'	47°	6
7	3°17'	+60'	52°	3°54'	+60'	52°	4°32'	+60'	52°	5°09'	+60'	52°	5°46'	+60'	52°	6°23'	+60'	52°	7°00'	+60'	47°	7
8	4°17'	+60'	51°	4°54'	+60'	52°	5°32'	+60'	52°	6°09'	+60'	52°	6°46'	+60'	52°	7°23'	+60'	52°	8°00'	+60'	24°	8
9	5°17'	+60'	51°	5°54'	+60'	51°	6°31'	+60'	52°	7°09'	+60'	52°	7°46'	+60'	52°	8°23'	+60'	52°	9°00'	+60'	90°	9
10	6°17'	+60'	51°	6°54'	+60'	51°	7°31'	+60'	52°	8°09'	+60'	52°	8°46'	+60'	52°	9°23'	+60'	52°	10°00'	+60'	63°	10
11	7°16'	+60'	51°	7°54'	+60'	51°	8°31'	+60'	51°	9°09'	+60'	52°	9°46'	+60'	52°	10°23'	+60'	52°	11°00'	+60'	63°	11
12	8°16'	+60'	51°	8°54'	+60'	51°	9°31'	+60'	51°	10°09'	+60'	52°	10°46'	+60'	52°	11°23'	+60'	52°	12°00'	+60'	90°	12
13	9°16'	+60'	51°	9°54'	+60'	51°	10°31'	+60'	51°	11°09'	+60'	51°	11°46'	+60'	52°	12°23'	+60'	52°	13°00'	+60'	90°	13
14	10°16'	+60'	51°	10°53'	+60'	51°	11°31'	+60'	51°	12°08'	+60'	51°	12°46'	+60'	52°	13°23'	+60'	52°	14°00'	+60'	21°	14
15	11°16'	+60'	51°	11°53'	+60'	51°	12°31'	+60'	51°	13°08'	+60'	51°	13°46'	+60'	52°	14°23'	+60'	52°	15°00'	+60'	20°	15
16	12°15'	+60'	51°	12°53'	+60'	51°	13°31'	+60'	51°	14°08'	+60'	51°	14°46'	+60'	52°	15°23'	+60'	52°	16°00'	+60'	19°	16
17	13°15'	+60'	51°	13°53'	+60'	51°	14°31'	+60'	51°	15°08'	+60'	51°	15°46'	+60'	52°	16°23'	+60'	52°	17°00'	+60'	19°	17
18	14°15'	+60'	51°	14°53'	+60'	51°	15°31'	+60'	51°	16°08'	+60'	51°	16°46'	+60'	52°	17°23'	+60'	52°	18°00'	+60'	18°	18
19	15°15'	+60'	51°	15°53'	+60'	51°	16°31'	+60'	51°	17°08'	+60'	51°	17°46'	+60'	51°	18°23'	+60'	52°	19°00'	+60'	17°	19
20	16°14'	+60'	50°	16°53'	+60'	51°	17°30'	+60'	51°	18°08'	+60'	51°	18°46'	+60'	51°	19°23'	+60'	52°	20°00'	+60'	15°	20
21	17°14'	+60'	50°	17°52'	+60'	51°	18°30'	+60'	51°	19°08'	+60'	51°	19°46'	+60'	51°	20°23'	+60'	52°	21°00'	+60'	14°	21
22	18°14'	+60'	50°	18°52'	+60'	51°	19°30'	+60'	51°	20°08'	+60'	51°	20°46'	+60'	51°	21°23'	+60'	52°	22°00'	+60'	12°	22
23	19°14'	+60'	50°	19°52'	+60'	50°	20°30'	+60'	51°	21°08'	+60'	51°	21°46'	+60'	51°	22°23'	+60'	52°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

128° 232° LHA **Latitude SAME as DECLINATION** 128° 232° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

51° 309° LHA **Latitude CONTRARY to Declination** 51° 309° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°46'	-60'	129°	3°09'	-60'	129°	2°31'	-60'	129°	1°53'	-60'	129°	1°16'	-60'	129°	0°38'	-60'	129°	0°00'	-60'	129°	0
1	2°47'	-60'	129°	2°09'	-60'	129°	1°31'	-60'	129°	0°53'	-60'	129°	0°16'	-60'	129°	0°22'	+60'	51°	1°00'	+60'	51°	1
2	1°47'	-60'	129°	1°09'	-60'	129°	0°31'	-60'	129°	0°07'	+60'	51°	0°44'	+60'	51°	1°22'	+60'	51°	2°00'	+60'	47°	2
3	0°47'	-60'	129°	0°09'	-60'	129°	0°29'	+60'	51°	1°07'	+60'	51°	1°44'	+60'	51°	2°22'	+60'	51°	3°00'	+60'	55°	3
4	0°13'	+60'	51°	0°51'	+60'	51°	1°29'	+60'	51°	2°07'	+60'	51°	2°44'	+60'	51°	3°22'	+60'	51°	4°00'	+60'	47°	4
5	1°13'	+60'	51°	1°51'	+60'	51°	2°29'	+60'	51°	3°07'	+60'	51°	3°44'	+60'	51°	4°22'	+60'	51°	5°00'	+60'	47°	5
6	2°13'	+60'	51°	2°51'	+60'	51°	3°29'	+60'	51°	4°06'	+60'	51°	4°44'	+60'	51°	5°22'	+60'	51°	6°00'	+60'	47°	6
7	3°12'	+60'	51°	3°50'	+60'	51°	4°28'	+60'	51°	5°06'	+60'	51°	5°44'	+60'	51°	6°22'	+60'	51°	7°00'	+60'	47°	7
8	4°12'	+60'	51°	4°50'	+60'	51°	5°28'	+60'	51°	6°06'	+60'	51°	6°44'	+60'	51°	7°22'	+60'	51°	8°00'	+60'	24°	8
9	5°12'	+60'	50°	5°50'	+60'	50°	6°28'	+60'	51°	7°06'	+60'	51°	7°44'	+60'	51°	8°22'	+60'	51°	9°00'	+60'	90°	9
10	6°12'	+60'	50°	6°50'	+60'	50°	7°28'	+60'	51°	8°06'	+60'	51°	8°44'	+60'	51°	9°22'	+60'	51°	10°00'	+60'	63°	10
11	7°12'	+60'	50°	7°50'	+60'	50°	8°28'	+60'	50°	9°06'	+60'	51°	9°44'	+60'	51°	10°22'	+60'	51°	11°00'	+60'	63°	11
12	8°11'	+60'	50°	8°50'	+60'	50°	9°28'	+60'	50°	10°06'	+60'	51°	10°44'	+60'	51°	11°22'	+60'	51°	12°00'	+60'	90°	12
13	9°11'	+60'	50°	9°50'	+60'	50°	10°28'	+60'	50°	11°06'	+60'	51°	11°44'	+60'	51°	12°22'	+60'	51°	13°00'	+60'	90°	13
14	10°11'	+60'	50°	10°49'	+60'	50°	11°28'	+60'	50°	12°06'	+60'	50°	12°44'	+60'	51°	13°22'	+60'	51°	14°00'	+60'	21°	14
15	11°11'	+60'	50°	11°49'	+60'	50°	12°28'	+60'	50°	13°06'	+60'	50°	13°44'	+60'	51°	14°22'	+60'	51°	15°00'	+60'	20°	15
16	12°10'	+60'	50°	12°49'	+60'	50°	13°28'	+60'	50°	14°06'	+60'	50°	14°44'	+60'	51°	15°22'	+60'	51°	16°00'	+60'	19°	16
17	13°10'	+60'	50°	13°49'	+60'	50°	14°28'	+60'	50°	15°06'	+60'	50°	15°44'	+60'	51°	16°22'	+60'	51°	17°00'	+60'	19°	17
18	14°10'	+60'	50°	14°49'	+60'	50°	15°27'	+60'	50°	16°06'	+60'	50°	16°44'	+60'	51°	17°22'	+60'	51°	18°00'	+60'	18°	18
19	15°10'	+60'	50°	15°49'	+60'	50°	16°27'	+60'	50°	17°06'	+60'	50°	17°44'	+60'	50°	18°22'	+60'	51°	19°00'	+60'	17°	19
20	16°10'	+60'	49°	16°49'	+60'	50°	17°27'	+60'	50°	18°06'	+60'	50°	18°44'	+60'	50°	19°22'	+60'	51°	20°00'	+60'	15°	20
21	17°09'	+60'	49°	17°48'	+60'	50°	18°27'	+60'	50°	19°06'	+60'	50°	19°44'	+60'	50°	20°22'	+60'	51°	21°00'	+60'	14°	21
22	18°09'	+60'	49°	18°48'	+60'	50°	19°27'	+60'	50°	20°06'	+60'	50°	20°44'	+60'	50°	21°22'	+60'	51°	22°00'	+60'	12°	22
23	19°09'	+60'	49°	19°48'	+60'	49°	20°27'	+60'	50°	21°06'	+60'	50°	21°44'	+60'	50°	22°22'	+60'	51°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

129° 231° LHA **Latitude SAME as DECLINATION** 129° 231° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

50° 310° LHA — Latitude CONTRARY to Declination — 50° 310° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°51'	-60'	130°	3°13'	-60'	130°	2°34'	-60'	130°	1°56'	-60'	130°	1°17'	-60'	130°	0°39'	-60'	130°	0°00'	-60'	130°	0
1	2°51'	-60'	130°	2°13'	-60'	130°	1°34'	-60'	130°	0°56'	-60'	130°	0°17'	-60'	130°	0°21'	+60'	50°	1°00'	+60'	51°	1
2	1°52'	-60'	130°	1°13'	-60'	130°	0°34'	-60'	130°	0°04'	+60'	50°	0°43'	+60'	50°	1°21'	+60'	50°	2°00'	+60'	47°	2
3	0°52'	-60'	130°	0°13'	-60'	130°	0°26'	+60'	50°	1°04'	+60'	50°	1°43'	+60'	50°	2°21'	+60'	50°	3°00'	+60'	55°	3
4	0°08'	+60'	50°	0°47'	+60'	50°	1°25'	+60'	50°	2°04'	+60'	50°	2°43'	+60'	50°	3°21'	+60'	50°	4°00'	+60'	47°	4
5	1°08'	+60'	50°	1°47'	+60'	50°	2°25'	+60'	50°	3°04'	+60'	50°	3°43'	+60'	50°	4°21'	+60'	50°	5°00'	+60'	47°	5
6	2°08'	+60'	50°	2°47'	+60'	50°	3°25'	+60'	50°	4°04'	+60'	50°	4°43'	+60'	50°	5°21'	+60'	50°	6°00'	+60'	47°	6
7	3°07'	+60'	50°	3°46'	+60'	50°	4°25'	+60'	50°	5°04'	+60'	50°	5°43'	+60'	50°	6°21'	+60'	50°	7°00'	+60'	47°	7
8	4°07'	+60'	50°	4°46'	+60'	50°	5°25'	+60'	50°	6°04'	+60'	50°	6°43'	+60'	50°	7°21'	+60'	50°	8°00'	+60'	24°	8
9	5°07'	+60'	49°	5°46'	+60'	50°	6°25'	+60'	50°	7°04'	+60'	50°	7°43'	+60'	50°	8°21'	+60'	50°	9°00'	+60'	90°	9
10	6°07'	+60'	49°	6°46'	+60'	49°	7°25'	+60'	50°	8°04'	+60'	50°	8°43'	+60'	50°	9°21'	+60'	50°	10°00'	+60'	63°	10
11	7°07'	+60'	49°	7°46'	+60'	49°	8°25'	+60'	49°	9°04'	+60'	50°	9°43'	+60'	50°	10°21'	+60'	50°	11°00'	+60'	63°	11
12	8°07'	+60'	49°	8°46'	+60'	49°	9°25'	+60'	49°	10°04'	+60'	50°	10°43'	+60'	50°	11°21'	+60'	50°	12°00'	+60'	90°	12
13	9°06'	+60'	49°	9°46'	+60'	49°	10°25'	+60'	49°	11°04'	+60'	50°	11°43'	+60'	50°	12°21'	+60'	50°	13°00'	+60'	90°	13
14	10°06'	+60'	49°	10°45'	+60'	49°	11°25'	+60'	49°	12°04'	+60'	49°	12°43'	+60'	50°	13°21'	+60'	50°	14°00'	+60'	21°	14
15	11°06'	+60'	49°	11°45'	+60'	49°	12°25'	+60'	49°	13°04'	+60'	49°	13°43'	+60'	50°	14°21'	+60'	50°	15°00'	+60'	20°	15
16	12°06'	+60'	49°	12°45'	+60'	49°	13°24'	+60'	49°	14°04'	+60'	49°	14°43'	+60'	50°	15°21'	+60'	50°	16°00'	+60'	19°	16
17	13°06'	+60'	49°	13°45'	+60'	49°	14°24'	+60'	49°	15°03'	+60'	49°	15°43'	+60'	50°	16°21'	+60'	50°	17°00'	+60'	19°	17
18	14°05'	+60'	49°	14°45'	+60'	49°	15°24'	+60'	49°	16°03'	+60'	49°	16°42'	+60'	50°	17°21'	+60'	50°	18°00'	+60'	18°	18
19	15°05'	+60'	49°	15°45'	+60'	49°	16°24'	+60'	49°	17°03'	+60'	49°	17°42'	+60'	49°	18°21'	+60'	50°	19°00'	+60'	17°	19
20	16°05'	+60'	49°	16°45'	+60'	49°	17°24'	+60'	49°	18°03'	+60'	49°	18°42'	+60'	49°	19°21'	+60'	50°	20°00'	+60'	15°	20
21	17°05'	+60'	48°	17°44'	+60'	49°	18°24'	+60'	49°	19°03'	+60'	49°	19°42'	+60'	49°	20°21'	+60'	50°	21°00'	+60'	14°	21
22	18°04'	+60'	48°	18°44'	+60'	49°	19°24'	+60'	49°	20°03'	+60'	49°	20°42'	+60'	49°	21°21'	+60'	50°	22°00'	+60'	12°	22
23	19°04'	+60'	48°	19°44'	+60'	49°	20°24'	+60'	49°	21°03'	+60'	49°	21°42'	+60'	49°	22°21'	+60'	50°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

130° 230° LHA — Latitude SAME as DECLINATION — 130° 230° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

49° 311° LHA — Latitude CONTRARY to Declination — 49° 311° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	3°56'	-60'	131°	3°17'	-60'	131°	2°37'	-60'	131°	1°58'	-60'	131°	1°19'	-60'	131°	0°39'	-60'	131°	0°00'	-60'	131°	0
1	2°56'	-60'	131°	2°17'	-60'	131°	1°37'	-60'	131°	0°58'	-60'	131°	0°19'	-60'	131°	0°21'	+60'	49°	1°00'	+60'	47°	1
2	1°56'	-60'	131°	1°17'	-60'	131°	0°38'	-60'	131°	0°02'	+60'	49°	0°41'	+60'	49°	1°21'	+60'	49°	2°00'	+60'	47°	2
3	0°56'	-60'	131°	0°17'	-60'	131°	0°22'	+60'	49°	1°02'	+60'	49°	1°41'	+60'	49°	2°21'	+60'	49°	3°00'	+60'	55°	3
4	0°03'	+60'	49°	0°43'	+60'	49°	1°22'	+60'	49°	2°02'	+60'	49°	2°41'	+60'	49°	3°21'	+60'	49°	4°00'	+60'	47°	4
5	1°03'	+60'	49°	1°43'	+60'	49°	2°22'	+60'	49°	3°02'	+60'	49°	3°41'	+60'	49°	4°21'	+60'	49°	5°00'	+60'	47°	5
6	2°03'	+60'	49°	2°43'	+60'	49°	3°22'	+60'	49°	4°02'	+60'	49°	4°41'	+60'	49°	5°21'	+60'	49°	6°00'	+60'	47°	6
7	3°03'	+60'	49°	3°42'	+60'	49°	4°22'	+60'	49°	5°02'	+60'	49°	5°41'	+60'	49°	6°21'	+60'	49°	7°00'	+60'	47°	7
8	4°03'	+60'	49°	4°42'	+60'	49°	5°22'	+60'	49°	6°02'	+60'	49°	6°41'	+60'	49°	7°21'	+60'	49°	8°00'	+60'	24°	8
9	5°02'	+60'	48°	5°42'	+60'	49°	6°22'	+60'	49°	7°02'	+60'	49°	7°41'	+60'	49°	8°21'	+60'	49°	9°00'	+60'	90°	9
10	6°02'	+60'	48°	6°42'	+60'	48°	7°22'	+60'	49°	8°01'	+60'	49°	8°41'	+60'	49°	9°21'	+60'	49°	10°00'	+60'	63°	10
11	7°02'	+60'	48°	7°42'	+60'	48°	8°22'	+60'	48°	9°01'	+60'	49°	9°41'	+60'	49°	10°21'	+60'	49°	11°00'	+60'	63°	11
12	8°02'	+60'	48°	8°42'	+60'	48°	9°22'	+60'	48°	10°01'	+60'	49°	10°41'	+60'	49°	11°21'	+60'	49°	12°00'	+60'	90°	12
13	9°02'	+60'	48°	9°42'	+60'	48°	10°22'	+60'	48°	11°01'	+60'	49°	11°41'	+60'	49°	12°21'	+60'	49°	13°00'	+60'	90°	13
14	10°01'	+60'	48°	10°41'	+60'	48°	11°21'	+60'	48°	12°01'	+60'	48°	12°41'	+60'	49°	13°21'	+60'	49°	14°00'	+60'	21°	14
15	11°01'	+60'	48°	11°41'	+60'	48°	12°21'	+60'	48°	13°01'	+60'	48°	13°41'	+60'	49°	14°21'	+60'	49°	15°00'	+60'	20°	15
16	12°01'	+60'	48°	12°41'	+60'	48°	13°21'	+60'	48°	14°01'	+60'	48°	14°41'	+60'	49°	15°21'	+60'	49°	16°00'	+60'	19°	16
17	13°01'	+60'	48°	13°41'	+60'	48°	14°21'	+60'	48°	15°01'	+60'	48°	15°41'	+60'	49°	16°21'	+60'	49°	17°00'	+60'	19°	17
18	14°01'	+60'	48°	14°41'	+60'	48°	15°21'	+60'	48°	16°01'	+60'	48°	16°41'	+60'	49°	17°21'	+60'	49°	18°00'	+60'	18°	18
19	15°00'	+60'	48°	15°41'	+60'	48°	16°21'	+60'	48°	17°01'	+60'	48°	17°41'	+60'	49°	18°21'	+60'	49°	19°00'	+60'	17°	19
20	16°00'	+60'	48°	16°41'	+60'	48°	17°21'	+60'	48°	18°01'	+60'	48°	18°41'	+60'	48°	19°21'	+60'	49°	20°00'	+60'	15°	20
21	17°00'	+60'	47°	17°41'	+60'	48°	18°21'	+60'	48°	19°01'	+60'	48°	19°41'	+60'	48°	20°21'	+60'	49°	21°00'	+60'	14°	21
22	18°00'	+60'	47°	18°40'	+60'	48°	19°21'	+60'	48°	20°01'	+60'	48°	20°41'	+60'	48°	21°21'	+60'	49°	22°00'	+60'	12°	22
23	19°00'	+60'	47°	19°40'	+60'	48°	20°21'	+60'	48°	21°01'	+60'	48°	21°41'	+60'	48°	22°21'	+60'	49°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

131° 229° LHA — Latitude SAME as DECLINATION — 131° 229° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

48° 312° LHA — Latitude CONTRARY to Declination — 48° 312° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°01'	-60'	132°	3°21'	-60'	132°	2°41'	-60'	132°	2°00'	-60'	132°	1°20'	-60'	132°	0°40'	-60'	132°	0°00'	-60'	132°	0
1	3°01'	-60'	132°	2°21'	-60'	132°	1°41'	-60'	132°	1°00'	-60'	132°	0°20'	-60'	132°	0°20'	+60'	48°	1°00'	+60'	47°	1
2	2°01'	-60'	132°	1°21'	-60'	132°	0°41'	-60'	132°	0°01'	-60'	132°	0°40'	+60'	48°	1°20'	+60'	48°	2°00'	+60'	47°	2
3	1°01'	-60'	132°	0°21'	-60'	132°	0°19'	+60'	48°	0°59'	+60'	48°	1°40'	+60'	48°	2°20'	+60'	48°	3°00'	+60'	55°	3
4	0°01'	-60'	132°	0°39'	+60'	48°	1°19'	+60'	48°	1°59'	+60'	48°	2°40'	+60'	48°	3°20'	+60'	48°	4°00'	+60'	47°	4
5	0°58'	+60'	48°	1°39'	+60'	48°	2°19'	+60'	48°	2°59'	+60'	48°	3°40'	+60'	48°	4°20'	+60'	48°	5°00'	+60'	47°	5
6	1°58'	+60'	48°	2°39'	+60'	48°	3°19'	+60'	48°	3°59'	+60'	48°	4°40'	+60'	48°	5°20'	+60'	48°	6°00'	+60'	47°	6
7	2°58'	+60'	48°	3°39'	+60'	48°	4°19'	+60'	48°	4°59'	+60'	48°	5°40'	+60'	48°	6°20'	+60'	48°	7°00'	+60'	47°	7
8	3°58'	+60'	48°	4°38'	+60'	48°	5°19'	+60'	48°	5°59'	+60'	48°	6°40'	+60'	48°	7°20'	+60'	48°	8°00'	+60'	24°	8
9	4°58'	+60'	47°	5°38'	+60'	48°	6°19'	+60'	48°	6°59'	+60'	48°	7°40'	+60'	48°	8°20'	+60'	48°	9°00'	+60'	90°	9
10	5°58'	+60'	47°	6°38'	+60'	47°	7°19'	+60'	48°	7°59'	+60'	48°	8°40'	+60'	48°	9°20'	+60'	48°	10°00'	+60'	63°	10
11	6°57'	+60'	47°	7°38'	+60'	47°	8°19'	+60'	47°	8°59'	+60'	48°	9°39'	+60'	48°	10°20'	+60'	48°	11°00'	+60'	63°	11
12	7°57'	+60'	47°	8°38'	+60'	47°	9°19'	+60'	47°	9°59'	+60'	48°	10°39'	+60'	48°	11°20'	+60'	48°	12°00'	+60'	90°	12
13	8°57'	+60'	47°	9°38'	+60'	47°	10°18'	+60'	47°	10°59'	+60'	48°	11°39'	+60'	48°	12°20'	+60'	48°	13°00'	+60'	90°	13
14	9°57'	+60'	47°	10°38'	+60'	47°	11°18'	+60'	47°	11°59'	+60'	47°	12°39'	+60'	48°	13°20'	+60'	48°	14°00'	+60'	21°	14
15	10°57'	+60'	47°	11°37'	+60'	47°	12°18'	+60'	47°	12°59'	+60'	47°	13°39'	+60'	48°	14°20'	+60'	48°	15°00'	+60'	20°	15
16	11°56'	+60'	47°	12°37'	+60'	47°	13°18'	+60'	47°	13°59'	+60'	47°	14°39'	+60'	48°	15°20'	+60'	48°	16°00'	+60'	19°	16
17	12°56'	+60'	47°	13°37'	+60'	47°	14°18'	+60'	47°	14°59'	+60'	47°	15°39'	+60'	48°	16°20'	+60'	48°	17°00'	+60'	19°	17
18	13°56'	+60'	47°	14°37'	+60'	47°	15°18'	+60'	47°	15°59'	+60'	47°	16°39'	+60'	48°	17°20'	+60'	48°	18°00'	+60'	18°	18
19	14°56'	+60'	47°	15°37'	+60'	47°	16°18'	+60'	47°	16°59'	+60'	47°	17°39'	+60'	48°	18°20'	+60'	48°	19°00'	+60'	17°	19
20	15°56'	+60'	47°	16°37'	+60'	47°	17°18'	+60'	47°	17°59'	+60'	47°	18°39'	+60'	47°	19°20'	+60'	48°	20°00'	+60'	15°	20
21	16°55'	+60'	46°	17°37'	+60'	47°	18°18'	+60'	47°	18°59'	+60'	47°	19°39'	+60'	47°	20°20'	+60'	48°	21°00'	+60'	14°	21
22	17°55'	+60'	46°	18°37'	+60'	47°	19°18'	+60'	47°	19°59'	+60'	47°	20°39'	+60'	47°	21°20'	+60'	48°	22°00'	+60'	12°	22
23	18°55'	+60'	46°	19°36'	+60'	47°	20°18'	+60'	47°	20°58'	+60'	47°	21°39'	+60'	47°	22°20'	+60'	48°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

132° 228° LHA — Latitude SAME as DECLINATION — 132° 228° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

47° 313° LHA — Latitude CONTRARY to Declination — 47° 313° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°05'	-60'	133°	3°24'	-60'	133°	2°44'	-60'	133°	2°03'	-60'	133°	1°22'	-60'	133°	0°41'	-60'	133°	0°00'	-60'	133°	0
1	3°05'	-60'	133°	2°25'	-60'	133°	1°44'	-60'	133°	1°03'	-60'	133°	0°22'	-60'	133°	0°19'	+60'	47°	1°00'	+60'	47°	1
2	2°06'	-60'	133°	1°25'	-60'	133°	0°44'	-60'	133°	0°03'	-60'	133°	0°38'	+60'	47°	1°19'	+60'	47°	2°00'	+60'	47°	2
3	1°06'	-60'	133°	0°25'	-60'	133°	0°16'	+60'	47°	0°57'	+60'	47°	1°38'	+60'	47°	2°19'	+60'	47°	3°00'	+60'	55°	3
4	0°06'	-60'	133°	0°35'	+60'	47°	1°16'	+60'	47°	1°57'	+60'	47°	2°38'	+60'	47°	3°19'	+60'	47°	4°00'	+60'	47°	4
5	0°54'	+60'	47°	1°35'	+60'	47°	2°16'	+60'	47°	2°57'	+60'	47°	3°38'	+60'	47°	4°19'	+60'	47°	5°00'	+60'	47°	5
6	1°54'	+60'	47°	2°35'	+60'	47°	3°16'	+60'	47°	3°57'	+60'	47°	4°38'	+60'	47°	5°19'	+60'	47°	6°00'	+60'	47°	6
7	2°53'	+60'	47°	3°35'	+60'	47°	4°16'	+60'	47°	4°57'	+60'	47°	5°38'	+60'	47°	6°19'	+60'	47°	7°00'	+60'	47°	7
8	3°53'	+60'	47°	4°35'	+60'	47°	5°16'	+60'	47°	5°57'	+60'	47°	6°38'	+60'	47°	7°19'	+60'	47°	8°00'	+60'	24°	8
9	4°53'	+60'	46°	5°34'	+60'	47°	6°16'	+60'	47°	6°57'	+60'	47°	7°38'	+60'	47°	8°19'	+60'	47°	9°00'	+60'	90°	9
10	5°53'	+60'	46°	6°34'	+60'	46°	7°16'	+60'	47°	7°57'	+60'	47°	8°38'	+60'	47°	9°19'	+60'	47°	10°00'	+60'	63°	10
11	6°53'	+60'	46°	7°34'	+60'	46°	8°16'	+60'	47°	8°57'	+60'	47°	9°38'	+60'	47°	10°19'	+60'	47°	11°00'	+60'	63°	11
12	7°53'	+60'	46°	8°34'	+60'	46°	9°15'	+60'	46°	9°57'	+60'	47°	10°38'	+60'	47°	11°19'	+60'	47°	12°00'	+60'	90°	12
13	8°52'	+60'	46°	9°34'	+60'	46°	10°15'	+60'	46°	10°57'	+60'	47°	11°38'	+60'	47°	12°19'	+60'	47°	13°00'	+60'	90°	13
14	9°52'	+60'	46°	10°34'	+60'	46°	11°15'	+60'	46°	11°57'	+60'	46°	12°38'	+60'	47°	13°19'	+60'	47°	14°00'	+60'	21°	14
15	10°52'	+60'	46°	11°34'	+60'	46°	12°15'	+60'	46°	12°57'	+60'	46°	13°38'	+60'	47°	14°19'	+60'	47°	15°00'	+60'	20°	15
16	11°52'	+60'	46°	12°34'	+60'	46°	13°15'	+60'	46°	13°57'	+60'	46°	14°38'	+60'	47°	15°19'	+60'	47°	16°00'	+60'	19°	16
17	12°52'	+60'	46°	13°33'	+60'	46°	14°15'	+60'	46°	14°57'	+60'	46°	15°38'	+60'	47°	16°19'	+60'	47°	17°00'	+60'	19°	17
18	13°52'	+60'	46°	14°33'	+60'	46°	15°15'	+60'	46°	15°56'	+60'	46°	16°38'	+60'	47°	17°19'	+60'	47°	18°00'	+60'	18°	18
19	14°51'	+60'	46°	15°33'	+60'	46°	16°15'	+60'	46°	16°56'	+60'	46°	17°38'	+60'	47°	18°19'	+60'	47°	19°00'	+60'	17°	19
20	15°51'	+60'	46°	16°33'	+60'	46°	17°15'	+60'	46°	17°56'	+60'	46°	18°38'	+60'	46°	19°19'	+60'	47°	20°00'	+60'	15°	20
21	16°51'	+60'	46°	17°33'	+60'	46°	18°15'	+60'	46°	18°56'	+60'	46°	19°38'	+60'	46°	20°19'	+60'	47°	21°00'	+60'	14°	21
22	17°51'	+60'	45°	18°33'	+60'	46°	19°15'	+60'	46°	19°56'	+60'	46°	20°38'	+60'	46°	21°19'	+60'	47°	22°00'	+60'	12°	22
23	18°51'	+60'	45°	19°33'	+60'	46°	20°15'	+60'	46°	20°56'	+60'	46°	21°38'	+60'	46°	22°19'	+60'	47°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

133° 227° LHA — Latitude SAME as DECLINATION — 133° 227° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

46° 314° LHA — Latitude CONTRARY to Declination — 46° 314° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°10'	-60'	134°	3°28'	-60'	134°	2°47'	-60'	134°	2°05'	-60'	134°	1°23'	-60'	134°	0°42'	-60'	134°	0°00'	-60'	134°	0
1	3°10'	-60'	134°	2°28'	-60'	134°	1°47'	-60'	134°	1°05'	-60'	134°	0°23'	-60'	134°	0°18'	+60'	46°	1°00'	+60'	47°	1
2	2°10'	-60'	134°	1°28'	-60'	134°	0°47'	-60'	134°	0°05'	-60'	134°	0°37'	+60'	46°	1°18'	+60'	46°	2°00'	+60'	47°	2
3	1°10'	-60'	134°	0°29'	-60'	134°	0°13'	+60'	46°	0°55'	+60'	46°	1°37'	+60'	46°	2°18'	+60'	46°	3°00'	+60'	55°	3
4	0°11'	-60'	134°	0°31'	+60'	46°	1°13'	+60'	46°	1°55'	+60'	46°	2°37'	+60'	46°	3°18'	+60'	46°	4°00'	+60'	47°	4
5	0°49'	+60'	46°	1°31'	+60'	46°	2°13'	+60'	46°	2°55'	+60'	46°	3°37'	+60'	46°	4°18'	+60'	46°	5°00'	+60'	47°	5
6	1°49'	+60'	46°	2°31'	+60'	46°	3°13'	+60'	46°	3°55'	+60'	46°	4°37'	+60'	46°	5°18'	+60'	46°	6°00'	+60'	47°	6
7	2°49'	+60'	46°	3°31'	+60'	46°	4°13'	+60'	46°	4°55'	+60'	46°	5°37'	+60'	46°	6°18'	+60'	46°	7°00'	+60'	47°	7
8	3°49'	+60'	46°	4°31'	+60'	46°	5°13'	+60'	46°	5°55'	+60'	46°	6°36'	+60'	46°	7°18'	+60'	46°	8°00'	+60'	0°	8
9	4°49'	+60'	45°	5°31'	+60'	46°	6°13'	+60'	46°	6°55'	+60'	46°	7°36'	+60'	46°	8°18'	+60'	46°	9°00'	+60'	63°	9
10	5°48'	+60'	45°	6°31'	+60'	45°	7°13'	+60'	46°	7°55'	+60'	46°	8°36'	+60'	46°	9°18'	+60'	46°	10°00'	+60'	23°	10
11	6°48'	+60'	45°	7°30'	+60'	45°	8°13'	+60'	46°	8°55'	+60'	46°	9°36'	+60'	46°	10°18'	+60'	46°	11°00'	+60'	23°	11
12	7°48'	+60'	45°	8°30'	+60'	45°	9°12'	+60'	45°	9°54'	+60'	46°	10°36'	+60'	46°	11°18'	+60'	46°	12°00'	+60'	90°	12
13	8°48'	+60'	45°	9°30'	+60'	45°	10°12'	+60'	45°	10°54'	+60'	46°	11°36'	+60'	46°	12°18'	+60'	46°	13°00'	+60'	90°	13
14	9°48'	+60'	45°	10°30'	+60'	45°	11°12'	+60'	45°	11°54'	+60'	46°	12°36'	+60'	46°	13°18'	+60'	46°	14°00'	+60'	21°	14
15	10°48'	+60'	45°	11°30'	+60'	45°	12°12'	+60'	45°	12°54'	+60'	45°	13°36'	+60'	46°	14°18'	+60'	46°	15°00'	+60'	20°	15
16	11°47'	+60'	45°	12°30'	+60'	45°	13°12'	+60'	45°	13°54'	+60'	45°	14°36'	+60'	46°	15°18'	+60'	46°	16°00'	+60'	19°	16
17	12°47'	+60'	45°	13°30'	+60'	45°	14°12'	+60'	45°	14°54'	+60'	45°	15°36'	+60'	46°	16°18'	+60'	46°	17°00'	+60'	19°	17
18	13°47'	+60'	45°	14°30'	+60'	45°	15°12'	+60'	45°	15°54'	+60'	45°	16°36'	+60'	46°	17°18'	+60'	46°	18°00'	+60'	18°	18
19	14°47'	+60'	45°	15°29'	+60'	45°	16°12'	+60'	45°	16°54'	+60'	45°	17°36'	+60'	46°	18°18'	+60'	46°	19°00'	+60'	17°	19
20	15°47'	+60'	45°	16°29'	+60'	45°	17°12'	+60'	45°	17°54'	+60'	45°	18°36'	+60'	45°	19°18'	+60'	46°	20°00'	+60'	15°	20
21	16°47'	+60'	45°	17°29'	+60'	45°	18°12'	+60'	45°	18°54'	+60'	45°	19°36'	+60'	45°	20°18'	+60'	46°	21°00'	+60'	14°	21
22	17°46'	+60'	44°	18°29'	+60'	45°	19°12'	+60'	45°	19°54'	+60'	45°	20°36'	+60'	45°	21°18'	+60'	46°	22°00'	+60'	12°	22
23	18°46'	+60'	44°	19°29'	+60'	45°	20°12'	+60'	45°	20°54'	+60'	45°	21°36'	+60'	45°	22°18'	+60'	46°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

134° 226° LHA — Latitude SAME as DECLINATION — 134° 226° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

45° 315° LHA — Latitude CONTRARY to Declination — 45° 315° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°14'	-60'	135°	3°32'	-60'	135°	2°50'	-60'	135°	2°07'	-60'	135°	1°25'	-60'	135°	0°42'	-60'	135°	0°00'	-60'	135°	0
1	3°14'	-60'	135°	2°32'	-60'	135°	1°50'	-60'	135°	1°07'	-60'	135°	0°25'	-60'	135°	0°18'	+60'	45°	1°00'	+60'	47°	1
2	2°15'	-60'	135°	1°32'	-60'	135°	0°50'	-60'	135°	0°07'	-60'	135°	0°35'	+60'	45°	1°18'	+60'	45°	2°00'	+60'	47°	2
3	1°15'	-60'	135°	0°32'	-60'	135°	0°10'	+60'	45°	0°53'	+60'	45°	1°35'	+60'	45°	2°18'	+60'	45°	3°00'	+60'	55°	3
4	0°15'	-60'	135°	0°28'	+60'	45°	1°10'	+60'	45°	1°53'	+60'	45°	2°35'	+60'	45°	3°18'	+60'	45°	4°00'	+60'	47°	4
5	0°45'	+60'	45°	1°27'	+60'	45°	2°10'	+60'	45°	2°53'	+60'	45°	3°35'	+60'	45°	4°18'	+60'	45°	5°00'	+60'	47°	5
6	1°45'	+60'	45°	2°27'	+60'	45°	3°10'	+60'	45°	3°53'	+60'	45°	4°35'	+60'	45°	5°18'	+60'	45°	6°00'	+60'	47°	6
7	2°45'	+60'	45°	3°27'	+60'	45°	4°10'	+60'	45°	4°52'	+60'	45°	5°35'	+60'	45°	6°18'	+60'	45°	7°00'	+60'	47°	7
8	3°44'	+60'	45°	4°27'	+60'	45°	5°10'	+60'	45°	5°52'	+60'	45°	6°35'	+60'	45°	7°18'	+60'	45°	8°00'	+60'	0°	8
9	4°44'	+60'	44°	5°27'	+60'	45°	6°10'	+60'	45°	6°52'	+60'	45°	7°35'	+60'	45°	8°18'	+60'	45°	9°00'	+60'	63°	9
10	5°44'	+60'	44°	6°27'	+60'	44°	7°10'	+60'	45°	7°52'	+60'	45°	8°35'	+60'	45°	9°18'	+60'	45°	10°00'	+60'	23°	10
11	6°44'	+60'	44°	7°27'	+60'	44°	8°10'	+60'	45°	8°52'	+60'	45°	9°35'	+60'	45°	10°18'	+60'	45°	11°00'	+60'	23°	11
12	7°44'	+60'	44°	8°27'	+60'	44°	9°09'	+60'	44°	9°52'	+60'	45°	10°35'	+60'	45°	11°18'	+60'	45°	12°00'	+60'	62°	12
13	8°44'	+60'	44°	9°27'	+60'	44°	10°09'	+60'	44°	10°52'	+60'	45°	11°35'	+60'	45°	12°18'	+60'	45°	13°00'	+60'	62°	13
14	9°43'	+60'	44°	10°26'	+60'	44°	11°09'	+60'	44°	11°52'	+60'	45°	12°35'	+60'	45°	13°18'	+60'	45°	14°00'	+60'	0°	14
15	10°43'	+60'	44°	11°26'	+60'	44°	12°09'	+60'	44°	12°52'	+60'	44°	13°35'	+60'	45°	14°18'	+60'	45°	15°00'	+60'	20°	15
16	11°43'	+60'	44°	12°26'	+60'	44°	13°09'	+60'	44°	13°52'	+60'	44°	14°35'	+60'	45°	15°17'	+60'	45°	16°00'	+60'	19°	16
17	12°43'	+60'	44°	13°26'	+60'	44°	14°09'	+60'	44°	14°52'	+60'	44°	15°35'	+60'	45°	16°17'	+60'	45°	17°00'	+60'	19°	17
18	13°43'	+60'	44°	14°26'	+60'	44°	15°09'	+60'	44°	15°52'	+60'	44°	16°35'	+60'	45°	17°17'	+60'	45°	18°00'	+60'	18°	18
19	14°43'	+60'	44°	15°26'	+60'	44°	16°09'	+60'	44°	16°52'	+60'	44°	17°35'	+60'	45°	18°17'	+60'	45°	19°00'	+60'	17°	19
20	15°42'	+60'	44°	16°26'	+60'	44°	17°09'	+60'	44°	17°52'	+60'	44°	18°35'	+60'	45°	19°17'	+60'	45°	20°00'	+60'	15°	20
21	16°42'	+60'	44°	17°26'	+60'	44°	18°09'	+60'	44°	18°52'	+60'	44°	19°35'	+60'	44°	20°17'	+60'	45°	21°00'	+60'	14°	21
22	17°42'	+60'	43°	18°25'	+60'	44°	19°09'	+60'	44°	19°52'	+60'	44°	20°35'	+60'	44°	21°17'	+60'	45°	22°00'	+60'	12°	22
23	18°42'	+60'	43°	19°25'	+60'	44°	20°09'	+60'	44°	20°52'	+60'	44°	21°35'	+60'	44°	22°17'	+60'	45°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

135° 225° LHA — Latitude SAME as DECLINATION — 135° 225° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

44° 316° LHA — Latitude CONTRARY to Declination — 44° 316° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°19'	-60'	136°	3°36'	-60'	136°	2°53'	-60'	136°	2°09'	-60'	136°	1°26'	-60'	136°	0°43'	-60'	136°	0°00'	-60'	136°	0
1	3°19'	-60'	136°	2°36'	-60'	136°	1°53'	-60'	136°	1°09'	-60'	136°	0°26'	-60'	136°	0°17'	+60'	44°	1°00'	+60'	43°	1
2	2°19'	-60'	136°	1°36'	-60'	136°	0°53'	-60'	136°	0°10'	-60'	136°	0°34'	+60'	44°	1°17'	+60'	44°	2°00'	+60'	47°	2
3	1°19'	-60'	136°	0°36'	-60'	136°	0°07'	+60'	44°	0°50'	+60'	44°	1°34'	+60'	44°	2°17'	+60'	44°	3°00'	+60'	55°	3
4	0°19'	-60'	136°	0°24'	+60'	44°	1°07'	+60'	44°	1°50'	+60'	44°	2°34'	+60'	44°	3°17'	+60'	44°	4°00'	+60'	47°	4
5	0°40'	+60'	44°	1°24'	+60'	44°	2°07'	+60'	44°	2°50'	+60'	44°	3°34'	+60'	44°	4°17'	+60'	44°	5°00'	+60'	47°	5
6	1°40'	+60'	44°	2°24'	+60'	44°	3°07'	+60'	44°	3°50'	+60'	44°	4°34'	+60'	44°	5°17'	+60'	44°	6°00'	+60'	47°	6
7	2°40'	+60'	44°	3°24'	+60'	44°	4°07'	+60'	44°	4°50'	+60'	44°	5°34'	+60'	44°	6°17'	+60'	44°	7°00'	+60'	47°	7
8	3°40'	+60'	44°	4°23'	+60'	44°	5°07'	+60'	44°	5°50'	+60'	44°	6°34'	+60'	44°	7°17'	+60'	44°	8°00'	+60'	0°	8
9	4°40'	+60'	44°	5°23'	+60'	44°	6°07'	+60'	44°	6°50'	+60'	44°	7°34'	+60'	44°	8°17'	+60'	44°	9°00'	+60'	63°	9
10	5°40'	+60'	43°	6°23'	+60'	44°	7°07'	+60'	44°	7°50'	+60'	44°	8°34'	+60'	44°	9°17'	+60'	44°	10°00'	+60'	23°	10
11	6°40'	+60'	43°	7°23'	+60'	43°	8°07'	+60'	44°	8°50'	+60'	44°	9°33'	+60'	44°	10°17'	+60'	44°	11°00'	+60'	23°	11
12	7°39'	+60'	43°	8°23'	+60'	43°	9°07'	+60'	43°	9°50'	+60'	44°	10°33'	+60'	44°	11°17'	+60'	44°	12°00'	+60'	62°	12
13	8°39'	+60'	43°	9°23'	+60'	43°	10°07'	+60'	43°	10°50'	+60'	44°	11°33'	+60'	44°	12°17'	+60'	44°	13°00'	+60'	62°	13
14	9°39'	+60'	43°	10°23'	+60'	43°	11°06'	+60'	43°	11°50'	+60'	44°	12°33'	+60'	44°	13°17'	+60'	44°	14°00'	+60'	0°	14
15	10°39'	+60'	43°	11°23'	+60'	43°	12°06'	+60'	43°	12°50'	+60'	43°	13°33'	+60'	44°	14°17'	+60'	44°	15°00'	+60'	20°	15
16	11°39'	+60'	43°	12°23'	+60'	43°	13°06'	+60'	43°	13°50'	+60'	43°	14°33'	+60'	44°	15°17'	+60'	44°	16°00'	+60'	19°	16
17	12°39'	+60'	43°	13°22'	+60'	43°	14°06'	+60'	43°	14°50'	+60'	43°	15°33'	+60'	44°	16°17'	+60'	44°	17°00'	+60'	19°	17
18	13°38'	+60'	43°	14°22'	+60'	43°	15°06'	+60'	43°	15°50'	+60'	43°	16°33'	+60'	44°	17°17'	+60'	44°	18°00'	+60'	18°	18
19	14°38'	+60'	43°	15°22'	+60'	43°	16°06'	+60'	43°	16°50'	+60'	43°	17°33'	+60'	44°	18°17'	+60'	44°	19°00'	+60'	17°	19
20	15°38'	+60'	43°	16°22'	+60'	43°	17°06'	+60'	43°	17°50'	+60'	43°	18°33'	+60'	44°	19°17'	+60'	44°	20°00'	+60'	15°	20
21	16°38'	+60'	43°	17°22'	+60'	43°	18°06'	+60'	43°	18°50'	+60'	43°	19°33'	+60'	43°	20°17'	+60'	44°	21°00'	+60'	14°	21
22	17°38'	+60'	43°	18°22'	+60'	43°	19°06'	+60'	43°	19°50'	+60'	43°	20°33'	+60'	43°	21°17'	+60'	44°	22°00'	+60'	12°	22
23	18°38'	+60'	42°	19°22'	+60'	43°	20°06'	+60'	43°	20°50'	+60'	43°	21°33'	+60'	43°	22°17'	+60'	44°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

136° 224° LHA — Latitude SAME as DECLINATION — 136° 224° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

43° 317° LHA — Latitude CONTRARY to Declination — 43° 317° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°23'	-60'	137°	3°39'	-60'	137°	2°55'	-60'	137°	2°12'	-60'	137°	1°28'	-60'	137°	0°44'	-60'	137°	0°00'	-60'	137°	0
1	3°23'	-60'	137°	2°39'	-60'	137°	1°56'	-60'	137°	1°12'	-60'	137°	0°28'	-60'	137°	0°16'	+60'	43°	1°00'	+60'	43°	1
2	2°23'	-60'	137°	1°39'	-60'	137°	0°56'	-60'	137°	0°12'	-60'	137°	0°32'	+60'	43°	1°16'	+60'	43°	2°00'	+60'	47°	2
3	1°24'	-60'	137°	0°40'	-60'	137°	0°04'	+60'	43°	0°48'	+60'	43°	1°32'	+60'	43°	2°16'	+60'	43°	3°00'	+60'	55°	3
4	0°24'	-60'	137°	0°20'	+60'	43°	1°04'	+60'	43°	1°48'	+60'	43°	2°32'	+60'	43°	3°16'	+60'	43°	4°00'	+60'	47°	4
5	0°36'	+60'	43°	1°20'	+60'	43°	2°04'	+60'	43°	2°48'	+60'	43°	3°32'	+60'	43°	4°16'	+60'	43°	5°00'	+60'	47°	5
6	1°36'	+60'	43°	2°20'	+60'	43°	3°04'	+60'	43°	3°48'	+60'	43°	4°32'	+60'	43°	5°16'	+60'	43°	6°00'	+60'	47°	6
7	2°36'	+60'	43°	3°20'	+60'	43°	4°04'	+60'	43°	4°48'	+60'	43°	5°32'	+60'	43°	6°16'	+60'	43°	7°00'	+60'	47°	7
8	3°36'	+60'	43°	4°20'	+60'	43°	5°04'	+60'	43°	5°48'	+60'	43°	6°32'	+60'	43°	7°16'	+60'	43°	8°00'	+60'	0°	8
9	4°36'	+60'	43°	5°20'	+60'	43°	6°04'	+60'	43°	6°48'	+60'	43°	7°32'	+60'	43°	8°16'	+60'	43°	9°00'	+60'	63°	9
10	5°35'	+60'	42°	6°20'	+60'	43°	7°04'	+60'	43°	7°48'	+60'	43°	8°32'	+60'	43°	9°16'	+60'	43°	10°00'	+60'	23°	10
11	6°35'	+60'	42°	7°20'	+60'	42°	8°04'	+60'	43°	8°48'	+60'	43°	9°32'	+60'	43°	10°16'	+60'	43°	11°00'	+60'	23°	11
12	7°35'	+60'	42°	8°19'	+60'	42°	9°04'	+60'	42°	9°48'	+60'	43°	10°32'	+60'	43°	11°16'	+60'	43°	12°00'	+60'	62°	12
13	8°35'	+60'	42°	9°19'	+60'	42°	10°04'	+60'	42°	10°48'	+60'	43°	11°32'	+60'	43°	12°16'	+60'	43°	13°00'	+60'	62°	13
14	9°35'	+60'	42°	10°19'	+60'	42°	11°04'	+60'	42°	11°48'	+60'	43°	12°32'	+60'	43°	13°16'	+60'	43°	14°00'	+60'	0°	14
15	10°35'	+60'	42°	11°19'	+60'	42°	12°04'	+60'	42°	12°48'	+60'	42°	13°32'	+60'	43°	14°16'	+60'	43°	15°00'	+60'	20°	15
16	11°34'	+60'	42°	12°19'	+60'	42°	13°03'	+60'	42°	13°48'	+60'	42°	14°32'	+60'	43°	15°16'	+60'	43°	16°00'	+60'	19°	16
17	12°34'	+60'	42°	13°19'	+60'	42°	14°03'	+60'	42°	14°48'	+60'	42°	15°32'	+60'	43°	16°16'	+60'	43°	17°00'	+60'	19°	17
18	13°34'	+60'	42°	14°19'	+60'	42°	15°03'	+60'	42°	15°48'	+60'	42°	16°32'	+60'	43°	17°16'	+60'	43°	18°00'	+60'	18°	18
19	14°34'	+60'	42°	15°19'	+60'	42°	16°03'	+60'	42°	16°48'	+60'	42°	17°32'	+60'	43°	18°16'	+60'	43°	19°00'	+60'	17°	19
20	15°34'	+60'	42°	16°19'	+60'	42°	17°03'	+60'	42°	17°48'	+60'	42°	18°32'	+60'	43°	19°16'	+60'	43°	20°00'	+60'	15°	20
21	16°34'	+60'	42°	17°18'	+60'	42°	18°03'	+60'	42°	18°48'	+60'	42°	19°32'	+60'	42°	20°16'	+60'	43°	21°00'	+60'	14°	21
22	17°33'	+60'	42°	18°18'	+60'	42°	19°03'	+60'	42°	19°48'	+60'	42°	20°32'	+60'	42°	21°16'	+60'	43°	22°00'	+60'	12°	22
23	18°33'	+60'	41°	19°18'	+60'	42°	20°03'	+60'	42°	20°47'	+60'	42°	21°32'	+60'	42°	22°16'	+60'	43°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

137° 223° LHA — Latitude SAME as DECLINATION — 137° 223° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

42° 318° LHA — Latitude CONTRARY to Declination — 42° 318° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°27'	-60'	138°	3°43'	-60'	138°	2°58'	-60'	138°	2°14'	-60'	138°	1°29'	-60'	138°	0°45'	-60'	138°	0°00'	-60'	138°	0
1	3°27'	-60'	138°	2°43'	-60'	138°	1°58'	-60'	138°	1°14'	-60'	138°	0°29'	-60'	138°	0°15'	+60'	42°	1°00'	+60'	43°	1
2	2°28'	-60'	138°	1°43'	-60'	138°	0°58'	-60'	138°	0°14'	-60'	138°	0°31'	+60'	42°	1°15'	+60'	42°	2°00'	+60'	37°	2
3	1°28'	-60'	138°	0°43'	-60'	138°	0°02'	+60'	42°	0°46'	+60'	42°	1°31'	+60'	42°	2°15'	+60'	42°	3°00'	+60'	47°	3
4	0°28'	-60'	138°	0°17'	+60'	42°	1°01'	+60'	42°	1°46'	+60'	42°	2°31'	+60'	42°	3°15'	+60'	42°	4°00'	+60'	47°	4
5	0°32'	+60'	42°	1°17'	+60'	42°	2°01'	+60'	42°	2°46'	+60'	42°	3°31'	+60'	42°	4°15'	+60'	42°	5°00'	+60'	47°	5
6	1°32'	+60'	42°	2°17'	+60'	42°	3°01'	+60'	42°	3°46'	+60'	42°	4°31'	+60'	42°	5°15'	+60'	42°	6°00'	+60'	47°	6
7	2°32'	+60'	42°	3°16'	+60'	42°	4°01'	+60'	42°	4°46'	+60'	42°	5°31'	+60'	42°	6°15'	+60'	42°	7°00'	+60'	47°	7
8	3°32'	+60'	42°	4°16'	+60'	42°	5°01'	+60'	42°	5°46'	+60'	42°	6°31'	+60'	42°	7°15'	+60'	42°	8°00'	+60'	0°	8
9	4°31'	+60'	42°	5°16'	+60'	42°	6°01'	+60'	42°	6°46'	+60'	42°	7°31'	+60'	42°	8°15'	+60'	42°	9°00'	+60'	63°	9
10	5°31'	+60'	41°	6°16'	+60'	42°	7°01'	+60'	42°	7°46'	+60'	42°	8°31'	+60'	42°	9°15'	+60'	42°	10°00'	+60'	23°	10
11	6°31'	+60'	41°	7°16'	+60'	41°	8°01'	+60'	42°	8°46'	+60'	42°	9°31'	+60'	42°	10°15'	+60'	42°	11°00'	+60'	23°	11
12	7°31'	+60'	41°	8°16'	+60'	41°	9°01'	+60'	42°	9°46'	+60'	42°	10°31'	+60'	42°	11°15'	+60'	42°	12°00'	+60'	62°	12
13	8°31'	+60'	41°	9°16'	+60'	41°	10°01'	+60'	41°	10°46'	+60'	42°	11°31'	+60'	42°	12°15'	+60'	42°	13°00'	+60'	62°	13
14	9°31'	+60'	41°	10°16'	+60'	41°	11°01'	+60'	41°	11°46'	+60'	42°	12°31'	+60'	42°	13°15'	+60'	42°	14°00'	+60'	0°	14
15	10°30'	+60'	41°	11°16'	+60'	41°	12°01'	+60'	41°	12°46'	+60'	42°	13°31'	+60'	42°	14°15'	+60'	42°	15°00'	+60'	20°	15
16	11°30'	+60'	41°	12°16'	+60'	41°	13°01'	+60'	41°	13°46'	+60'	41°	14°31'	+60'	42°	15°15'	+60'	42°	16°00'	+60'	19°	16
17	12°30'	+60'	41°	13°15'	+60'	41°	14°01'	+60'	41°	14°46'	+60'	41°	15°31'	+60'	42°	16°15'	+60'	42°	17°00'	+60'	19°	17
18	13°30'	+60'	41°	14°15'	+60'	41°	15°01'	+60'	41°	15°46'	+60'	41°	16°31'	+60'	42°	17°15'	+60'	42°	18°00'	+60'	18°	18
19	14°30'	+60'	41°	15°15'	+60'	41°	16°00'	+60'	41°	16°46'	+60'	41°	17°31'	+60'	42°	18°15'	+60'	42°	19°00'	+60'	17°	19
20	15°30'	+60'	41°	16°15'	+60'	41°	17°00'	+60'	41°	17°46'	+60'	41°	18°30'	+60'	42°	19°15'	+60'	42°	20°00'	+60'	15°	20
21	16°30'	+60'	41°	17°15'	+60'	41°	18°00'	+60'	41°	18°45'	+60'	41°	19°30'	+60'	42°	20°15'	+60'	42°	21°00'	+60'	14°	21
22	17°29'	+60'	41°	18°15'	+60'	41°	19°00'	+60'	41°	19°45'	+60'	41°	20°30'	+60'	41°	21°15'	+60'	42°	22°00'	+60'	12°	22
23	18°29'	+60'	41°	19°15'	+60'	41°	20°00'	+60'	41°	20°45'	+60'	41°	21°30'	+60'	41°	22°15'	+60'	42°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

138° 222° LHA — Latitude SAME as DECLINATION — 138° 222° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

41° 319° LHA — Latitude CONTRARY to Declination — 41° 319° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°31'	-60'	139°	3°46'	-60'	139°	3°01'	-60'	139°	2°16'	-60'	139°	1°31'	-60'	139°	0°45'	-60'	139°	0°00'	-60'	139°	0
1	3°32'	-60'	139°	2°46'	-60'	139°	2°01'	-60'	139°	1°16'	-60'	139°	0°31'	-60'	139°	0°15'	+60'	41°	1°00'	+60'	43°	1
2	2°32'	-60'	139°	1°46'	-60'	139°	1°01'	-60'	139°	0°16'	-60'	139°	0°29'	+60'	41°	1°15'	+60'	41°	2°00'	+60'	37°	2
3	1°32'	-60'	139°	0°47'	-60'	139°	0°01'	-60'	139°	0°44'	+60'	41°	1°29'	+60'	41°	2°15'	+60'	41°	3°00'	+60'	47°	3
4	0°32'	-60'	139°	0°13'	+60'	41°	0°59'	+60'	41°	1°44'	+60'	41°	2°29'	+60'	41°	3°15'	+60'	41°	4°00'	+60'	47°	4
5	0°28'	+60'	41°	1°13'	+60'	41°	1°59'	+60'	41°	2°44'	+60'	41°	3°29'	+60'	41°	4°15'	+60'	41°	5°00'	+60'	47°	5
6	1°28'	+60'	41°	2°13'	+60'	41°	2°59'	+60'	41°	3°44'	+60'	41°	4°29'	+60'	41°	5°15'	+60'	41°	6°00'	+60'	47°	6
7	2°28'	+60'	41°	3°13'	+60'	41°	3°58'	+60'	41°	4°44'	+60'	41°	5°29'	+60'	41°	6°15'	+60'	41°	7°00'	+60'	47°	7
8	3°27'	+60'	41°	4°13'	+60'	41°	4°58'	+60'	41°	5°44'	+60'	41°	6°29'	+60'	41°	7°15'	+60'	41°	8°00'	+60'	0°	8
9	4°27'	+60'	41°	5°13'	+60'	41°	5°58'	+60'	41°	6°44'	+60'	41°	7°29'	+60'	41°	8°15'	+60'	41°	9°00'	+60'	63°	9
10	5°27'	+60'	40°	6°13'	+60'	41°	6°58'	+60'	41°	7°44'	+60'	41°	8°29'	+60'	41°	9°15'	+60'	41°	10°00'	+60'	23°	10
11	6°27'	+60'	40°	7°13'	+60'	40°	7°58'	+60'	41°	8°44'	+60'	41°	9°29'	+60'	41°	10°15'	+60'	41°	11°00'	+60'	23°	11
12	7°27'	+60'	40°	8°13'	+60'	40°	8°58'	+60'	41°	9°44'	+60'	41°	10°29'	+60'	41°	11°15'	+60'	41°	12°00'	+60'	62°	12
13	8°27'	+60'	40°	9°12'	+60'	40°	9°58'	+60'	40°	10°44'	+60'	41°	11°29'	+60'	41°	12°15'	+60'	41°	13°00'	+60'	62°	13
14	9°27'	+60'	40°	10°12'	+60'	40°	10°58'	+60'	40°	11°44'	+60'	41°	12°29'	+60'	41°	13°15'	+60'	41°	14°00'	+60'	0°	14
15	10°26'	+60'	40°	11°12'	+60'	40°	11°58'	+60'	40°	12°44'	+60'	41°	13°29'	+60'	41°	14°15'	+60'	41°	15°00'	+60'	20°	15
16	11°26'	+60'	40°	12°12'	+60'	40°	12°58'	+60'	40°	13°44'	+60'	40°	14°29'	+60'	41°	15°15'	+60'	41°	16°00'	+60'	19°	16
17	12°26'	+60'	40°	13°12'	+60'	40°	13°58'	+60'	40°	14°44'	+60'	40°	15°29'	+60'	41°	16°15'	+60'	41°	17°00'	+60'	19°	17
18	13°26'	+60'	40°	14°12'	+60'	40°	14°58'	+60'	40°	15°44'	+60'	40°	16°29'	+60'	41°	17°15'	+60'	41°	18°00'	+60'	18°	18
19	14°26'	+60'	40°	15°12'	+60'	40°	15°58'	+60'	40°	16°43'	+60'	40°	17°29'	+60'	41°	18°15'	+60'	41°	19°00'	+60'	17°	19
20	15°26'	+60'	40°	16°12'	+60'	40°	16°58'	+60'	40°	17°43'	+60'	40°	18°29'	+60'	41°	19°15'	+60'	41°	20°00'	+60'	15°	20
21	16°25'	+60'	40°	17°12'	+60'	40°	17°58'	+60'	40°	18°43'	+60'	40°	19°29'	+60'	41°	20°15'	+60'	41°	21°00'	+60'	14°	21
22	17°25'	+60'	40°	18°11'	+60'	40°	18°58'	+60'	40°	19°43'	+60'	40°	20°29'	+60'	40°	21°15'	+60'	41°	22°00'	+60'	12°	22
23	18°25'	+60'	40°	19°11'	+60'	40°	19°57'	+60'	40°	20°43'	+60'	40°	21°29'	+60'	40°	22°15'	+60'	41°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

139° 221° LHA — Latitude SAME as DECLINATION — 139° 221° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

40° 320° LHA — Latitude CONTRARY to Declination — 40° 320° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°36'	-60'	140°	3°50'	-60'	140°	3°04'	-60'	140°	2°18'	-60'	140°	1°32'	-60'	140°	0°46'	-60'	140°	0°00'	-60'	140°	0
1	3°36'	-60'	140°	2°50'	-60'	140°	2°04'	-60'	140°	1°18'	-60'	140°	0°32'	-60'	140°	0°14'	+60'	40°	1°00'	+60'	38°	1
2	2°36'	-60'	140°	1°50'	-60'	140°	1°04'	-60'	140°	0°18'	-60'	140°	0°28'	+60'	40°	1°14'	+60'	40°	2°00'	+60'	37°	2
3	1°36'	-60'	140°	0°50'	-60'	140°	0°04'	-60'	140°	0°42'	+60'	40°	1°28'	+60'	40°	2°14'	+60'	40°	3°00'	+60'	47°	3
4	0°36'	-60'	140°	0°10'	+60'	40°	0°56'	+60'	40°	1°42'	+60'	40°	2°28'	+60'	40°	3°14'	+60'	40°	4°00'	+60'	47°	4
5	0°24'	+60'	40°	1°10'	+60'	40°	1°56'	+60'	40°	2°42'	+60'	40°	3°28'	+60'	40°	4°14'	+60'	40°	5°00'	+60'	47°	5
6	1°24'	+60'	40°	2°10'	+60'	40°	2°56'	+60'	40°	3°42'	+60'	40°	4°28'	+60'	40°	5°14'	+60'	40°	6°00'	+60'	47°	6
7	2°23'	+60'	40°	3°10'	+60'	40°	3°56'	+60'	40°	4°42'	+60'	40°	5°28'	+60'	40°	6°14'	+60'	40°	7°00'	+60'	47°	7
8	3°23'	+60'	40°	4°10'	+60'	40°	4°56'	+60'	40°	5°42'	+60'	40°	6°28'	+60'	40°	7°14'	+60'	40°	8°00'	+60'	0°	8
9	4°23'	+60'	40°	5°09'	+60'	40°	5°56'	+60'	40°	6°42'	+60'	40°	7°28'	+60'	40°	8°14'	+60'	40°	9°00'	+60'	63°	9
10	5°23'	+60'	39°	6°09'	+60'	40°	6°56'	+60'	40°	7°42'	+60'	40°	8°28'	+60'	40°	9°14'	+60'	40°	10°00'	+60'	23°	10
11	6°23'	+60'	39°	7°09'	+60'	39°	7°56'	+60'	40°	8°42'	+60'	40°	9°28'	+60'	40°	10°14'	+60'	40°	11°00'	+60'	23°	11
12	7°23'	+60'	39°	8°09'	+60'	39°	8°55'	+60'	40°	9°42'	+60'	40°	10°28'	+60'	40°	11°14'	+60'	40°	12°00'	+60'	62°	12
13	8°23'	+60'	39°	9°09'	+60'	39°	9°55'	+60'	39°	10°42'	+60'	40°	11°28'	+60'	40°	12°14'	+60'	40°	13°00'	+60'	62°	13
14	9°23'	+60'	39°	10°09'	+60'	39°	10°55'	+60'	39°	11°42'	+60'	40°	12°28'	+60'	40°	13°14'	+60'	40°	14°00'	+60'	0°	14
15	10°22'	+60'	39°	11°09'	+60'	39°	11°55'	+60'	39°	12°42'	+60'	40°	13°28'	+60'	40°	14°14'	+60'	40°	15°00'	+60'	20°	15
16	11°22'	+60'	39°	12°09'	+60'	39°	12°55'	+60'	39°	13°42'	+60'	39°	14°28'	+60'	40°	15°14'	+60'	40°	16°00'	+60'	19°	16
17	12°22'	+60'	39°	13°09'	+60'	39°	13°55'	+60'	39°	14°42'	+60'	39°	15°28'	+60'	40°	16°14'	+60'	40°	17°00'	+60'	19°	17
18	13°22'	+60'	39°	14°09'	+60'	39°	14°55'	+60'	39°	15°42'	+60'	39°	16°28'	+60'	40°	17°14'	+60'	40°	18°00'	+60'	18°	18
19	14°22'	+60'	39°	15°08'	+60'	39°	15°55'	+60'	39°	16°41'	+60'	39°	17°28'	+60'	40°	18°14'	+60'	40°	19°00'	+60'	17°	19
20	15°22'	+60'	39°	16°08'	+60'	39°	16°55'	+60'	39°	17°41'	+60'	39°	18°28'	+60'	40°	19°14'	+60'	40°	20°00'	+60'	15°	20
21	16°22'	+60'	39°	17°08'	+60'	39°	17°55'	+60'	39°	18°41'	+60'	39°	19°28'	+60'	40°	20°14'	+60'	40°	21°00'	+60'	14°	21
22	17°21'	+60'	39°	18°08'	+60'	39°	18°55'	+60'	39°	19°41'	+60'	39°	20°28'	+60'	40°	21°14'	+60'	40°	22°00'	+60'	12°	22
23	18°21'	+60'	39°	19°08'	+60'	39°	19°55'	+60'	39°	20°41'	+60'	39°	21°28'	+60'	39°	22°14'	+60'	40°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

140° 220° LHA — Latitude SAME as DECLINATION — 140° 220° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

39° 321° LHA — Latitude CONTRARY to Declination — 39° 321° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°40'	-60'	141°	3°53'	-60'	141°	3°06'	-60'	141°	2°20'	-60'	141°	1°33'	-60'	141°	0°47'	-60'	141°	0°00'	-60'	141°	0
1	3°40'	-60'	141°	2°53'	-60'	141°	2°07'	-60'	141°	1°20'	-60'	141°	0°33'	-60'	141°	0°13'	+60'	39°	1°00'	+60'	38°	1
2	2°40'	-60'	141°	1°53'	-60'	141°	1°07'	-60'	141°	0°20'	-60'	141°	0°27'	+60'	39°	1°13'	+60'	39°	2°00'	+60'	37°	2
3	1°40'	-60'	141°	0°53'	-60'	141°	0°07'	-60'	141°	0°40'	+60'	39°	1°27'	+60'	39°	2°13'	+60'	39°	3°00'	+60'	47°	3
4	0°40'	-60'	141°	0°07'	+60'	39°	0°53'	+60'	39°	1°40'	+60'	39°	2°27'	+60'	39°	3°13'	+60'	39°	4°00'	+60'	47°	4
5	0°20'	+60'	39°	1°07'	+60'	39°	1°53'	+60'	39°	2°40'	+60'	39°	3°27'	+60'	39°	4°13'	+60'	39°	5°00'	+60'	47°	5
6	1°20'	+60'	39°	2°06'	+60'	39°	2°53'	+60'	39°	3°40'	+60'	39°	4°27'	+60'	39°	5°13'	+60'	39°	6°00'	+60'	47°	6
7	2°20'	+60'	39°	3°06'	+60'	39°	3°53'	+60'	39°	4°40'	+60'	39°	5°27'	+60'	39°	6°13'	+60'	39°	7°00'	+60'	47°	7
8	3°19'	+60'	39°	4°06'	+60'	39°	4°53'	+60'	39°	5°40'	+60'	39°	6°27'	+60'	39°	7°13'	+60'	39°	8°00'	+60'	0°	8
9	4°19'	+60'	39°	5°06'	+60'	39°	5°53'	+60'	39°	6°40'	+60'	39°	7°27'	+60'	39°	8°13'	+60'	39°	9°00'	+60'	63°	9
10	5°19'	+60'	38°	6°06'	+60'	39°	6°53'	+60'	39°	7°40'	+60'	39°	8°27'	+60'	39°	9°13'	+60'	39°	10°00'	+60'	23°	10
11	6°19'	+60'	38°	7°06'	+60'	39°	7°53'	+60'	39°	8°40'	+60'	39°	9°27'	+60'	39°	10°13'	+60'	39°	11°00'	+60'	23°	11
12	7°19'	+60'	38°	8°06'	+60'	38°	8°53'	+60'	39°	9°40'	+60'	39°	10°27'	+60'	39°	11°13'	+60'	39°	12°00'	+60'	62°	12
13	8°19'	+60'	38°	9°06'	+60'	38°	9°53'	+60'	38°	10°40'	+60'	39°	11°27'	+60'	39°	12°13'	+60'	39°	13°00'	+60'	62°	13
14	9°19'	+60'	38°	10°06'	+60'	38°	10°53'	+60'	38°	11°40'	+60'	39°	12°27'	+60'	39°	13°13'	+60'	39°	14°00'	+60'	0°	14
15	10°18'	+60'	38°	11°06'	+60'	38°	11°53'	+60'	38°	12°40'	+60'	39°	13°27'	+60'	39°	14°13'	+60'	39°	15°00'	+60'	20°	15
16	11°18'	+60'	38°	12°06'	+60'	38°	12°53'	+60'	38°	13°40'	+60'	39°	14°27'	+60'	39°	15°13'	+60'	39°	16°00'	+60'	19°	16
17	12°18'	+60'	38°	13°05'	+60'	38°	13°53'	+60'	38°	14°40'	+60'	38°	15°26'	+60'	39°	16°13'	+60'	39°	17°00'	+60'	19°	17
18	13°18'	+60'	38°	14°05'	+60'	38°	14°52'	+60'	38°	15°40'	+60'	38°	16°26'	+60'	39°	17°13'	+60'	39°	18°00'	+60'	18°	18
19	14°18'	+60'	38°	15°05'	+60'	38°	15°52'	+60'	38°	16°40'	+60'	38°	17°26'	+60'	39°	18°13'	+60'	39°	19°00'	+60'	17°	19
20	15°18'	+60'	38°	16°05'	+60'	38°	16°52'	+60'	38°	17°39'	+60'	38°	18°26'	+60'	39°	19°13'	+60'	39°	20°00'	+60'	15°	20
21	16°18'	+60'	38°	17°05'	+60'	38°	17°52'	+60'	38°	18°39'	+60'	38°	19°26'	+60'	39°	20°13'	+60'	39°	21°00'	+60'	14°	21
22	17°17'	+60'	38°	18°05'	+60'	38°	18°52'	+60'	38°	19°39'	+60'	38°	20°26'	+60'	39°	21°13'	+60'	39°	22°00'	+60'	12°	22
23	18°17'	+60'	38°	19°05'	+60'	38°	19°52'	+60'	38°	20°39'	+60'	38°	21°26'	+60'	38°	22°13'	+60'	39°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

141° 219° LHA — Latitude SAME as DECLINATION — 141° 219° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

38° 322° LHA — Latitude CONTRARY to Declination — 38° 322° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°43'	-60'	142°	3°56'	-60'	142°	3°09'	-60'	142°	2°22'	-60'	142°	1°35'	-60'	142°	0°47'	-60'	142°	0°00'	-60'	142°	0
1	3°44'	-60'	142°	2°56'	-60'	142°	2°09'	-60'	142°	1°22'	-60'	142°	0°35'	-60'	142°	0°13'	+60'	38°	1°00'	+60'	38°	1
2	2°44'	-60'	142°	1°56'	-60'	142°	1°09'	-60'	142°	0°22'	-60'	142°	0°25'	+60'	38°	1°13'	+60'	38°	2°00'	+60'	37°	2
3	1°44'	-60'	142°	0°57'	-60'	142°	0°09'	-60'	142°	0°38'	+60'	38°	1°25'	+60'	38°	2°13'	+60'	38°	3°00'	+60'	47°	3
4	0°44'	-60'	142°	0°03'	+60'	38°	0°51'	+60'	38°	1°38'	+60'	38°	2°25'	+60'	38°	3°13'	+60'	38°	4°00'	+60'	47°	4
5	0°16'	+60'	38°	1°03'	+60'	38°	1°51'	+60'	38°	2°38'	+60'	38°	3°25'	+60'	38°	4°13'	+60'	38°	5°00'	+60'	47°	5
6	1°16'	+60'	38°	2°03'	+60'	38°	2°51'	+60'	38°	3°38'	+60'	38°	4°25'	+60'	38°	5°13'	+60'	38°	6°00'	+60'	47°	6
7	2°16'	+60'	38°	3°03'	+60'	38°	3°51'	+60'	38°	4°38'	+60'	38°	5°25'	+60'	38°	6°13'	+60'	38°	7°00'	+60'	47°	7
8	3°16'	+60'	38°	4°03'	+60'	38°	4°50'	+60'	38°	5°38'	+60'	38°	6°25'	+60'	38°	7°13'	+60'	38°	8°00'	+60'	0°	8
9	4°15'	+60'	38°	5°03'	+60'	38°	5°50'	+60'	38°	6°38'	+60'	38°	7°25'	+60'	38°	8°13'	+60'	38°	9°00'	+60'	63°	9
10	5°15'	+60'	38°	6°03'	+60'	38°	6°50'	+60'	38°	7°38'	+60'	38°	8°25'	+60'	38°	9°13'	+60'	38°	10°00'	+60'	23°	10
11	6°15'	+60'	37°	7°03'	+60'	38°	7°50'	+60'	38°	8°38'	+60'	38°	9°25'	+60'	38°	10°13'	+60'	38°	11°00'	+60'	23°	11
12	7°15'	+60'	37°	8°03'	+60'	37°	8°50'	+60'	38°	9°38'	+60'	38°	10°25'	+60'	38°	11°13'	+60'	38°	12°00'	+60'	62°	12
13	8°15'	+60'	37°	9°03'	+60'	37°	9°50'	+60'	38°	10°38'	+60'	38°	11°25'	+60'	38°	12°13'	+60'	38°	13°00'	+60'	62°	13
14	9°15'	+60'	37°	10°02'	+60'	37°	10°50'	+60'	37°	11°38'	+60'	38°	12°25'	+60'	38°	13°13'	+60'	38°	14°00'	+60'	0°	14
15	10°15'	+60'	37°	11°02'	+60'	37°	11°50'	+60'	37°	12°38'	+60'	38°	13°25'	+60'	38°	14°13'	+60'	38°	15°00'	+60'	20°	15
16	11°15'	+60'	37°	12°02'	+60'	37°	12°50'	+60'	37°	13°38'	+60'	38°	14°25'	+60'	38°	15°13'	+60'	38°	16°00'	+60'	19°	16
17	12°14'	+60'	37°	13°02'	+60'	37°	13°50'	+60'	37°	14°38'	+60'	37°	15°25'	+60'	38°	16°13'	+60'	38°	17°00'	+60'	19°	17
18	13°14'	+60'	37°	14°02'	+60'	37°	14°50'	+60'	37°	15°38'	+60'	37°	16°25'	+60'	38°	17°13'	+60'	38°	18°00'	+60'	18°	18
19	14°14'	+60'	37°	15°02'	+60'	37°	15°50'	+60'	37°	16°38'	+60'	37°	17°25'	+60'	38°	18°13'	+60'	38°	19°00'	+60'	17°	19
20	15°14'	+60'	37°	16°02'	+60'	37°	16°50'	+60'	37°	17°38'	+60'	37°	18°25'	+60'	38°	19°13'	+60'	38°	20°00'	+60'	15°	20
21	16°14'	+60'	37°	17°02'	+60'	37°	17°50'	+60'	37°	18°38'	+60'	37°	19°25'	+60'	38°	20°13'	+60'	38°	21°00'	+60'	14°	21
22	17°14'	+60'	37°	18°02'	+60'	37°	18°50'	+60'	37°	19°37'	+60'	37°	20°25'	+60'	38°	21°13'	+60'	38°	22°00'	+60'	12°	22
23	18°14'	+60'	37°	19°02'	+60'	37°	19°50'	+60'	37°	20°37'	+60'	37°	21°25'	+60'	38°	22°13'	+60'	38°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

142° 218° LHA — Latitude SAME as DECLINATION — 142° 218° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

37° 323° LHA — Latitude CONTRARY to Declination — 37° 323° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°47'	-60'	143°	3°59'	-60'	143°	3°12'	-60'	143°	2°24'	-60'	143°	1°36'	-60'	143°	0°48'	-60'	143°	0°00'	-60'	143°	0
1	3°47'	-60'	143°	3°00'	-60'	143°	2°12'	-60'	143°	1°24'	-60'	143°	0°36'	-60'	143°	0°12'	+60'	37°	1°00'	+60'	38°	1
2	2°48'	-60'	143°	2°00'	-60'	143°	1°12'	-60'	143°	0°24'	-60'	143°	0°24'	+60'	37°	1°12'	+60'	37°	2°00'	+60'	37°	2
3	1°48'	-60'	143°	1°00'	-60'	143°	0°12'	-60'	143°	0°36'	+60'	37°	1°24'	+60'	37°	2°12'	+60'	37°	3°00'	+60'	47°	3
4	0°48'	-60'	143°	0°00'	+60'	37°	0°48'	+60'	37°	1°36'	+60'	37°	2°24'	+60'	37°	3°12'	+60'	37°	4°00'	+60'	25°	4
5	0°12'	+60'	37°	1°00'	+60'	37°	1°48'	+60'	37°	2°36'	+60'	37°	3°24'	+60'	37°	4°12'	+60'	37°	5°00'	+60'	25°	5
6	1°12'	+60'	37°	2°00'	+60'	37°	2°48'	+60'	37°	3°36'	+60'	37°	4°24'	+60'	37°	5°12'	+60'	37°	6°00'	+60'	24°	6
7	2°12'	+60'	37°	3°00'	+60'	37°	3°48'	+60'	37°	4°36'	+60'	37°	5°24'	+60'	37°	6°12'	+60'	37°	7°00'	+60'	47°	7
8	3°12'	+60'	37°	4°00'	+60'	37°	4°48'	+60'	37°	5°36'	+60'	37°	6°24'	+60'	37°	7°12'	+60'	37°	8°00'	+60'	0°	8
9	4°12'	+60'	37°	5°00'	+60'	37°	5°48'	+60'	37°	6°36'	+60'	37°	7°24'	+60'	37°	8°12'	+60'	37°	9°00'	+60'	63°	9
10	5°11'	+60'	37°	6°00'	+60'	37°	6°48'	+60'	37°	7°36'	+60'	37°	8°24'	+60'	37°	9°12'	+60'	37°	10°00'	+60'	23°	10
11	6°11'	+60'	36°	7°00'	+60'	37°	7°48'	+60'	37°	8°36'	+60'	37°	9°24'	+60'	37°	10°12'	+60'	37°	11°00'	+60'	23°	11
12	7°11'	+60'	36°	8°00'	+60'	36°	8°48'	+60'	37°	9°36'	+60'	37°	10°24'	+60'	37°	11°12'	+60'	37°	12°00'	+60'	62°	12
13	8°11'	+60'	36°	8°59'	+60'	36°	9°48'	+60'	37°	10°36'	+60'	37°	11°24'	+60'	37°	12°12'	+60'	37°	13°00'	+60'	62°	13
14	9°11'	+60'	36°	9°59'	+60'	36°	10°48'	+60'	36°	11°36'	+60'	37°	12°24'	+60'	37°	13°12'	+60'	37°	14°00'	+60'	0°	14
15	10°11'	+60'	36°	10°59'	+60'	36°	11°48'	+60'	36°	12°36'	+60'	37°	13°24'	+60'	37°	14°12'	+60'	37°	15°00'	+60'	20°	15
16	11°11'	+60'	36°	11°59'	+60'	36°	12°48'	+60'	36°	13°36'	+60'	37°	14°24'	+60'	37°	15°12'	+60'	37°	16°00'	+60'	19°	16
17	12°11'	+60'	36°	12°59'	+60'	36°	13°47'	+60'	36°	14°36'	+60'	36°	15°24'	+60'	37°	16°12'	+60'	37°	17°00'	+60'	19°	17
18	13°11'	+60'	36°	13°59'	+60'	36°	14°47'	+60'	36°	15°36'	+60'	36°	16°24'	+60'	37°	17°12'	+60'	37°	18°00'	+60'	18°	18
19	14°10'	+60'	36°	14°59'	+60'	36°	15°47'	+60'	36°	16°36'	+60'	36°	17°24'	+60'	37°	18°12'	+60'	37°	19°00'	+60'	17°	19
20	15°10'	+60'	36°	15°59'	+60'	36°	16°47'	+60'	36°	17°36'	+60'	36°	18°24'	+60'	37°	19°12'	+60'	37°	20°00'	+60'	15°	20
21	16°10'	+60'	36°	16°59'	+60'	36°	17°47'	+60'	36°	18°36'	+60'	36°	19°24'	+60'	37°	20°12'	+60'	37°	21°00'	+60'	14°	21
22	17°10'	+60'	36°	17°59'	+60'	36°	18°47'	+60'	36°	19°36'	+60'	36°	20°24'	+60'	37°	21°12'	+60'	37°	22°00'	+60'	12°	22
23	18°10'	+60'	36°	18°59'	+60'	36°	19°47'	+60'	36°	20°36'	+60'	36°	21°24'	+60'	37°	22°12'	+60'	37°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

143° 217° LHA — Latitude SAME as DECLINATION — 143° 217° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

36° 324° LHA — Latitude CONTRARY to Declination — 36° 324° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°51'	-60'	144°	4°03'	-60'	144°	3°14'	-60'	144°	2°26'	-60'	144°	1°37'	-60'	144°	0°49'	-60'	144°	0°00'	-60'	144°	0
1	3°51'	-60'	144°	3°03'	-60'	144°	2°14'	-60'	144°	1°26'	-60'	144°	0°37'	-60'	144°	0°11'	+60'	36°	1°00'	+60'	38°	1
2	2°51'	-60'	144°	2°03'	-60'	144°	1°14'	-60'	144°	0°26'	-60'	144°	0°23'	+60'	36°	1°11'	+60'	36°	2°00'	+60'	37°	2
3	1°51'	-60'	144°	1°03'	-60'	144°	0°14'	-60'	144°	0°34'	+60'	36°	1°23'	+60'	36°	2°11'	+60'	36°	3°00'	+60'	47°	3
4	0°52'	-60'	144°	0°03'	-60'	144°	0°46'	+60'	36°	1°34'	+60'	36°	2°23'	+60'	36°	3°11'	+60'	36°	4°00'	+60'	25°	4
5	0°08'	+60'	36°	0°57'	+60'	36°	1°46'	+60'	36°	2°34'	+60'	36°	3°23'	+60'	36°	4°11'	+60'	36°	5°00'	+60'	25°	5
6	1°08'	+60'	36°	1°57'	+60'	36°	2°46'	+60'	36°	3°34'	+60'	36°	4°23'	+60'	36°	5°11'	+60'	36°	6°00'	+60'	24°	6
7	2°08'	+60'	36°	2°57'	+60'	36°	3°46'	+60'	36°	4°34'	+60'	36°	5°23'	+60'	36°	6°11'	+60'	36°	7°00'	+60'	0°	7
8	3°08'	+60'	36°	3°57'	+60'	36°	4°45'	+60'	36°	5°34'	+60'	36°	6°23'	+60'	36°	7°11'	+60'	36°	8°00'	+60'	0°	8
9	4°08'	+60'	36°	4°57'	+60'	36°	5°45'	+60'	36°	6°34'	+60'	36°	7°23'	+60'	36°	8°11'	+60'	36°	9°00'	+60'	63°	9
10	5°08'	+60'	36°	5°57'	+60'	36°	6°45'	+60'	36°	7°34'	+60'	36°	8°23'	+60'	36°	9°11'	+60'	36°	10°00'	+60'	23°	10
11	6°08'	+60'	35°	6°57'	+60'	36°	7°45'	+60'	36°	8°34'	+60'	36°	9°23'	+60'	36°	10°11'	+60'	36°	11°00'	+60'	23°	11
12	7°08'	+60'	35°	7°56'	+60'	35°	8°45'	+60'	36°	9°34'	+60'	36°	10°23'	+60'	36°	11°11'	+60'	36°	12°00'	+60'	62°	12
13	8°07'	+60'	35°	8°56'	+60'	35°	9°45'	+60'	36°	10°34'	+60'	36°	11°23'	+60'	36°	12°11'	+60'	36°	13°00'	+60'	62°	13
14	9°07'	+60'	35°	9°56'	+60'	35°	10°45'	+60'	35°	11°34'	+60'	36°	12°23'	+60'	36°	13°11'	+60'	36°	14°00'	+60'	0°	14
15	10°07'	+60'	35°	10°56'	+60'	35°	11°45'	+60'	35°	12°34'	+60'	36°	13°23'	+60'	36°	14°11'	+60'	36°	15°00'	+60'	20°	15
16	11°07'	+60'	35°	11°56'	+60'	35°	12°45'	+60'	35°	13°34'	+60'	36°	14°23'	+60'	36°	15°11'	+60'	36°	16°00'	+60'	19°	16
17	12°07'	+60'	35°	12°56'	+60'	35°	13°45'	+60'	35°	14°34'	+60'	36°	15°23'	+60'	36°	16°11'	+60'	36°	17°00'	+60'	19°	17
18	13°07'	+60'	35°	13°56'	+60'	35°	14°45'	+60'	35°	15°34'	+60'	35°	16°23'	+60'	36°	17°11'	+60'	36°	18°00'	+60'	18°	18
19	14°07'	+60'	35°	14°56'	+60'	35°	15°45'	+60'	35°	16°34'	+60'	35°	17°23'	+60'	36°	18°11'	+60'	36°	19°00'	+60'	17°	19
20	15°07'	+60'	35°	15°56'	+60'	35°	16°45'	+60'	35°	17°34'	+60'	35°	18°23'	+60'	36°	19°11'	+60'	36°	20°00'	+60'	15°	20
21	16°07'	+60'	35°	16°56'	+60'	35°	17°45'	+60'	35°	18°34'	+60'	35°	19°23'	+60'	36°	20°11'	+60'	36°	21°00'	+60'	14°	21
22	17°06'	+60'	35°	17°56'	+60'	35°	18°45'	+60'	35°	19°34'	+60'	35°	20°23'	+60'	36°	21°11'	+60'	36°	22°00'	+60'	12°	22
23	18°06'	+60'	35°	18°56'	+60'	35°	19°45'	+60'	35°	20°34'	+60'	35°	21°23'	+60'	36°	22°11'	+60'	36°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

144° 216° LHA — Latitude SAME as DECLINATION — 144° 216° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

35° 325° LHA — Latitude CONTRARY to Declination — 35° 325° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°55'	-60'	145°	4°06'	-60'	145°	3°17'	-60'	145°	2°27'	-60'	145°	1°38'	-60'	145°	0°49'	-60'	145°	0°00'	-60'	145°	0
1	3°55'	-60'	145°	3°06'	-60'	145°	2°17'	-60'	145°	1°27'	-60'	145°	0°38'	-60'	145°	0°11'	+60'	35°	1°00'	+60'	38°	1
2	2°55'	-60'	145°	2°06'	-60'	145°	1°17'	-60'	145°	0°27'	-60'	145°	0°22'	+60'	35°	1°11'	+60'	35°	2°00'	+60'	37°	2
3	1°55'	-60'	145°	1°06'	-60'	145°	0°17'	-60'	145°	0°32'	+60'	35°	1°22'	+60'	35°	2°11'	+60'	35°	3°00'	+60'	47°	3
4	0°55'	-60'	145°	0°06'	-60'	145°	0°43'	+60'	35°	1°32'	+60'	35°	2°22'	+60'	35°	3°11'	+60'	35°	4°00'	+60'	25°	4
5	0°05'	+60'	35°	0°54'	+60'	35°	1°43'	+60'	35°	2°32'	+60'	35°	3°22'	+60'	35°	4°11'	+60'	35°	5°00'	+60'	25°	5
6	1°05'	+60'	35°	1°54'	+60'	35°	2°43'	+60'	35°	3°32'	+60'	35°	4°22'	+60'	35°	5°11'	+60'	35°	6°00'	+60'	24°	6
7	2°05'	+60'	35°	2°54'	+60'	35°	3°43'	+60'	35°	4°32'	+60'	35°	5°22'	+60'	35°	6°11'	+60'	35°	7°00'	+60'	0°	7
8	3°04'	+60'	35°	3°54'	+60'	35°	4°43'	+60'	35°	5°32'	+60'	35°	6°22'	+60'	35°	7°11'	+60'	35°	8°00'	+60'	0°	8
9	4°04'	+60'	35°	4°54'	+60'	35°	5°43'	+60'	35°	6°32'	+60'	35°	7°22'	+60'	35°	8°11'	+60'	35°	9°00'	+60'	63°	9
10	5°04'	+60'	35°	5°54'	+60'	35°	6°43'	+60'	35°	7°32'	+60'	35°	8°22'	+60'	35°	9°11'	+60'	35°	10°00'	+60'	23°	10
11	6°04'	+60'	34°	6°54'	+60'	35°	7°43'	+60'	35°	8°32'	+60'	35°	9°22'	+60'	35°	10°11'	+60'	35°	11°00'	+60'	23°	11
12	7°04'	+60'	34°	7°53'	+60'	34°	8°43'	+60'	35°	9°32'	+60'	35°	10°22'	+60'	35°	11°11'	+60'	35°	12°00'	+60'	62°	12
13	8°04'	+60'	34°	8°53'	+60'	34°	9°43'	+60'	35°	10°32'	+60'	35°	11°22'	+60'	35°	12°11'	+60'	35°	13°00'	+60'	62°	13
14	9°04'	+60'	34°	9°53'	+60'	34°	10°43'	+60'	35°	11°32'	+60'	35°	12°22'	+60'	35°	13°11'	+60'	35°	14°00'	+60'	0°	14
15	10°04'	+60'	34°	10°53'	+60'	34°	11°43'	+60'	34°	12°32'	+60'	35°	13°22'	+60'	35°	14°11'	+60'	35°	15°00'	+60'	20°	15
16	11°04'	+60'	34°	11°53'	+60'	34°	12°43'	+60'	34°	13°32'	+60'	35°	14°22'	+60'	35°	15°11'	+60'	35°	16°00'	+60'	19°	16
17	12°03'	+60'	34°	12°53'	+60'	34°	13°43'	+60'	34°	14°32'	+60'	35°	15°21'	+60'	35°	16°11'	+60'	35°	17°00'	+60'	19°	17
18	13°03'	+60'	34°	13°53'	+60'	34°	14°43'	+60'	34°	15°32'	+60'	34°	16°21'	+60'	35°	17°11'	+60'	35°	18°00'	+60'	18°	18
19	14°03'	+60'	34°	14°53'	+60'	34°	15°43'	+60'	34°	16°32'	+60'	34°	17°21'	+60'	35°	18°11'	+60'	35°	19°00'	+60'	17°	19
20	15°03'	+60'	34°	15°53'	+60'	34°	16°42'	+60'	34°	17°32'	+60'	34°	18°21'	+60'	35°	19°11'	+60'	35°	20°00'	+60'	15°	20
21	16°03'	+60'	34°	16°53'	+60'	34°	17°42'	+60'	34°	18°32'	+60'	34°	19°21'	+60'	35°	20°11'	+60'	35°	21°00'	+60'	14°	21
22	17°03'	+60'	34°	17°53'	+60'	34°	18°42'	+60'	34°	19°32'	+60'	34°	20°21'	+60'	35°	21°11'	+60'	35°	22°00'	+60'	12°	22
23	18°03'	+60'	34°	18°53'	+60'	34°	19°42'	+60'	34°	20°32'	+60'	34°	21°21'	+60'	35°	22°11'	+60'	35°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

145° 215° LHA — Latitude SAME as DECLINATION — 145° 215° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

34° 326° LHA — **Latitude CONTRARY to Declination** — **34° 326° LHA**

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	4°58'	-60'	146°	4°09'	-60'	146°	3°19'	-60'	146°	2°29'	-60'	146°	1°39'	-60'	146°	0°50'	-60'	146°	0°00'	-60'	146°	0
1	3°58'	-60'	146°	3°09'	-60'	146°	2°19'	-60'	146°	1°29'	-60'	146°	0°39'	-60'	146°	0°10'	+60'	34°	1°00'	+60'	32°	1
2	2°58'	-60'	146°	2°09'	-60'	146°	1°19'	-60'	146°	0°29'	-60'	146°	0°20'	+60'	34°	1°10'	+60'	34°	2°00'	+60'	37°	2
3	1°59'	-60'	146°	1°09'	-60'	146°	0°19'	-60'	146°	0°31'	+60'	34°	1°20'	+60'	34°	2°10'	+60'	34°	3°00'	+60'	47°	3
4	0°59'	-60'	146°	0°09'	-60'	146°	0°41'	+60'	34°	1°31'	+60'	34°	2°20'	+60'	34°	3°10'	+60'	34°	4°00'	+60'	25°	4
5	0°01'	+60'	34°	0°51'	+60'	34°	1°41'	+60'	34°	2°31'	+60'	34°	3°20'	+60'	34°	4°10'	+60'	34°	5°00'	+60'	25°	5
6	1°01'	+60'	34°	1°51'	+60'	34°	2°41'	+60'	34°	3°31'	+60'	34°	4°20'	+60'	34°	5°10'	+60'	34°	6°00'	+60'	24°	6
7	2°01'	+60'	34°	2°51'	+60'	34°	3°41'	+60'	34°	4°31'	+60'	34°	5°20'	+60'	34°	6°10'	+60'	34°	7°00'	+60'	0°	7
8	3°01'	+60'	34°	3°51'	+60'	34°	4°41'	+60'	34°	5°31'	+60'	34°	6°20'	+60'	34°	7°10'	+60'	34°	8°00'	+60'	0°	8
9	4°01'	+60'	34°	4°51'	+60'	34°	5°41'	+60'	34°	6°31'	+60'	34°	7°20'	+60'	34°	8°10'	+60'	34°	9°00'	+60'	63°	9
10	5°01'	+60'	34°	5°51'	+60'	34°	6°41'	+60'	34°	7°31'	+60'	34°	8°20'	+60'	34°	9°10'	+60'	34°	10°00'	+60'	23°	10
11	6°01'	+60'	34°	6°51'	+60'	34°	7°41'	+60'	34°	8°31'	+60'	34°	9°20'	+60'	34°	10°10'	+60'	34°	11°00'	+60'	23°	11
12	7°00'	+60'	33°	7°51'	+60'	34°	8°41'	+60'	34°	9°30'	+60'	34°	10°20'	+60'	34°	11°10'	+60'	34°	12°00'	+60'	62°	12
13	8°00'	+60'	33°	8°50'	+60'	33°	9°40'	+60'	34°	10°30'	+60'	34°	11°20'	+60'	34°	12°10'	+60'	34°	13°00'	+60'	62°	13
14	9°00'	+60'	33°	9°50'	+60'	33°	10°40'	+60'	34°	11°30'	+60'	34°	12°20'	+60'	34°	13°10'	+60'	34°	14°00'	+60'	0°	14
15	10°00'	+60'	33°	10°50'	+60'	33°	11°40'	+60'	33°	12°30'	+60'	34°	13°20'	+60'	34°	14°10'	+60'	34°	15°00'	+60'	20°	15
16	11°00'	+60'	33°	11°50'	+60'	33°	12°40'	+60'	33°	13°30'	+60'	34°	14°20'	+60'	34°	15°10'	+60'	34°	16°00'	+60'	19°	16
17	12°00'	+60'	33°	12°50'	+60'	33°	13°40'	+60'	33°	14°30'	+60'	34°	15°20'	+60'	34°	16°10'	+60'	34°	17°00'	+60'	19°	17
18	13°00'	+60'	33°	13°50'	+60'	33°	14°40'	+60'	33°	15°30'	+60'	33°	16°20'	+60'	34°	17°10'	+60'	34°	18°00'	+60'	18°	18
19	14°00'	+60'	33°	14°50'	+60'	33°	15°40'	+60'	33°	16°30'	+60'	33°	17°20'	+60'	34°	18°10'	+60'	34°	19°00'	+60'	17°	19
20	15°00'	+60'	33°	15°50'	+60'	33°	16°40'	+60'	33°	17°30'	+60'	33°	18°20'	+60'	34°	19°10'	+60'	34°	20°00'	+60'	15°	20
21	16°00'	+60'	33°	16°50'	+60'	33°	17°40'	+60'	33°	18°30'	+60'	33°	19°20'	+60'	34°	20°10'	+60'	34°	21°00'	+60'	14°	21
22	16°59'	+60'	33°	17°50'	+60'	33°	18°40'	+60'	33°	19°30'	+60'	33°	20°20'	+60'	34°	21°10'	+60'	34°	22°00'	+60'	12°	22
23	17°59'	+60'	33°	18°50'	+60'	33°	19°40'	+60'	33°	20°30'	+60'	33°	21°20'	+60'	34°	22°10'	+60'	34°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

146° 214° LHA — **Latitude SAME as DECLINATION** — **146° 214° LHA**

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

33° 327° LHA — **Latitude CONTRARY to Declination** — **33° 327° LHA**

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°02'	-60'	147°	4°12'	-60'	147°	3°21'	-60'	147°	2°31'	-60'	147°	1°41'	-60'	147°	0°50'	-60'	147°	0°00'	-60'	147°	0
1	4°02'	-60'	147°	3°12'	-60'	147°	2°21'	-60'	147°	1°31'	-60'	147°	0°41'	-60'	147°	0°10'	+60'	33°	1°00'	+60'	32°	1
2	3°02'	-60'	147°	2°12'	-60'	147°	1°21'	-60'	147°	0°31'	-60'	147°	0°19'	+60'	33°	1°10'	+60'	33°	2°00'	+60'	37°	2
3	2°02'	-60'	147°	1°12'	-60'	147°	0°21'	-60'	147°	0°29'	+60'	33°	1°19'	+60'	33°	2°10'	+60'	33°	3°00'	+60'	47°	3
4	1°02'	-60'	147°	0°12'	-60'	147°	0°39'	+60'	33°	1°29'	+60'	33°	2°19'	+60'	33°	3°10'	+60'	33°	4°00'	+60'	25°	4
5	0°02'	-60'	147°	0°48'	+60'	33°	1°39'	+60'	33°	2°29'	+60'	33°	3°19'	+60'	33°	4°10'	+60'	33°	5°00'	+60'	25°	5
6	0°58'	+60'	33°	1°48'	+60'	33°	2°39'	+60'	33°	3°29'	+60'	33°	4°19'	+60'	33°	5°10'	+60'	33°	6°00'	+60'	24°	6
7	1°58'	+60'	33°	2°48'	+60'	33°	3°38'	+60'	33°	4°29'	+60'	33°	5°19'	+60'	33°	6°10'	+60'	33°	7°00'	+60'	0°	7
8	2°57'	+60'	33°	3°48'	+60'	33°	4°38'	+60'	33°	5°29'	+60'	33°	6°19'	+60'	33°	7°10'	+60'	33°	8°00'	+60'	0°	8
9	3°57'	+60'	33°	4°48'	+60'	33°	5°38'	+60'	33°	6°29'	+60'	33°	7°19'	+60'	33°	8°10'	+60'	33°	9°00'	+60'	63°	9
10	4°57'	+60'	33°	5°48'	+60'	33°	6°38'	+60'	33°	7°29'	+60'	33°	8°19'	+60'	33°	9°10'	+60'	33°	10°00'	+60'	23°	10
11	5°57'	+60'	33°	6°48'	+60'	33°	7°38'	+60'	33°	8°29'	+60'	33°	9°19'	+60'	33°	10°10'	+60'	33°	11°00'	+60'	23°	11
12	6°57'	+60'	32°	7°48'	+60'	33°	8°38'	+60'	33°	9°29'	+60'	33°	10°19'	+60'	33°	11°10'	+60'	33°	12°00'	+60'	62°	12
13	7°57'	+60'	32°	8°48'	+60'	32°	9°38'	+60'	33°	10°29'	+60'	33°	11°19'	+60'	33°	12°10'	+60'	33°	13°00'	+60'	62°	13
14	8°57'	+60'	32°	9°48'	+60'	32°	10°38'	+60'	33°	11°29'	+60'	33°	12°19'	+60'	33°	13°10'	+60'	33°	14°00'	+60'	0°	14
15	9°57'	+60'	32°	10°47'	+60'	32°	11°38'	+60'	32°	12°29'	+60'	33°	13°19'	+60'	33°	14°10'	+60'	33°	15°00'	+60'	20°	15
16	10°57'	+60'	32°	11°47'	+60'	32°	12°38'	+60'	32°	13°29'	+60'	33°	14°19'	+60'	33°	15°10'	+60'	33°	16°00'	+60'	19°	16
17	11°57'	+60'	32°	12°47'	+60'	32°	13°38'	+60'	32°	14°29'	+60'	33°	15°19'	+60'	33°	16°10'	+60'	33°	17°00'	+60'	19°	17
18	12°56'	+60'	32°	13°47'	+60'	32°	14°38'	+60'	32°	15°29'	+60'	33°	16°19'	+60'	33°	17°10'	+60'	33°	18°00'	+60'	18°	18
19	13°56'	+60'	32°	14°47'	+60'	32°	15°38'	+60'	32°	16°29'	+60'	32°	17°19'	+60'	33°	18°10'	+60'	33°	19°00'	+60'	17°	19
20	14°56'	+60'	32°	15°47'	+60'	32°	16°38'	+60'	32°	17°29'	+60'	32°	18°19'	+60'	33°	19°10'	+60'	33°	20°00'	+60'	15°	20
21	15°56'	+60'	32°	16°47'	+60'	32°	17°38'	+60'	32°	18°29'	+60'	32°	19°19'	+60'	33°	20°10'	+60'	33°	21°00'	+60'	14°	21
22	16°56'	+60'	32°	17°47'	+60'	32°	18°38'	+60'	32°	19°29'	+60'	32°	20°19'	+60'	33°	21°10'	+60'	33°	22°00'	+60'	12°	22
23	17°56'	+60'	32°	18°47'	+60'	32°	19°38'	+60'	32°	20°28'	+60'	32°	21°19'	+60'	33°	22°10'	+60'	33°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

147° 213° LHA — **Latitude SAME as DECLINATION** — **147° 213° LHA**

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

32° 328° LHA — Latitude CONTRARY to Declination — 32° 328° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°05'	-60'	148°	4°14'	-60'	148°	3°23'	-60'	148°	2°33'	-60'	148°	1°42'	-60'	148°	0°51'	-60'	148°	0°00'	-60'	148°	0
1	4°05'	-60'	148°	3°14'	-60'	148°	2°24'	-60'	148°	1°33'	-60'	148°	0°42'	-60'	148°	0°09'	+60'	32°	1°00'	+60'	32°	1
2	3°05'	-60'	148°	2°14'	-60'	148°	1°24'	-60'	148°	0°33'	-60'	148°	0°18'	+60'	32°	1°09'	+60'	32°	2°00'	+60'	37°	2
3	2°05'	-60'	148°	1°15'	-60'	148°	0°24'	-60'	148°	0°27'	+60'	32°	1°18'	+60'	32°	2°09'	+60'	32°	3°00'	+60'	47°	3
4	1°06'	-60'	148°	0°15'	-60'	148°	0°36'	+60'	32°	1°27'	+60'	32°	2°18'	+60'	32°	3°09'	+60'	32°	4°00'	+60'	25°	4
5	0°06'	-60'	148°	0°45'	+60'	32°	1°36'	+60'	32°	2°27'	+60'	32°	3°18'	+60'	32°	4°09'	+60'	32°	5°00'	+60'	25°	5
6	0°54'	+60'	32°	1°45'	+60'	32°	2°36'	+60'	32°	3°27'	+60'	32°	4°18'	+60'	32°	5°09'	+60'	32°	6°00'	+60'	24°	6
7	1°54'	+60'	32°	2°45'	+60'	32°	3°36'	+60'	32°	4°27'	+60'	32°	5°18'	+60'	32°	6°09'	+60'	32°	7°00'	+60'	0°	7
8	2°54'	+60'	32°	3°45'	+60'	32°	4°36'	+60'	32°	5°27'	+60'	32°	6°18'	+60'	32°	7°09'	+60'	32°	8°00'	+60'	0°	8
9	3°54'	+60'	32°	4°45'	+60'	32°	5°36'	+60'	32°	6°27'	+60'	32°	7°18'	+60'	32°	8°09'	+60'	32°	9°00'	+60'	63°	9
10	4°54'	+60'	32°	5°45'	+60'	32°	6°36'	+60'	32°	7°27'	+60'	32°	8°18'	+60'	32°	9°09'	+60'	32°	10°00'	+60'	23°	10
11	5°54'	+60'	32°	6°45'	+60'	32°	7°36'	+60'	32°	8°27'	+60'	32°	9°18'	+60'	32°	10°09'	+60'	32°	11°00'	+60'	23°	11
12	6°54'	+60'	31°	7°45'	+60'	32°	8°36'	+60'	32°	9°27'	+60'	32°	10°18'	+60'	32°	11°09'	+60'	32°	12°00'	+60'	62°	12
13	7°54'	+60'	31°	8°45'	+60'	31°	9°36'	+60'	32°	10°27'	+60'	32°	11°18'	+60'	32°	12°09'	+60'	32°	13°00'	+60'	62°	13
14	8°54'	+60'	31°	9°45'	+60'	31°	10°36'	+60'	32°	11°27'	+60'	32°	12°18'	+60'	32°	13°09'	+60'	32°	14°00'	+60'	0°	14
15	9°53'	+60'	31°	10°45'	+60'	31°	11°36'	+60'	32°	12°27'	+60'	32°	13°18'	+60'	32°	14°09'	+60'	32°	15°00'	+60'	20°	15
16	10°53'	+60'	31°	11°45'	+60'	31°	12°36'	+60'	31°	13°27'	+60'	32°	14°18'	+60'	32°	15°09'	+60'	32°	16°00'	+60'	19°	16
17	11°53'	+60'	31°	12°45'	+60'	31°	13°36'	+60'	31°	14°27'	+60'	32°	15°18'	+60'	32°	16°09'	+60'	32°	17°00'	+60'	19°	17
18	12°53'	+60'	31°	13°45'	+60'	31°	14°36'	+60'	31°	15°27'	+60'	32°	16°18'	+60'	32°	17°09'	+60'	32°	18°00'	+60'	18°	18
19	13°53'	+60'	31°	14°44'	+60'	31°	15°36'	+60'	31°	16°27'	+60'	31°	17°18'	+60'	32°	18°09'	+60'	32°	19°00'	+60'	17°	19
20	14°53'	+60'	31°	15°44'	+60'	31°	16°36'	+60'	31°	17°27'	+60'	31°	18°18'	+60'	32°	19°09'	+60'	32°	20°00'	+60'	15°	20
21	15°53'	+60'	31°	16°44'	+60'	31°	17°36'	+60'	31°	18°27'	+60'	31°	19°18'	+60'	32°	20°09'	+60'	32°	21°00'	+60'	14°	21
22	16°53'	+60'	31°	17°44'	+60'	31°	18°36'	+60'	31°	19°27'	+60'	31°	20°18'	+60'	32°	21°09'	+60'	32°	22°00'	+60'	12°	22
23	17°53'	+60'	31°	18°44'	+60'	31°	19°36'	+60'	31°	20°27'	+60'	31°	21°18'	+60'	32°	22°09'	+60'	32°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

148° 212° LHA — Latitude SAME as DECLINATION — 148° 212° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

31° 329° LHA — Latitude CONTRARY to Declination — 31° 329° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°08'	-60'	149°	4°17'	-60'	149°	3°26'	-60'	149°	2°34'	-60'	149°	1°43'	-60'	149°	0°51'	-60'	149°	0°00'	-60'	149°	0
1	4°09'	-60'	149°	3°17'	-60'	149°	2°26'	-60'	149°	1°34'	-60'	149°	0°43'	-60'	149°	0°09'	+60'	31°	1°00'	+60'	32°	1
2	3°09'	-60'	149°	2°17'	-60'	149°	1°26'	-60'	149°	0°34'	-60'	149°	0°17'	+60'	31°	1°09'	+60'	31°	2°00'	+60'	25°	2
3	2°09'	-60'	149°	1°17'	-60'	149°	0°26'	-60'	149°	0°26'	+60'	31°	1°17'	+60'	31°	2°09'	+60'	31°	3°00'	+60'	37°	3
4	1°09'	-60'	149°	0°17'	-60'	149°	0°34'	+60'	31°	1°26'	+60'	31°	2°17'	+60'	31°	3°09'	+60'	31°	4°00'	+60'	25°	4
5	0°09'	-60'	149°	0°43'	+60'	31°	1°34'	+60'	31°	2°26'	+60'	31°	3°17'	+60'	31°	4°09'	+60'	31°	5°00'	+60'	25°	5
6	0°51'	+60'	31°	1°43'	+60'	31°	2°34'	+60'	31°	3°26'	+60'	31°	4°17'	+60'	31°	5°09'	+60'	31°	6°00'	+60'	24°	6
7	1°51'	+60'	31°	2°43'	+60'	31°	3°34'	+60'	31°	4°26'	+60'	31°	5°17'	+60'	31°	6°09'	+60'	31°	7°00'	+60'	0°	7
8	2°51'	+60'	31°	3°42'	+60'	31°	4°34'	+60'	31°	5°26'	+60'	31°	6°17'	+60'	31°	7°09'	+60'	31°	8°00'	+60'	0°	8
9	3°51'	+60'	31°	4°42'	+60'	31°	5°34'	+60'	31°	6°26'	+60'	31°	7°17'	+60'	31°	8°09'	+60'	31°	9°00'	+60'	63°	9
10	4°51'	+60'	31°	5°42'	+60'	31°	6°34'	+60'	31°	7°26'	+60'	31°	8°17'	+60'	31°	9°09'	+60'	31°	10°00'	+60'	23°	10
11	5°51'	+60'	31°	6°42'	+60'	31°	7°34'	+60'	31°	8°25'	+60'	31°	9°17'	+60'	31°	10°09'	+60'	31°	11°00'	+60'	23°	11
12	6°51'	+60'	30°	7°42'	+60'	31°	8°34'	+60'	31°	9°25'	+60'	31°	10°17'	+60'	31°	11°09'	+60'	31°	12°00'	+60'	62°	12
13	7°50'	+60'	30°	8°42'	+60'	31°	9°34'	+60'	31°	10°25'	+60'	31°	11°17'	+60'	31°	12°09'	+60'	31°	13°00'	+60'	62°	13
14	8°50'	+60'	30°	9°42'	+60'	30°	10°34'	+60'	31°	11°25'	+60'	31°	12°17'	+60'	31°	13°09'	+60'	31°	14°00'	+60'	0°	14
15	9°50'	+60'	30°	10°42'	+60'	30°	11°34'	+60'	31°	12°25'	+60'	31°	13°17'	+60'	31°	14°09'	+60'	31°	15°00'	+60'	20°	15
16	10°50'	+60'	30°	11°42'	+60'	30°	12°34'	+60'	30°	13°25'	+60'	31°	14°17'	+60'	31°	15°09'	+60'	31°	16°00'	+60'	19°	16
17	11°50'	+60'	30°	12°42'	+60'	30°	13°34'	+60'	30°	14°25'	+60'	31°	15°17'	+60'	31°	16°09'	+60'	31°	17°00'	+60'	19°	17
18	12°50'	+60'	30°	13°42'	+60'	30°	14°34'	+60'	30°	15°25'	+60'	31°	16°17'	+60'	31°	17°09'	+60'	31°	18°00'	+60'	18°	18
19	13°50'	+60'	30°	14°42'	+60'	30°	15°34'	+60'	30°	16°25'	+60'	31°	17°17'	+60'	31°	18°09'	+60'	31°	19°00'	+60'	17°	19
20	14°50'	+60'	30°	15°42'	+60'	30°	16°34'	+60'	30°	17°25'	+60'	30°	18°17'	+60'	31°	19°09'	+60'	31°	20°00'	+60'	15°	20
21	15°50'	+60'	30°	16°42'	+60'	30°	17°33'	+60'	30°	18°25'	+60'	30°	19°17'	+60'	31°	20°09'	+60'	31°	21°00'	+60'	14°	21
22	16°50'	+60'	30°	17°42'	+60'	30°	18°33'	+60'	30°	19°25'	+60'	30°	20°17'	+60'	31°	21°09'	+60'	31°	22°00'	+60'	12°	22
23	17°50'	+60'	30°	18°42'	+60'	30°	19°33'	+60'	30°	20°25'	+60'	30°	21°17'	+60'	31°	22°09'	+60'	31°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

149° 211° LHA — Latitude SAME as DECLINATION — 149° 211° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

30° 330° LHA — Latitude CONTRARY to Declination — 30° 330° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°12'	-60'	150°	4°20'	-60'	150°	3°28'	-60'	150°	2°36'	-60'	150°	1°44'	-60'	150°	0°52'	-60'	150°	0°00'	-60'	150°	0
1	4°12'	-60'	150°	3°20'	-60'	150°	2°28'	-60'	150°	1°36'	-60'	150°	0°44'	-60'	150°	0°08'	+60'	30°	1°00'	+60'	32°	1
2	3°12'	-60'	150°	2°20'	-60'	150°	1°28'	-60'	150°	0°36'	-60'	150°	0°16'	+60'	30°	1°08'	+60'	30°	2°00'	+60'	25°	2
3	2°12'	-60'	150°	1°20'	-60'	150°	0°28'	-60'	150°	0°24'	+60'	30°	1°16'	+60'	30°	2°08'	+60'	30°	3°00'	+60'	37°	3
4	1°12'	-60'	150°	0°20'	-60'	150°	0°32'	+60'	30°	1°24'	+60'	30°	2°16'	+60'	30°	3°08'	+60'	30°	4°00'	+60'	25°	4
5	0°12'	-60'	150°	0°40'	+60'	30°	1°32'	+60'	30°	2°24'	+60'	30°	3°16'	+60'	30°	4°08'	+60'	30°	5°00'	+60'	25°	5
6	0°48'	+60'	30°	1°40'	+60'	30°	2°32'	+60'	30°	3°24'	+60'	30°	4°16'	+60'	30°	5°08'	+60'	30°	6°00'	+60'	24°	6
7	1°48'	+60'	30°	2°40'	+60'	30°	3°32'	+60'	30°	4°24'	+60'	30°	5°16'	+60'	30°	6°08'	+60'	30°	7°00'	+60'	0°	7
8	2°48'	+60'	30°	3°40'	+60'	30°	4°32'	+60'	30°	5°24'	+60'	30°	6°16'	+60'	30°	7°08'	+60'	30°	8°00'	+60'	0°	8
9	3°48'	+60'	30°	4°40'	+60'	30°	5°32'	+60'	30°	6°24'	+60'	30°	7°16'	+60'	30°	8°08'	+60'	30°	9°00'	+60'	63°	9
10	4°48'	+60'	30°	5°40'	+60'	30°	6°32'	+60'	30°	7°24'	+60'	30°	8°16'	+60'	30°	9°08'	+60'	30°	10°00'	+60'	23°	10
11	5°47'	+60'	30°	6°40'	+60'	30°	7°32'	+60'	30°	8°24'	+60'	30°	9°16'	+60'	30°	10°08'	+60'	30°	11°00'	+60'	23°	11
12	6°47'	+60'	30°	7°40'	+60'	30°	8°32'	+60'	30°	9°24'	+60'	30°	10°16'	+60'	30°	11°08'	+60'	30°	12°00'	+60'	62°	12
13	7°47'	+60'	29°	8°40'	+60'	30°	9°32'	+60'	30°	10°24'	+60'	30°	11°16'	+60'	30°	12°08'	+60'	30°	13°00'	+60'	62°	13
14	8°47'	+60'	29°	9°39'	+60'	29°	10°32'	+60'	30°	11°24'	+60'	30°	12°16'	+60'	30°	13°08'	+60'	30°	14°00'	+60'	0°	14
15	9°47'	+60'	29°	10°39'	+60'	29°	11°32'	+60'	30°	12°24'	+60'	30°	13°16'	+60'	30°	14°08'	+60'	30°	15°00'	+60'	20°	15
16	10°47'	+60'	29°	11°39'	+60'	29°	12°32'	+60'	29°	13°24'	+60'	30°	14°16'	+60'	30°	15°08'	+60'	30°	16°00'	+60'	19°	16
17	11°47'	+60'	29°	12°39'	+60'	29°	13°32'	+60'	29°	14°24'	+60'	30°	15°16'	+60'	30°	16°08'	+60'	30°	17°00'	+60'	19°	17
18	12°47'	+60'	29°	13°39'	+60'	29°	14°32'	+60'	29°	15°24'	+60'	30°	16°16'	+60'	30°	17°08'	+60'	30°	18°00'	+60'	18°	18
19	13°47'	+60'	29°	14°39'	+60'	29°	15°31'	+60'	29°	16°24'	+60'	30°	17°16'	+60'	30°	18°08'	+60'	30°	19°00'	+60'	17°	19
20	14°47'	+60'	29°	15°39'	+60'	29°	16°31'	+60'	29°	17°24'	+60'	29°	18°16'	+60'	30°	19°08'	+60'	30°	20°00'	+60'	15°	20
21	15°47'	+60'	29°	16°39'	+60'	29°	17°31'	+60'	29°	18°24'	+60'	29°	19°16'	+60'	30°	20°08'	+60'	30°	21°00'	+60'	14°	21
22	16°47'	+60'	29°	17°39'	+60'	29°	18°31'	+60'	29°	19°24'	+60'	29°	20°16'	+60'	30°	21°08'	+60'	30°	22°00'	+60'	12°	22
23	17°46'	+60'	29°	18°39'	+60'	29°	19°31'	+60'	29°	20°24'	+60'	29°	21°16'	+60'	30°	22°08'	+60'	30°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

150° 210° LHA — Latitude SAME as DECLINATION — 150° 210° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

29° 331° LHA — Latitude CONTRARY to Declination — 29° 331° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°15'	-60'	151°	4°22'	-60'	151°	3°30'	-60'	151°	2°37'	-60'	151°	1°45'	-60'	151°	0°52'	-60'	151°	0°00'	-60'	151°	0
1	4°15'	-60'	151°	3°22'	-60'	151°	2°30'	-60'	151°	1°37'	-60'	151°	0°45'	-60'	151°	0°08'	+60'	29°	1°00'	+60'	32°	1
2	3°15'	-60'	151°	2°22'	-60'	151°	1°30'	-60'	151°	0°37'	-60'	151°	0°15'	+60'	29°	1°08'	+60'	29°	2°00'	+60'	25°	2
3	2°15'	-60'	151°	1°22'	-60'	151°	0°30'	-60'	151°	0°23'	+60'	29°	1°15'	+60'	29°	2°08'	+60'	29°	3°00'	+60'	37°	3
4	1°15'	-60'	151°	0°23'	-60'	151°	0°30'	+60'	29°	1°23'	+60'	29°	2°15'	+60'	29°	3°08'	+60'	29°	4°00'	+60'	25°	4
5	0°15'	-60'	151°	0°37'	+60'	29°	1°30'	+60'	29°	2°22'	+60'	29°	3°15'	+60'	29°	4°08'	+60'	29°	5°00'	+60'	25°	5
6	0°45'	+60'	29°	1°37'	+60'	29°	2°30'	+60'	29°	3°22'	+60'	29°	4°15'	+60'	29°	5°08'	+60'	29°	6°00'	+60'	24°	6
7	1°45'	+60'	29°	2°37'	+60'	29°	3°30'	+60'	29°	4°22'	+60'	29°	5°15'	+60'	29°	6°08'	+60'	29°	7°00'	+60'	0°	7
8	2°45'	+60'	29°	3°37'	+60'	29°	4°30'	+60'	29°	5°22'	+60'	29°	6°15'	+60'	29°	7°08'	+60'	29°	8°00'	+60'	0°	8
9	3°45'	+60'	29°	4°37'	+60'	29°	5°30'	+60'	29°	6°22'	+60'	29°	7°15'	+60'	29°	8°08'	+60'	29°	9°00'	+60'	63°	9
10	4°44'	+60'	29°	5°37'	+60'	29°	6°30'	+60'	29°	7°22'	+60'	29°	8°15'	+60'	29°	9°08'	+60'	29°	10°00'	+60'	23°	10
11	5°44'	+60'	29°	6°37'	+60'	29°	7°30'	+60'	29°	8°22'	+60'	29°	9°15'	+60'	29°	10°07'	+60'	29°	11°00'	+60'	23°	11
12	6°44'	+60'	29°	7°37'	+60'	29°	8°30'	+60'	29°	9°22'	+60'	29°	10°15'	+60'	29°	11°07'	+60'	29°	12°00'	+60'	62°	12
13	7°44'	+60'	28°	8°37'	+60'	29°	9°30'	+60'	29°	10°22'	+60'	29°	11°15'	+60'	29°	12°07'	+60'	29°	13°00'	+60'	62°	13
14	8°44'	+60'	28°	9°37'	+60'	28°	10°30'	+60'	29°	11°22'	+60'	29°	12°15'	+60'	29°	13°07'	+60'	29°	14°00'	+60'	0°	14
15	9°44'	+60'	28°	10°37'	+60'	28°	11°30'	+60'	29°	12°22'	+60'	29°	13°15'	+60'	29°	14°07'	+60'	29°	15°00'	+60'	20°	15
16	10°44'	+60'	28°	11°37'	+60'	28°	12°30'	+60'	29°	13°22'	+60'	29°	14°15'	+60'	29°	15°07'	+60'	29°	16°00'	+60'	19°	16
17	11°44'	+60'	28°	12°37'	+60'	28°	13°30'	+60'	28°	14°22'	+60'	29°	15°15'	+60'	29°	16°07'	+60'	29°	17°00'	+60'	19°	17
18	12°44'	+60'	28°	13°37'	+60'	28°	14°30'	+60'	28°	15°22'	+60'	29°	16°15'	+60'	29°	17°07'	+60'	29°	18°00'	+60'	18°	18
19	13°44'	+60'	28°	14°37'	+60'	28°	15°29'	+60'	28°	16°22'	+60'	29°	17°15'	+60'	29°	18°07'	+60'	29°	19°00'	+60'	17°	19
20	14°44'	+60'	28°	15°37'	+60'	28°	16°29'	+60'	28°	17°22'	+60'	29°	18°15'	+60'	29°	19°07'	+60'	29°	20°00'	+60'	15°	20
21	15°44'	+60'	28°	16°37'	+60'	28°	17°29'	+60'	28°	18°22'	+60'	28°	19°15'	+60'	29°	20°07'	+60'	29°	21°00'	+60'	14°	21
22	16°44'	+60'	28°	17°36'	+60'	28°	18°29'	+60'	28°	19°22'	+60'	28°	20°15'	+60'	29°	21°07'	+60'	29°	22°00'	+60'	12°	22
23	17°43'	+60'	28°	18°36'	+60'	28°	19°29'	+60'	28°	20°22'	+60'	28°	21°15'	+60'	29°	22°07'	+60'	29°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

151° 209° LHA — Latitude SAME as DECLINATION — 151° 209° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

28° 332° LHA — Latitude CONTRARY to Declination — 28° 332° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°18'	-60'	152°	4°25'	-60'	152°	3°32'	-60'	152°	2°39'	-60'	152°	1°46'	-60'	152°	0°53'	-60'	152°	0°00'	-60'	152°	0
1	4°18'	-60'	152°	3°25'	-60'	152°	2°32'	-60'	152°	1°39'	-60'	152°	0°46'	-60'	152°	0°07'	+60'	28°	1°00'	+60'	25°	1
2	3°18'	-60'	152°	2°25'	-60'	152°	1°32'	-60'	152°	0°39'	-60'	152°	0°14'	+60'	28°	1°07'	+60'	28°	2°00'	+60'	25°	2
3	2°18'	-60'	152°	1°25'	-60'	152°	0°32'	-60'	152°	0°21'	+60'	28°	1°14'	+60'	28°	2°07'	+60'	28°	3°00'	+60'	37°	3
4	1°18'	-60'	152°	0°25'	-60'	152°	0°28'	+60'	28°	1°21'	+60'	28°	2°14'	+60'	28°	3°07'	+60'	28°	4°00'	+60'	25°	4
5	0°18'	-60'	152°	0°35'	+60'	28°	1°28'	+60'	28°	2°21'	+60'	28°	3°14'	+60'	28°	4°07'	+60'	28°	5°00'	+60'	25°	5
6	0°42'	+60'	28°	1°35'	+60'	28°	2°28'	+60'	28°	3°21'	+60'	28°	4°14'	+60'	28°	5°07'	+60'	28°	6°00'	+60'	24°	6
7	1°42'	+60'	28°	2°35'	+60'	28°	3°28'	+60'	28°	4°21'	+60'	28°	5°14'	+60'	28°	6°07'	+60'	28°	7°00'	+60'	0°	7
8	2°42'	+60'	28°	3°35'	+60'	28°	4°28'	+60'	28°	5°21'	+60'	28°	6°14'	+60'	28°	7°07'	+60'	28°	8°00'	+60'	0°	8
9	3°42'	+60'	28°	4°35'	+60'	28°	5°28'	+60'	28°	6°21'	+60'	28°	7°14'	+60'	28°	8°07'	+60'	28°	9°00'	+60'	63°	9
10	4°42'	+60'	28°	5°35'	+60'	28°	6°28'	+60'	28°	7°21'	+60'	28°	8°14'	+60'	28°	9°07'	+60'	28°	10°00'	+60'	23°	10
11	5°41'	+60'	28°	6°35'	+60'	28°	7°28'	+60'	28°	8°21'	+60'	28°	9°14'	+60'	28°	10°07'	+60'	28°	11°00'	+60'	23°	11
12	6°41'	+60'	28°	7°35'	+60'	28°	8°28'	+60'	28°	9°21'	+60'	28°	10°14'	+60'	28°	11°07'	+60'	28°	12°00'	+60'	62°	12
13	7°41'	+60'	27°	8°35'	+60'	28°	9°28'	+60'	28°	10°21'	+60'	28°	11°14'	+60'	28°	12°07'	+60'	28°	13°00'	+60'	62°	13
14	8°41'	+60'	27°	9°34'	+60'	28°	10°28'	+60'	28°	11°21'	+60'	28°	12°14'	+60'	28°	13°07'	+60'	28°	14°00'	+60'	0°	14
15	9°41'	+60'	27°	10°34'	+60'	27°	11°28'	+60'	28°	12°21'	+60'	28°	13°14'	+60'	28°	14°07'	+60'	28°	15°00'	+60'	20°	15
16	10°41'	+60'	27°	11°34'	+60'	27°	12°28'	+60'	28°	13°21'	+60'	28°	14°14'	+60'	28°	15°07'	+60'	28°	16°00'	+60'	19°	16
17	11°41'	+60'	27°	12°34'	+60'	27°	13°28'	+60'	27°	14°21'	+60'	28°	15°14'	+60'	28°	16°07'	+60'	28°	17°00'	+60'	19°	17
18	12°41'	+60'	27°	13°34'	+60'	27°	14°28'	+60'	27°	15°21'	+60'	28°	16°14'	+60'	28°	17°07'	+60'	28°	18°00'	+60'	18°	18
19	13°41'	+60'	27°	14°34'	+60'	27°	15°28'	+60'	27°	16°21'	+60'	28°	17°14'	+60'	28°	18°07'	+60'	28°	19°00'	+60'	17°	19
20	14°41'	+60'	27°	15°34'	+60'	27°	16°27'	+60'	27°	17°21'	+60'	28°	18°14'	+60'	28°	19°07'	+60'	28°	20°00'	+60'	15°	20
21	15°41'	+60'	27°	16°34'	+60'	27°	17°27'	+60'	27°	18°21'	+60'	28°	19°14'	+60'	28°	20°07'	+60'	28°	21°00'	+60'	14°	21
22	16°41'	+60'	27°	17°34'	+60'	27°	18°27'	+60'	27°	19°21'	+60'	27°	20°14'	+60'	28°	21°07'	+60'	28°	22°00'	+60'	12°	22
23	17°41'	+60'	27°	18°34'	+60'	27°	19°27'	+60'	27°	20°21'	+60'	27°	21°14'	+60'	28°	22°07'	+60'	28°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

152° 208° LHA — Latitude SAME as DECLINATION — 152° 208° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

27° 333° LHA — Latitude CONTRARY to Declination — 27° 333° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°21'	-60'	153°	4°27'	-60'	153°	3°34'	-60'	153°	2°40'	-60'	153°	1°47'	-60'	153°	0°53'	-60'	153°	0°00'	-60'	153°	0
1	4°21'	-60'	153°	3°27'	-60'	153°	2°34'	-60'	153°	1°40'	-60'	153°	0°47'	-60'	153°	0°07'	+60'	27°	1°00'	+60'	25°	1
2	3°21'	-60'	153°	2°27'	-60'	153°	1°34'	-60'	153°	0°40'	-60'	153°	0°13'	+60'	27°	1°07'	+60'	27°	2°00'	+60'	25°	2
3	2°21'	-60'	153°	1°27'	-60'	153°	0°34'	-60'	153°	0°20'	+60'	27°	1°13'	+60'	27°	2°07'	+60'	27°	3°00'	+60'	37°	3
4	1°21'	-60'	153°	0°27'	-60'	153°	0°26'	+60'	27°	1°20'	+60'	27°	2°13'	+60'	27°	3°07'	+60'	27°	4°00'	+60'	25°	4
5	0°21'	-60'	153°	0°33'	+60'	27°	1°26'	+60'	27°	2°20'	+60'	27°	3°13'	+60'	27°	4°07'	+60'	27°	5°00'	+60'	25°	5
6	0°39'	+60'	27°	1°32'	+60'	27°	2°26'	+60'	27°	3°20'	+60'	27°	4°13'	+60'	27°	5°07'	+60'	27°	6°00'	+60'	24°	6
7	1°39'	+60'	27°	2°32'	+60'	27°	3°26'	+60'	27°	4°20'	+60'	27°	5°13'	+60'	27°	6°07'	+60'	27°	7°00'	+60'	0°	7
8	2°39'	+60'	27°	3°32'	+60'	27°	4°26'	+60'	27°	5°19'	+60'	27°	6°13'	+60'	27°	7°07'	+60'	27°	8°00'	+60'	0°	8
9	3°39'	+60'	27°	4°32'	+60'	27°	5°26'	+60'	27°	6°19'	+60'	27°	7°13'	+60'	27°	8°07'	+60'	27°	9°00'	+60'	63°	9
10	4°39'	+60'	27°	5°32'	+60'	27°	6°26'	+60'	27°	7°19'	+60'	27°	8°13'	+60'	27°	9°07'	+60'	27°	10°00'	+60'	23°	10
11	5°39'	+60'	27°	6°32'	+60'	27°	7°26'	+60'	27°	8°19'	+60'	27°	9°13'	+60'	27°	10°07'	+60'	27°	11°00'	+60'	23°	11
12	6°39'	+60'	27°	7°32'	+60'	27°	8°26'	+60'	27°	9°19'	+60'	27°	10°13'	+60'	27°	11°07'	+60'	27°	12°00'	+60'	62°	12
13	7°38'	+60'	27°	8°32'	+60'	27°	9°26'	+60'	27°	10°19'	+60'	27°	11°13'	+60'	27°	12°07'	+60'	27°	13°00'	+60'	62°	13
14	8°38'	+60'	26°	9°32'	+60'	27°	10°26'	+60'	27°	11°19'	+60'	27°	12°13'	+60'	27°	13°07'	+60'	27°	14°00'	+60'	0°	14
15	9°38'	+60'	26°	10°32'	+60'	26°	11°26'	+60'	27°	12°19'	+60'	27°	13°13'	+60'	27°	14°07'	+60'	27°	15°00'	+60'	20°	15
16	10°38'	+60'	26°	11°32'	+60'	26°	12°26'	+60'	27°	13°19'	+60'	27°	14°13'	+60'	27°	15°07'	+60'	27°	16°00'	+60'	19°	16
17	11°38'	+60'	26°	12°32'	+60'	26°	13°26'	+60'	27°	14°19'	+60'	27°	15°13'	+60'	27°	16°07'	+60'	27°	17°00'	+60'	19°	17
18	12°38'	+60'	26°	13°32'	+60'	26°	14°26'	+60'	26°	15°19'	+60'	27°	16°13'	+60'	27°	17°07'	+60'	27°	18°00'	+60'	18°	18
19	13°38'	+60'	26°	14°32'	+60'	26°	15°26'	+60'	26°	16°19'	+60'	27°	17°13'	+60'	27°	18°07'	+60'	27°	19°00'	+60'	17°	19
20	14°38'	+60'	26°	15°32'	+60'	26°	16°26'	+60'	26°	17°19'	+60'	27°	18°13'	+60'	27°	19°07'	+60'	27°	20°00'	+60'	15°	20
21	15°38'	+60'	26°	16°32'	+60'	26°	17°26'	+60'	26°	18°19'	+60'	27°	19°13'	+60'	27°	20°06'	+60'	27°	21°00'	+60'	14°	21
22	16°38'	+60'	26°	17°32'	+60'	26°	18°26'	+60'	26°	19°19'	+60'	26°	20°13'	+60'	27°	21°06'	+60'	27°	22°00'	+60'	12°	22
23	17°38'	+60'	26°	18°32'	+60'	26°	19°25'	+60'	26°	20°19'	+60'	26°	21°13'	+60'	27°	22°06'	+60'	27°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

153° 207° LHA — Latitude SAME as DECLINATION — 153° 207° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

26° 334° LHA — Latitude CONTRARY to Declination — 26° 334° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°23'	-60'	154°	4°30'	-60'	154°	3°36'	-60'	154°	2°42'	-60'	154°	1°48'	-60'	154°	0°54'	-60'	154°	0°00'	-60'	154°	0
1	4°24'	-60'	154°	3°30'	-60'	154°	2°36'	-60'	154°	1°42'	-60'	154°	0°48'	-60'	154°	0°06'	+60'	26°	1°00'	+60'	25°	1
2	3°24'	-60'	154°	2°30'	-60'	154°	1°36'	-60'	154°	0°42'	-60'	154°	0°12'	+60'	26°	1°06'	+60'	26°	2°00'	+60'	25°	2
3	2°24'	-60'	154°	1°30'	-60'	154°	0°36'	-60'	154°	0°18'	+60'	26°	1°12'	+60'	26°	2°06'	+60'	26°	3°00'	+60'	37°	3
4	1°24'	-60'	154°	0°30'	-60'	154°	0°24'	+60'	26°	1°18'	+60'	26°	2°12'	+60'	26°	3°06'	+60'	26°	4°00'	+60'	25°	4
5	0°24'	-60'	154°	0°30'	+60'	26°	1°24'	+60'	26°	2°18'	+60'	26°	3°12'	+60'	26°	4°06'	+60'	26°	5°00'	+60'	25°	5
6	0°36'	+60'	26°	1°30'	+60'	26°	2°24'	+60'	26°	3°18'	+60'	26°	4°12'	+60'	26°	5°06'	+60'	26°	6°00'	+60'	24°	6
7	1°36'	+60'	26°	2°30'	+60'	26°	3°24'	+60'	26°	4°18'	+60'	26°	5°12'	+60'	26°	6°06'	+60'	26°	7°00'	+60'	0°	7
8	2°36'	+60'	26°	3°30'	+60'	26°	4°24'	+60'	26°	5°18'	+60'	26°	6°12'	+60'	26°	7°06'	+60'	26°	8°00'	+60'	0°	8
9	3°36'	+60'	26°	4°30'	+60'	26°	5°24'	+60'	26°	6°18'	+60'	26°	7°12'	+60'	26°	8°06'	+60'	26°	9°00'	+60'	63°	9
10	4°36'	+60'	26°	5°30'	+60'	26°	6°24'	+60'	26°	7°18'	+60'	26°	8°12'	+60'	26°	9°06'	+60'	26°	10°00'	+60'	23°	10
11	5°36'	+60'	26°	6°30'	+60'	26°	7°24'	+60'	26°	8°18'	+60'	26°	9°12'	+60'	26°	10°06'	+60'	26°	11°00'	+60'	23°	11
12	6°36'	+60'	26°	7°30'	+60'	26°	8°24'	+60'	26°	9°18'	+60'	26°	10°12'	+60'	26°	11°06'	+60'	26°	12°00'	+60'	62°	12
13	7°36'	+60'	26°	8°30'	+60'	26°	9°24'	+60'	26°	10°18'	+60'	26°	11°12'	+60'	26°	12°06'	+60'	26°	13°00'	+60'	62°	13
14	8°36'	+60'	25°	9°30'	+60'	26°	10°24'	+60'	26°	11°18'	+60'	26°	12°12'	+60'	26°	13°06'	+60'	26°	14°00'	+60'	0°	14
15	9°36'	+60'	25°	10°30'	+60'	26°	11°24'	+60'	26°	12°18'	+60'	26°	13°12'	+60'	26°	14°06'	+60'	26°	15°00'	+60'	20°	15
16	10°36'	+60'	25°	11°30'	+60'	25°	12°24'	+60'	26°	13°18'	+60'	26°	14°12'	+60'	26°	15°06'	+60'	26°	16°00'	+60'	19°	16
17	11°35'	+60'	25°	12°30'	+60'	25°	13°24'	+60'	26°	14°18'	+60'	26°	15°12'	+60'	26°	16°06'	+60'	26°	17°00'	+60'	19°	17
18	12°35'	+60'	25°	13°30'	+60'	25°	14°24'	+60'	25°	15°18'	+60'	26°	16°12'	+60'	26°	17°06'	+60'	26°	18°00'	+60'	18°	18
19	13°35'	+60'	25°	14°30'	+60'	25°	15°24'	+60'	25°	16°18'	+60'	26°	17°12'	+60'	26°	18°06'	+60'	26°	19°00'	+60'	17°	19
20	14°35'	+60'	25°	15°30'	+60'	25°	16°24'	+60'	25°	17°18'	+60'	26°	18°12'	+60'	26°	19°06'	+60'	26°	20°00'	+60'	15°	20
21	15°35'	+60'	25°	16°29'	+60'	25°	17°24'	+60'	25°	18°18'	+60'	26°	19°12'	+60'	26°	20°06'	+60'	26°	21°00'	+60'	14°	21
22	16°35'	+60'	25°	17°29'	+60'	25°	18°24'	+60'	25°	19°18'	+60'	26°	20°12'	+60'	26°	21°06'	+60'	26°	22°00'	+60'	12°	22
23	17°35'	+60'	25°	18°29'	+60'	25°	19°24'	+60'	25°	20°18'	+60'	25°	21°12'	+60'	26°	22°06'	+60'	26°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

154° 206° LHA — Latitude SAME as DECLINATION — 154° 206° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

25° 335° LHA — Latitude CONTRARY to Declination — 25° 335° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°26'	-60'	155°	4°32'	-60'	155°	3°37'	-60'	155°	2°43'	-60'	155°	1°49'	-60'	155°	0°54'	-60'	155°	0°00'	-60'	155°	0
1	4°26'	-60'	155°	3°32'	-60'	155°	2°38'	-60'	155°	1°43'	-60'	155°	0°49'	-60'	155°	0°06'	+60'	25°	1°00'	+60'	25°	1
2	3°26'	-60'	155°	2°32'	-60'	155°	1°38'	-60'	155°	0°43'	-60'	155°	0°11'	+60'	25°	1°06'	+60'	25°	2°00'	+60'	25°	2
3	2°26'	-60'	155°	1°32'	-60'	155°	0°38'	-60'	155°	0°17'	+60'	25°	1°11'	+60'	25°	2°06'	+60'	25°	3°00'	+60'	37°	3
4	1°26'	-60'	155°	0°32'	-60'	155°	0°22'	+60'	25°	1°17'	+60'	25°	2°11'	+60'	25°	3°06'	+60'	25°	4°00'	+60'	25°	4
5	0°26'	-60'	155°	0°28'	+60'	25°	1°22'	+60'	25°	2°17'	+60'	25°	3°11'	+60'	25°	4°06'	+60'	25°	5°00'	+60'	25°	5
6	0°33'	+60'	25°	1°28'	+60'	25°	2°22'	+60'	25°	3°17'	+60'	25°	4°11'	+60'	25°	5°06'	+60'	25°	6°00'	+60'	24°	6
7	1°33'	+60'	25°	2°28'	+60'	25°	3°22'	+60'	25°	4°17'	+60'	25°	5°11'	+60'	25°	6°06'	+60'	25°	7°00'	+60'	0°	7
8	2°33'	+60'	25°	3°28'	+60'	25°	4°22'	+60'	25°	5°17'	+60'	25°	6°11'	+60'	25°	7°06'	+60'	25°	8°00'	+60'	0°	8
9	3°33'	+60'	25°	4°28'	+60'	25°	5°22'	+60'	25°	6°17'	+60'	25°	7°11'	+60'	25°	8°06'	+60'	25°	9°00'	+60'	63°	9
10	4°33'	+60'	25°	5°28'	+60'	25°	6°22'	+60'	25°	7°17'	+60'	25°	8°11'	+60'	25°	9°06'	+60'	25°	10°00'	+60'	23°	10
11	5°33'	+60'	25°	6°28'	+60'	25°	7°22'	+60'	25°	8°17'	+60'	25°	9°11'	+60'	25°	10°06'	+60'	25°	11°00'	+60'	23°	11
12	6°33'	+60'	25°	7°28'	+60'	25°	8°22'	+60'	25°	9°17'	+60'	25°	10°11'	+60'	25°	11°06'	+60'	25°	12°00'	+60'	62°	12
13	7°33'	+60'	25°	8°28'	+60'	25°	9°22'	+60'	25°	10°17'	+60'	25°	11°11'	+60'	25°	12°06'	+60'	25°	13°00'	+60'	62°	13
14	8°33'	+60'	24°	9°28'	+60'	25°	10°22'	+60'	25°	11°17'	+60'	25°	12°11'	+60'	25°	13°06'	+60'	25°	14°00'	+60'	0°	14
15	9°33'	+60'	24°	10°28'	+60'	25°	11°22'	+60'	25°	12°17'	+60'	25°	13°11'	+60'	25°	14°06'	+60'	25°	15°00'	+60'	20°	15
16	10°33'	+60'	24°	11°28'	+60'	24°	12°22'	+60'	25°	13°17'	+60'	25°	14°11'	+60'	25°	15°06'	+60'	25°	16°00'	+60'	19°	16
17	11°33'	+60'	24°	12°27'	+60'	24°	13°22'	+60'	25°	14°17'	+60'	25°	15°11'	+60'	25°	16°06'	+60'	25°	17°00'	+60'	19°	17
18	12°33'	+60'	24°	13°27'	+60'	24°	14°22'	+60'	25°	15°17'	+60'	25°	16°11'	+60'	25°	17°06'	+60'	25°	18°00'	+60'	18°	18
19	13°33'	+60'	24°	14°27'	+60'	24°	15°22'	+60'	24°	16°17'	+60'	25°	17°11'	+60'	25°	18°06'	+60'	25°	19°00'	+60'	17°	19
20	14°33'	+60'	24°	15°27'	+60'	24°	16°22'	+60'	24°	17°17'	+60'	25°	18°11'	+60'	25°	19°06'	+60'	25°	20°00'	+60'	15°	20
21	15°33'	+60'	24°	16°27'	+60'	24°	17°22'	+60'	24°	18°17'	+60'	25°	19°11'	+60'	25°	20°06'	+60'	25°	21°00'	+60'	14°	21
22	16°33'	+60'	24°	17°27'	+60'	24°	18°22'	+60'	24°	19°17'	+60'	25°	20°11'	+60'	25°	21°06'	+60'	25°	22°00'	+60'	12°	22
23	17°32'	+60'	24°	18°27'	+60'	24°	19°22'	+60'	24°	20°17'	+60'	25°	21°11'	+60'	25°	22°06'	+60'	25°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

155° 205° LHA — Latitude SAME as DECLINATION — 155° 205° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

24° 336° LHA — Latitude CONTRARY to Declination — 24° 336° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°29'	-60'	156°	4°34'	-60'	156°	3°39'	-60'	156°	2°44'	-60'	156°	1°50'	-60'	156°	0°55'	-60'	156°	0°00'	-60'	156°	0
1	4°29'	-60'	156°	3°34'	-60'	156°	2°39'	-60'	156°	1°44'	-60'	156°	0°50'	-60'	156°	0°05'	+60'	24°	1°00'	+60'	25°	1
2	3°29'	-60'	156°	2°34'	-60'	156°	1°39'	-60'	156°	0°44'	-60'	156°	0°10'	+60'	24°	1°05'	+60'	24°	2°00'	+60'	25°	2
3	2°29'	-60'	156°	1°34'	-60'	156°	0°39'	-60'	156°	0°16'	+60'	24°	1°10'	+60'	24°	2°05'	+60'	24°	3°00'	+60'	37°	3
4	1°29'	-60'	156°	0°34'	-60'	156°	0°21'	+60'	24°	1°16'	+60'	24°	2°10'	+60'	24°	3°05'	+60'	24°	4°00'	+60'	25°	4
5	0°29'	-60'	156°	0°26'	+60'	24°	1°21'	+60'	24°	2°16'	+60'	24°	3°10'	+60'	24°	4°05'	+60'	24°	5°00'	+60'	25°	5
6	0°31'	+60'	24°	1°26'	+60'	24°	2°21'	+60'	24°	3°15'	+60'	24°	4°10'	+60'	24°	5°05'	+60'	24°	6°00'	+60'	24°	6
7	1°31'	+60'	24°	2°26'	+60'	24°	3°21'	+60'	24°	4°15'	+60'	24°	5°10'	+60'	24°	6°05'	+60'	24°	7°00'	+60'	0°	7
8	2°31'	+60'	24°	3°26'	+60'	24°	4°21'	+60'	24°	5°15'	+60'	24°	6°10'	+60'	24°	7°05'	+60'	24°	8°00'	+60'	0°	8
9	3°31'	+60'	24°	4°26'	+60'	24°	5°21'	+60'	24°	6°15'	+60'	24°	7°10'	+60'	24°	8°05'	+60'	24°	9°00'	+60'	63°	9
10	4°31'	+60'	24°	5°26'	+60'	24°	6°21'	+60'	24°	7°15'	+60'	24°	8°10'	+60'	24°	9°05'	+60'	24°	10°00'	+60'	23°	10
11	5°31'	+60'	24°	6°26'	+60'	24°	7°21'	+60'	24°	8°15'	+60'	24°	9°10'	+60'	24°	10°05'	+60'	24°	11°00'	+60'	23°	11
12	6°31'	+60'	24°	7°26'	+60'	24°	8°20'	+60'	24°	9°15'	+60'	24°	10°10'	+60'	24°	11°05'	+60'	24°	12°00'	+60'	62°	12
13	7°31'	+60'	24°	8°26'	+60'	24°	9°20'	+60'	24°	10°15'	+60'	24°	11°10'	+60'	24°	12°05'	+60'	24°	13°00'	+60'	62°	13
14	8°30'	+60'	24°	9°25'	+60'	24°	10°20'	+60'	24°	11°15'	+60'	24°	12°10'	+60'	24°	13°05'	+60'	24°	14°00'	+60'	0°	14
15	9°30'	+60'	23°	10°25'	+60'	24°	11°20'	+60'	24°	12°15'	+60'	24°	13°10'	+60'	24°	14°05'	+60'	24°	15°00'	+60'	20°	15
16	10°30'	+60'	23°	11°25'	+60'	24°	12°20'	+60'	24°	13°15'	+60'	24°	14°10'	+60'	24°	15°05'	+60'	24°	16°00'	+60'	19°	16
17	11°30'	+60'	23°	12°25'	+60'	23°	13°20'	+60'	24°	14°15'	+60'	24°	15°10'	+60'	24°	16°05'	+60'	24°	17°00'	+60'	19°	17
18	12°30'	+60'	23°	13°25'	+60'	23°	14°20'	+60'	24°	15°15'	+60'	24°	16°10'	+60'	24°	17°05'	+60'	24°	18°00'	+60'	18°	18
19	13°30'	+60'	23°	14°25'	+60'	23°	15°20'	+60'	24°	16°15'	+60'	24°	17°10'	+60'	24°	18°05'	+60'	24°	19°00'	+60'	17°	19
20	14°30'	+60'	23°	15°25'	+60'	23°	16°20'	+60'	23°	17°15'	+60'	24°	18°10'	+60'	24°	19°05'	+60'	24°	20°00'	+60'	15°	20
21	15°30'	+60'	23°	16°25'	+60'	23°	17°20'	+60'	23°	18°15'	+60'	24°	19°10'	+60'	24°	20°05'	+60'	24°	21°00'	+60'	14°	21
22	16°30'	+60'	23°	17°25'	+60'	23°	18°20'	+60'	23°	19°15'	+60'	24°	20°10'	+60'	24°	21°05'	+60'	24°	22°00'	+60'	12°	22
23	17°30'	+60'	23°	18°25'	+60'	23°	19°20'	+60'	23°	20°15'	+60'	24°	21°10'	+60'	24°	22°05'	+60'	24°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

156° 204° LHA — Latitude SAME as DECLINATION — 156° 204° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

23° 337° LHA — Latitude CONTRARY to Declination — 23° 337° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°31'	-60'	157°	4°36'	-60'	157°	3°41'	-60'	157°	2°46'	-60'	157°	1°50'	-60'	157°	0°55'	-60'	157°	0°00'	-60'	157°	0
1	4°31'	-60'	157°	3°36'	-60'	157°	2°41'	-60'	157°	1°46'	-60'	157°	0°50'	-60'	157°	0°05'	+60'	23°	1°00'	+60'	25°	1
2	3°31'	-60'	157°	2°36'	-60'	157°	1°41'	-60'	157°	0°46'	-60'	157°	0°10'	+60'	23°	1°05'	+60'	23°	2°00'	+60'	25°	2
3	2°31'	-60'	157°	1°36'	-60'	157°	0°41'	-60'	157°	0°14'	+60'	23°	1°10'	+60'	23°	2°05'	+60'	23°	3°00'	+60'	37°	3
4	1°31'	-60'	157°	0°36'	-60'	157°	0°19'	+60'	23°	1°14'	+60'	23°	2°10'	+60'	23°	3°05'	+60'	23°	4°00'	+60'	25°	4
5	0°32'	-60'	157°	0°24'	+60'	23°	1°19'	+60'	23°	2°14'	+60'	23°	3°10'	+60'	23°	4°05'	+60'	23°	5°00'	+60'	25°	5
6	0°28'	+60'	23°	1°24'	+60'	23°	2°19'	+60'	23°	3°14'	+60'	23°	4°10'	+60'	23°	5°05'	+60'	23°	6°00'	+60'	24°	6
7	1°28'	+60'	23°	2°24'	+60'	23°	3°19'	+60'	23°	4°14'	+60'	23°	5°10'	+60'	23°	6°05'	+60'	23°	7°00'	+60'	0°	7
8	2°28'	+60'	23°	3°24'	+60'	23°	4°19'	+60'	23°	5°14'	+60'	23°	6°09'	+60'	23°	7°05'	+60'	23°	8°00'	+60'	0°	8
9	3°28'	+60'	23°	4°24'	+60'	23°	5°19'	+60'	23°	6°14'	+60'	23°	7°09'	+60'	23°	8°05'	+60'	23°	9°00'	+60'	63°	9
10	4°28'	+60'	23°	5°24'	+60'	23°	6°19'	+60'	23°	7°14'	+60'	23°	8°09'	+60'	23°	9°05'	+60'	23°	10°00'	+60'	23°	10
11	5°28'	+60'	23°	6°24'	+60'	23°	7°19'	+60'	23°	8°14'	+60'	23°	9°09'	+60'	23°	10°05'	+60'	23°	11°00'	+60'	23°	11
12	6°28'	+60'	23°	7°23'	+60'	23°	8°19'	+60'	23°	9°14'	+60'	23°	10°09'	+60'	23°	11°05'	+60'	23°	12°00'	+60'	62°	12
13	7°28'	+60'	23°	8°23'	+60'	23°	9°19'	+60'	23°	10°14'	+60'	23°	11°09'	+60'	23°	12°05'	+60'	23°	13°00'	+60'	62°	13
14	8°28'	+60'	23°	9°23'	+60'	23°	10°19'	+60'	23°	11°14'	+60'	23°	12°09'	+60'	23°	13°05'	+60'	23°	14°00'	+60'	0°	14
15	9°28'	+60'	22°	10°23'	+60'	23°	11°19'	+60'	23°	12°14'	+60'	23°	13°09'	+60'	23°	14°05'	+60'	23°	15°00'	+60'	20°	15
16	10°28'	+60'	22°	11°23'	+60'	23°	12°19'	+60'	23°	13°14'	+60'	23°	14°09'	+60'	23°	15°05'	+60'	23°	16°00'	+60'	19°	16
17	11°28'	+60'	22°	12°23'	+60'	22°	13°19'	+60'	23°	14°14'	+60'	23°	15°09'	+60'	23°	16°05'	+60'	23°	17°00'	+60'	19°	17
18	12°28'	+60'	22°	13°23'	+60'	22°	14°19'	+60'	23°	15°14'	+60'	23°	16°09'	+60'	23°	17°05'	+60'	23°	18°00'	+60'	18°	18
19	13°28'	+60'	22°	14°23'	+60'	22°	15°19'	+60'	23°	16°14'	+60'	23°	17°09'	+60'	23°	18°05'	+60'	23°	19°00'	+60'	17°	19
20	14°28'	+60'	22°	15°23'	+60'	22°	16°19'	+60'	22°	17°14'	+60'	23°	18°09'	+60'	23°	19°05'	+60'	23°	20°00'	+60'	15°	20
21	15°28'	+60'	22°	16°23'	+60'	22°	17°19'	+60'	22°	18°14'	+60'	23°	19°09'	+60'	23°	20°05'	+60'	23°	21°00'	+60'	14°	21
22	16°28'	+60'	22°	17°23'	+60'	22°	18°19'	+60'	22°	19°14'	+60'	23°	20°09'	+60'	23°	21°05'	+60'	23°	22°00'	+60'	12°	22
23	17°28'	+60'	22°	18°23'	+60'	22°	19°19'	+60'	22°	20°14'	+60'	23°	21°09'	+60'	23°	22°05'	+60'	23°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

157° 203° LHA — Latitude SAME as DECLINATION — 157° 203° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

22° 338° LHA — Latitude CONTRARY to Declination — 22° 338° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°34'	-60'	158°	4°38'	-60'	158°	3°42'	-60'	158°	2°47'	-60'	158°	1°51'	-60'	158°	0°56'	-60'	158°	0°00'	-60'	158°	0
1	4°34'	-60'	158°	3°38'	-60'	158°	2°43'	-60'	158°	1°47'	-60'	158°	0°51'	-60'	158°	0°04'	+60'	22°	1°00'	+60'	25°	1
2	3°34'	-60'	158°	2°38'	-60'	158°	1°43'	-60'	158°	0°47'	-60'	158°	0°09'	+60'	22°	1°04'	+60'	22°	2°00'	+60'	25°	2
3	2°34'	-60'	158°	1°38'	-60'	158°	0°43'	-60'	158°	0°13'	+60'	22°	1°09'	+60'	22°	2°04'	+60'	22°	3°00'	+60'	37°	3
4	1°34'	-60'	158°	0°38'	-60'	158°	0°17'	+60'	22°	1°13'	+60'	22°	2°09'	+60'	22°	3°04'	+60'	22°	4°00'	+60'	25°	4
5	0°34'	-60'	158°	0°22'	+60'	22°	1°17'	+60'	22°	2°13'	+60'	22°	3°09'	+60'	22°	4°04'	+60'	22°	5°00'	+60'	25°	5
6	0°26'	+60'	22°	1°22'	+60'	22°	2°17'	+60'	22°	3°13'	+60'	22°	4°09'	+60'	22°	5°04'	+60'	22°	6°00'	+60'	24°	6
7	1°26'	+60'	22°	2°22'	+60'	22°	3°17'	+60'	22°	4°13'	+60'	22°	5°09'	+60'	22°	6°04'	+60'	22°	7°00'	+60'	0°	7
8	2°26'	+60'	22°	3°22'	+60'	22°	4°17'	+60'	22°	5°13'	+60'	22°	6°09'	+60'	22°	7°04'	+60'	22°	8°00'	+60'	0°	8
9	3°26'	+60'	22°	4°22'	+60'	22°	5°17'	+60'	22°	6°13'	+60'	22°	7°09'	+60'	22°	8°04'	+60'	22°	9°00'	+60'	63°	9
10	4°26'	+60'	22°	5°22'	+60'	22°	6°17'	+60'	22°	7°13'	+60'	22°	8°09'	+60'	22°	9°04'	+60'	22°	10°00'	+60'	23°	10
11	5°26'	+60'	22°	6°22'	+60'	22°	7°17'	+60'	22°	8°13'	+60'	22°	9°09'	+60'	22°	10°04'	+60'	22°	11°00'	+60'	23°	11
12	6°26'	+60'	22°	7°22'	+60'	22°	8°17'	+60'	22°	9°13'	+60'	22°	10°09'	+60'	22°	11°04'	+60'	22°	12°00'	+60'	62°	12
13	7°26'	+60'	22°	8°21'	+60'	22°	9°17'	+60'	22°	10°13'	+60'	22°	11°09'	+60'	22°	12°04'	+60'	22°	13°00'	+60'	62°	13
14	8°26'	+60'	22°	9°21'	+60'	22°	10°17'	+60'	22°	11°13'	+60'	22°	12°09'	+60'	22°	13°04'	+60'	22°	14°00'	+60'	0°	14
15	9°26'	+60'	22°	10°21'	+60'	22°	11°17'	+60'	22°	12°13'	+60'	22°	13°09'	+60'	22°	14°04'	+60'	22°	15°00'	+60'	20°	15
16	10°26'	+60'	21°	11°21'	+60'	22°	12°17'	+60'	22°	13°13'	+60'	22°	14°09'	+60'	22°	15°04'	+60'	22°	16°00'	+60'	19°	16
17	11°26'	+60'	21°	12°21'	+60'	22°	13°17'	+60'	22°	14°13'	+60'	22°	15°09'	+60'	22°	16°04'	+60'	22°	17°00'	+60'	19°	17
18	12°25'	+60'	21°	13°21'	+60'	21°	14°17'	+60'	22°	15°13'	+60'	22°	16°09'	+60'	22°	17°04'	+60'	22°	18°00'	+60'	18°	18
19	13°25'	+60'	21°	14°21'	+60'	21°	15°17'	+60'	22°	16°13'	+60'	22°	17°09'	+60'	22°	18°04'	+60'	22°	19°00'	+60'	17°	19
20	14°25'	+60'	21°	15°21'	+60'	21°	16°17'	+60'	22°	17°13'	+60'	22°	18°09'	+60'	22°	19°04'	+60'	22°	20°00'	+60'	15°	20
21	15°25'	+60'	21°	16°21'	+60'	21°	17°17'	+60'	21°	18°13'	+60'	22°	19°09'	+60'	22°	20°04'	+60'	22°	21°00'	+60'	14°	21
22	16°25'	+60'	21°	17°21'	+60'	21°	18°17'	+60'	21°	19°13'	+60'	22°	20°09'	+60'	22°	21°04'	+60'	22°	22°00'	+60'	12°	22
23	17°25'	+60'	21°	18°21'	+60'	21°	19°17'	+60'	21°	20°13'	+60'	22°	21°09'	+60'	22°	22°04'	+60'	22°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

158° 202° LHA — Latitude SAME as DECLINATION — 158° 202° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

21° 339° LHA — Latitude CONTRARY to Declination — 21° 339° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°36'	-60'	159°	4°40'	-60'	159°	3°44'	-60'	159°	2°48'	-60'	159°	1°52'	-60'	159°	0°56'	-60'	159°	0°00'	-60'	159°	0
1	4°36'	-60'	159°	3°40'	-60'	159°	2°44'	-60'	159°	1°48'	-60'	159°	0°52'	-60'	159°	0°04'	+60'	21°	1°00'	+60'	25°	1
2	3°36'	-60'	159°	2°40'	-60'	159°	1°44'	-60'	159°	0°48'	-60'	159°	0°08'	+60'	21°	1°04'	+60'	21°	2°00'	+60'	25°	2
3	2°36'	-60'	159°	1°40'	-60'	159°	0°44'	-60'	159°	0°12'	+60'	21°	1°08'	+60'	21°	2°04'	+60'	21°	3°00'	+60'	37°	3
4	1°36'	-60'	159°	0°40'	-60'	159°	0°16'	+60'	21°	1°12'	+60'	21°	2°08'	+60'	21°	3°04'	+60'	21°	4°00'	+60'	25°	4
5	0°36'	-60'	159°	0°20'	+60'	21°	1°16'	+60'	21°	2°12'	+60'	21°	3°08'	+60'	21°	4°04'	+60'	21°	5°00'	+60'	25°	5
6	0°24'	+60'	21°	1°20'	+60'	21°	2°16'	+60'	21°	3°12'	+60'	21°	4°08'	+60'	21°	5°04'	+60'	21°	6°00'	+60'	24°	6
7	1°24'	+60'	21°	2°20'	+60'	21°	3°16'	+60'	21°	4°12'	+60'	21°	5°08'	+60'	21°	6°04'	+60'	21°	7°00'	+60'	0°	7
8	2°24'	+60'	21°	3°20'	+60'	21°	4°16'	+60'	21°	5°12'	+60'	21°	6°08'	+60'	21°	7°04'	+60'	21°	8°00'	+60'	0°	8
9	3°24'	+60'	21°	4°20'	+60'	21°	5°16'	+60'	21°	6°12'	+60'	21°	7°08'	+60'	21°	8°04'	+60'	21°	9°00'	+60'	63°	9
10	4°24'	+60'	21°	5°20'	+60'	21°	6°16'	+60'	21°	7°12'	+60'	21°	8°08'	+60'	21°	9°04'	+60'	21°	10°00'	+60'	23°	10
11	5°24'	+60'	21°	6°20'	+60'	21°	7°16'	+60'	21°	8°12'	+60'	21°	9°08'	+60'	21°	10°04'	+60'	21°	11°00'	+60'	23°	11
12	6°23'	+60'	21°	7°20'	+60'	21°	8°16'	+60'	21°	9°12'	+60'	21°	10°08'	+60'	21°	11°04'	+60'	21°	12°00'	+60'	62°	12
13	7°23'	+60'	21°	8°20'	+60'	21°	9°16'	+60'	21°	10°12'	+60'	21°	11°08'	+60'	21°	12°04'	+60'	21°	13°00'	+60'	62°	13
14	8°23'	+60'	21°	9°20'	+60'	21°	10°16'	+60'	21°	11°12'	+60'	21°	12°08'	+60'	21°	13°04'	+60'	21°	14°00'	+60'	0°	14
15	9°23'	+60'	21°	10°20'	+60'	21°	11°16'	+60'	21°	12°12'	+60'	21°	13°08'	+60'	21°	14°04'	+60'	21°	15°00'	+60'	20°	15
16	10°23'	+60'	21°	11°19'	+60'	21°	12°16'	+60'	21°	13°12'	+60'	21°	14°08'	+60'	21°	15°04'	+60'	21°	16°00'	+60'	19°	16
17	11°23'	+60'	20°	12°19'	+60'	21°	13°16'	+60'	21°	14°12'	+60'	21°	15°08'	+60'	21°	16°04'	+60'	21°	17°00'	+60'	19°	17
18	12°23'	+60'	20°	13°19'	+60'	21°	14°16'	+60'	21°	15°12'	+60'	21°	16°08'	+60'	21°	17°04'	+60'	21°	18°00'	+60'	18°	18
19	13°23'	+60'	20°	14°19'	+60'	20°	15°16'	+60'	21°	16°12'	+60'	21°	17°08'	+60'	21°	18°04'	+60'	21°	19°00'	+60'	17°	19
20	14°23'	+60'	20°	15°19'	+60'	20°	16°16'	+60'	21°	17°12'	+60'	21°	18°08'	+60'	21°	19°04'	+60'	21°	20°00'	+60'	15°	20
21	15°23'	+60'	20°	16°19'	+60'	20°	17°16'	+60'	21°	18°12'	+60'	21°	19°08'	+60'	21°	20°04'	+60'	21°	21°00'	+60'	14°	21
22	16°23'	+60'	20°	17°19'	+60'	20°	18°16'	+60'	20°	19°12'	+60'	21°	20°08'	+60'	21°	21°04'	+60'	21°	22°00'	+60'	12°	22
23	17°23'	+60'	20°	18°19'	+60'	20°	19°16'	+60'	20°	20°12'	+60'	21°	21°08'	+60'	21°	22°04'	+60'	21°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

159° 201° LHA — Latitude SAME as DECLINATION — 159° 201° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

20° 340° LHA — Latitude CONTRARY to Declination — 20° 340° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°38'	-60'	160°	4°42'	-60'	160°	3°46'	-60'	160°	2°49'	-60'	160°	1°53'	-60'	160°	0°56'	-60'	160°	0°00'	-60'	160°	0
1	4°38'	-60'	160°	3°42'	-60'	160°	2°46'	-60'	160°	1°49'	-60'	160°	0°53'	-60'	160°	0°04'	+60'	20°	1°00'	+60'	16°	1
2	3°38'	-60'	160°	2°42'	-60'	160°	1°46'	-60'	160°	0°49'	-60'	160°	0°07'	+60'	20°	1°04'	+60'	20°	2°00'	+60'	25°	2
3	2°38'	-60'	160°	1°42'	-60'	160°	0°46'	-60'	160°	0°11'	+60'	20°	1°07'	+60'	20°	2°04'	+60'	20°	3°00'	+60'	37°	3
4	1°38'	-60'	160°	0°42'	-60'	160°	0°14'	+60'	20°	1°11'	+60'	20°	2°07'	+60'	20°	3°04'	+60'	20°	4°00'	+60'	25°	4
5	0°38'	-60'	160°	0°18'	+60'	20°	1°14'	+60'	20°	2°11'	+60'	20°	3°07'	+60'	20°	4°04'	+60'	20°	5°00'	+60'	25°	5
6	0°22'	+60'	20°	1°18'	+60'	20°	2°14'	+60'	20°	3°11'	+60'	20°	4°07'	+60'	20°	5°04'	+60'	20°	6°00'	+60'	24°	6
7	1°22'	+60'	20°	2°18'	+60'	20°	3°14'	+60'	20°	4°11'	+60'	20°	5°07'	+60'	20°	6°04'	+60'	20°	7°00'	+60'	0°	7
8	2°21'	+60'	20°	3°18'	+60'	20°	4°14'	+60'	20°	5°11'	+60'	20°	6°07'	+60'	20°	7°04'	+60'	20°	8°00'	+60'	0°	8
9	3°21'	+60'	20°	4°18'	+60'	20°	5°14'	+60'	20°	6°11'	+60'	20°	7°07'	+60'	20°	8°04'	+60'	20°	9°00'	+60'	63°	9
10	4°21'	+60'	20°	5°18'	+60'	20°	6°14'	+60'	20°	7°11'	+60'	20°	8°07'	+60'	20°	9°04'	+60'	20°	10°00'	+60'	23°	10
11	5°21'	+60'	20°	6°18'	+60'	20°	7°14'	+60'	20°	8°11'	+60'	20°	9°07'	+60'	20°	10°04'	+60'	20°	11°00'	+60'	23°	11
12	6°21'	+60'	20°	7°18'	+60'	20°	8°14'	+60'	20°	9°11'	+60'	20°	10°07'	+60'	20°	11°04'	+60'	20°	12°00'	+60'	62°	12
13	7°21'	+60'	20°	8°18'	+60'	20°	9°14'	+60'	20°	10°11'	+60'	20°	11°07'	+60'	20°	12°04'	+60'	20°	13°00'	+60'	62°	13
14	8°21'	+60'	20°	9°18'	+60'	20°	10°14'	+60'	20°	11°11'	+60'	20°	12°07'	+60'	20°	13°04'	+60'	20°	14°00'	+60'	0°	14
15	9°21'	+60'	20°	10°18'	+60'	20°	11°14'	+60'	20°	12°11'	+60'	20°	13°07'	+60'	20°	14°04'	+60'	20°	15°00'	+60'	20°	15
16	10°21'	+60'	20°	11°18'	+60'	20°	12°14'	+60'	20°	13°11'	+60'	20°	14°07'	+60'	20°	15°04'	+60'	20°	16°00'	+60'	19°	16
17	11°21'	+60'	19°	12°18'	+60'	20°	13°14'	+60'	20°	14°11'	+60'	20°	15°07'	+60'	20°	16°04'	+60'	20°	17°00'	+60'	19°	17
18	12°21'	+60'	19°	13°18'	+60'	20°	14°14'	+60'	20°	15°11'	+60'	20°	16°07'	+60'	20°	17°04'	+60'	20°	18°00'	+60'	18°	18
19	13°21'	+60'	19°	14°18'	+60'	19°	15°14'	+60'	20°	16°11'	+60'	20°	17°07'	+60'	20°	18°04'	+60'	20°	19°00'	+60'	17°	19
20	14°21'	+60'	19°	15°18'	+60'	19°	16°14'	+60'	20°	17°11'	+60'	20°	18°07'	+60'	20°	19°04'	+60'	20°	20°00'	+60'	15°	20
21	15°21'	+60'	19°	16°18'	+60'	19°	17°14'	+60'	20°	18°11'	+60'	20°	19°07'	+60'	20°	20°04'	+60'	20°	21°00'	+60'	14°	21
22	16°21'	+60'	19°	17°18'	+60'	19°	18°14'	+60'	20°	19°11'	+60'	20°	20°07'	+60'	20°	21°04'	+60'	20°	22°00'	+60'	12°	22
23	17°21'	+60'	19°	18°18'	+60'	19°	19°14'	+60'	19°	20°11'	+60'	20°	21°07'	+60'	20°	22°04'	+60'	20°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

160° 200° LHA — Latitude SAME as DECLINATION — 160° 200° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

19° 341° LHA — Latitude CONTRARY to Declination — 19° 341° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°40'	-60'	161°	4°44'	-60'	161°	3°47'	-60'	161°	2°50'	-60'	161°	1°53'	-60'	161°	0°57'	-60'	161°	0°00'	-60'	161°	0
1	4°40'	-60'	161°	3°44'	-60'	161°	2°47'	-60'	161°	1°50'	-60'	161°	0°53'	-60'	161°	0°03'	+60'	19°	1°00'	+60'	16°	1
2	3°40'	-60'	161°	2°44'	-60'	161°	1°47'	-60'	161°	0°50'	-60'	161°	0°07'	+60'	19°	1°03'	+60'	19°	2°00'	+60'	25°	2
3	2°40'	-60'	161°	1°44'	-60'	161°	0°47'	-60'	161°	0°10'	+60'	19°	1°07'	+60'	19°	2°03'	+60'	19°	3°00'	+60'	37°	3
4	1°40'	-60'	161°	0°44'	-60'	161°	0°13'	+60'	19°	1°10'	+60'	19°	2°07'	+60'	19°	3°03'	+60'	19°	4°00'	+60'	25°	4
5	0°40'	-60'	161°	0°16'	+60'	19°	1°13'	+60'	19°	2°10'	+60'	19°	3°07'	+60'	19°	4°03'	+60'	19°	5°00'	+60'	25°	5
6	0°19'	+60'	19°	1°16'	+60'	19°	2°13'	+60'	19°	3°10'	+60'	19°	4°07'	+60'	19°	5°03'	+60'	19°	6°00'	+60'	24°	6
7	1°19'	+60'	19°	2°16'	+60'	19°	3°13'	+60'	19°	4°10'	+60'	19°	5°07'	+60'	19°	6°03'	+60'	19°	7°00'	+60'	0°	7
8	2°19'	+60'	19°	3°16'	+60'	19°	4°13'	+60'	19°	5°10'	+60'	19°	6°07'	+60'	19°	7°03'	+60'	19°	8°00'	+60'	0°	8
9	3°19'	+60'	19°	4°16'	+60'	19°	5°13'	+60'	19°	6°10'	+60'	19°	7°07'	+60'	19°	8°03'	+60'	19°	9°00'	+60'	63°	9
10	4°19'	+60'	19°	5°16'	+60'	19°	6°13'	+60'	19°	7°10'	+60'	19°	8°07'	+60'	19°	9°03'	+60'	19°	10°00'	+60'	23°	10
11	5°19'	+60'	19°	6°16'	+60'	19°	7°13'	+60'	19°	8°10'	+60'	19°	9°06'	+60'	19°	10°03'	+60'	19°	11°00'	+60'	23°	11
12	6°19'	+60'	19°	7°16'	+60'	19°	8°13'	+60'	19°	9°10'	+60'	19°	10°06'	+60'	19°	11°03'	+60'	19°	12°00'	+60'	62°	12
13	7°19'	+60'	19°	8°16'	+60'	19°	9°13'	+60'	19°	10°10'	+60'	19°	11°06'	+60'	19°	12°03'	+60'	19°	13°00'	+60'	62°	13
14	8°19'	+60'	19°	9°16'	+60'	19°	10°13'	+60'	19°	11°10'	+60'	19°	12°06'	+60'	19°	13°03'	+60'	19°	14°00'	+60'	0°	14
15	9°19'	+60'	19°	10°16'	+60'	19°	11°13'	+60'	19°	12°10'	+60'	19°	13°06'	+60'	19°	14°03'	+60'	19°	15°00'	+60'	20°	15
16	10°19'	+60'	19°	11°16'	+60'	19°	12°13'	+60'	19°	13°10'	+60'	19°	14°06'	+60'	19°	15°03'	+60'	19°	16°00'	+60'	19°	16
17	11°19'	+60'	19°	12°16'	+60'	19°	13°13'	+60'	19°	14°10'	+60'	19°	15°06'	+60'	19°	16°03'	+60'	19°	17°00'	+60'	19°	17
18	12°19'	+60'	18°	13°16'	+60'	19°	14°13'	+60'	19°	15°10'	+60'	19°	16°06'	+60'	19°	17°03'	+60'	19°	18°00'	+60'	18°	18
19	13°19'	+60'	18°	14°16'	+60'	19°	15°13'	+60'	19°	16°10'	+60'	19°	17°06'	+60'	19°	18°03'	+60'	19°	19°00'	+60'	17°	19
20	14°19'	+60'	18°	15°16'	+60'	18°	16°13'	+60'	19°	17°10'	+60'	19°	18°06'	+60'	19°	19°03'	+60'	19°	20°00'	+60'	15°	20
21	15°19'	+60'	18°	16°16'	+60'	18°	17°13'	+60'	19°	18°10'	+60'	19°	19°06'	+60'	19°	20°03'	+60'	19°	21°00'	+60'	14°	21
22	16°19'	+60'	18°	17°16'	+60'	18°	18°13'	+60'	19°	19°10'	+60'	19°	20°06'	+60'	19°	21°03'	+60'	19°	22°00'	+60'	12°	22
23	17°19'	+60'	18°	18°16'	+60'	18°	19°13'	+60'	19°	20°10'	+60'	19°	21°06'	+60'	19°	22°03'	+60'	19°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

161° 199° LHA — Latitude SAME as DECLINATION — 161° 199° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

18° 342° LHA — Latitude CONTRARY to Declination — 18° 342° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°42'	-60'	162°	4°45'	-60'	162°	3°48'	-60'	162°	2°51'	-60'	162°	1°54'	-60'	162°	0°57'	-60'	162°	0°00'	-60'	162°	0
1	4°42'	-60'	162°	3°45'	-60'	162°	2°48'	-60'	162°	1°51'	-60'	162°	0°54'	-60'	162°	0°03'	+60'	18°	1°00'	+60'	16°	1
2	3°42'	-60'	162°	2°45'	-60'	162°	1°48'	-60'	162°	0°51'	-60'	162°	0°06'	+60'	18°	1°03'	+60'	18°	2°00'	+60'	25°	2
3	2°42'	-60'	162°	1°45'	-60'	162°	0°48'	-60'	162°	0°09'	+60'	18°	1°06'	+60'	18°	2°03'	+60'	18°	3°00'	+60'	37°	3
4	1°42'	-60'	162°	0°45'	-60'	162°	0°12'	+60'	18°	1°09'	+60'	18°	2°06'	+60'	18°	3°03'	+60'	18°	4°00'	+60'	25°	4
5	0°42'	-60'	162°	0°15'	+60'	18°	1°12'	+60'	18°	2°09'	+60'	18°	3°06'	+60'	18°	4°03'	+60'	18°	5°00'	+60'	25°	5
6	0°17'	+60'	18°	1°15'	+60'	18°	2°12'	+60'	18°	3°09'	+60'	18°	4°06'	+60'	18°	5°03'	+60'	18°	6°00'	+60'	24°	6
7	1°17'	+60'	18°	2°15'	+60'	18°	3°12'	+60'	18°	4°09'	+60'	18°	5°06'	+60'	18°	6°03'	+60'	18°	7°00'	+60'	0°	7
8	2°17'	+60'	18°	3°15'	+60'	18°	4°12'	+60'	18°	5°09'	+60'	18°	6°06'	+60'	18°	7°03'	+60'	18°	8°00'	+60'	0°	8
9	3°17'	+60'	18°	4°15'	+60'	18°	5°12'	+60'	18°	6°09'	+60'	18°	7°06'	+60'	18°	8°03'	+60'	18°	9°00'	+60'	63°	9
10	4°17'	+60'	18°	5°14'	+60'	18°	6°12'	+60'	18°	7°09'	+60'	18°	8°06'	+60'	18°	9°03'	+60'	18°	10°00'	+60'	23°	10
11	5°17'	+60'	18°	6°14'	+60'	18°	7°12'	+60'	18°	8°09'	+60'	18°	9°06'	+60'	18°	10°03'	+60'	18°	11°00'	+60'	23°	11
12	6°17'	+60'	18°	7°14'	+60'	18°	8°12'	+60'	18°	9°09'	+60'	18°	10°06'	+60'	18°	11°03'	+60'	18°	12°00'	+60'	62°	12
13	7°17'	+60'	18°	8°14'	+60'	18°	9°12'	+60'	18°	10°09'	+60'	18°	11°06'	+60'	18°	12°03'	+60'	18°	13°00'	+60'	62°	13
14	8°17'	+60'	18°	9°14'	+60'	18°	10°12'	+60'	18°	11°09'	+60'	18°	12°06'	+60'	18°	13°03'	+60'	18°	14°00'	+60'	0°	14
15	9°17'	+60'	18°	10°14'	+60'	18°	11°12'	+60'	18°	12°09'	+60'	18°	13°06'	+60'	18°	14°03'	+60'	18°	15°00'	+60'	20°	15
16	10°17'	+60'	18°	11°14'	+60'	18°	12°12'	+60'	18°	13°09'	+60'	18°	14°06'	+60'	18°	15°03'	+60'	18°	16°00'	+60'	19°	16
17	11°17'	+60'	18°	12°14'	+60'	18°	13°12'	+60'	18°	14°09'	+60'	18°	15°06'	+60'	18°	16°03'	+60'	18°	17°00'	+60'	19°	17
18	12°17'	+60'	18°	13°14'	+60'	18°	14°12'	+60'	18°	15°09'	+60'	18°	16°06'	+60'	18°	17°03'	+60'	18°	18°00'	+60'	18°	18
19	13°17'	+60'	17°	14°14'	+60'	18°	15°11'	+60'	18°	16°09'	+60'	18°	17°06'	+60'	18°	18°03'	+60'	18°	19°00'	+60'	17°	19
20	14°17'	+60'	17°	15°14'	+60'	18°	16°11'	+60'	18°	17°09'	+60'	18°	18°06'	+60'	18°	19°03'	+60'	18°	20°00'	+60'	15°	20
21	15°17'	+60'	17°	16°14'	+60'	17°	17°11'	+60'	18°	18°09'	+60'	18°	19°06'	+60'	18°	20°03'	+60'	18°	21°00'	+60'	14°	21
22	16°17'	+60'	17°	17°14'	+60'	17°	18°11'	+60'	18°	19°09'	+60'	18°	20°06'	+60'	18°	21°03'	+60'	18°	22°00'	+60'	12°	22
23	17°17'	+60'	17°	18°14'	+60'	17°	19°11'	+60'	18°	20°09'	+60'	18°	21°06'	+60'	18°	22°03'	+60'	18°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

162° 198° LHA — Latitude SAME as DECLINATION — 162° 198° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

17° 343° LHA — Latitude CONTRARY to Declination — 17° 343° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°44'	-60'	163°	4°47'	-60'	163°	3°49'	-60'	163°	2°52'	-60'	163°	1°55'	-60'	163°	0°57'	-60'	163°	0°00'	-60'	163°	0
1	4°44'	-60'	163°	3°47'	-60'	163°	2°50'	-60'	163°	1°52'	-60'	163°	0°55'	-60'	163°	0°03'	+60'	17°	1°00'	+60'	16°	1
2	3°44'	-60'	163°	2°47'	-60'	163°	1°50'	-60'	163°	0°52'	-60'	163°	0°05'	+60'	17°	1°03'	+60'	17°	2°00'	+60'	25°	2
3	2°44'	-60'	163°	1°47'	-60'	163°	0°50'	-60'	163°	0°08'	+60'	17°	1°05'	+60'	17°	2°03'	+60'	17°	3°00'	+60'	37°	3
4	1°44'	-60'	163°	0°47'	-60'	163°	0°10'	+60'	17°	1°08'	+60'	17°	2°05'	+60'	17°	3°03'	+60'	17°	4°00'	+60'	25°	4
5	0°44'	-60'	163°	0°13'	+60'	17°	1°10'	+60'	17°	2°08'	+60'	17°	3°05'	+60'	17°	4°03'	+60'	17°	5°00'	+60'	25°	5
6	0°16'	+60'	17°	1°13'	+60'	17°	2°10'	+60'	17°	3°08'	+60'	17°	4°05'	+60'	17°	5°03'	+60'	17°	6°00'	+60'	24°	6
7	1°16'	+60'	17°	2°13'	+60'	17°	3°10'	+60'	17°	4°08'	+60'	17°	5°05'	+60'	17°	6°03'	+60'	17°	7°00'	+60'	0°	7
8	2°16'	+60'	17°	3°13'	+60'	17°	4°10'	+60'	17°	5°08'	+60'	17°	6°05'	+60'	17°	7°03'	+60'	17°	8°00'	+60'	0°	8
9	3°16'	+60'	17°	4°13'	+60'	17°	5°10'	+60'	17°	6°08'	+60'	17°	7°05'	+60'	17°	8°03'	+60'	17°	9°00'	+60'	63°	9
10	4°16'	+60'	17°	5°13'	+60'	17°	6°10'	+60'	17°	7°08'	+60'	17°	8°05'	+60'	17°	9°03'	+60'	17°	10°00'	+60'	23°	10
11	5°15'	+60'	17°	6°13'	+60'	17°	7°10'	+60'	17°	8°08'	+60'	17°	9°05'	+60'	17°	10°03'	+60'	17°	11°00'	+60'	23°	11
12	6°15'	+60'	17°	7°13'	+60'	17°	8°10'	+60'	17°	9°08'	+60'	17°	10°05'	+60'	17°	11°03'	+60'	17°	12°00'	+60'	62°	12
13	7°15'	+60'	17°	8°13'	+60'	17°	9°10'	+60'	17°	10°08'	+60'	17°	11°05'	+60'	17°	12°03'	+60'	17°	13°00'	+60'	62°	13
14	8°15'	+60'	17°	9°13'	+60'	17°	10°10'	+60'	17°	11°08'	+60'	17°	12°05'	+60'	17°	13°03'	+60'	17°	14°00'	+60'	0°	14
15	9°15'	+60'	17°	10°13'	+60'	17°	11°10'	+60'	17°	12°08'	+60'	17°	13°05'	+60'	17°	14°03'	+60'	17°	15°00'	+60'	20°	15
16	10°15'	+60'	17°	11°13'	+60'	17°	12°10'	+60'	17°	13°08'	+60'	17°	14°05'	+60'	17°	15°03'	+60'	17°	16°00'	+60'	19°	16
17	11°15'	+60'	17°	12°13'	+60'	17°	13°10'	+60'	17°	14°08'	+60'	17°	15°05'	+60'	17°	16°03'	+60'	17°	17°00'	+60'	19°	17
18	12°15'	+60'	17°	13°13'	+60'	17°	14°10'	+60'	17°	15°08'	+60'	17°	16°05'	+60'	17°	17°03'	+60'	17°	18°00'	+60'	18°	18
19	13°15'	+60'	16°	14°13'	+60'	17°	15°10'	+60'	17°	16°08'	+60'	17°	17°05'	+60'	17°	18°03'	+60'	17°	19°00'	+60'	17°	19
20	14°15'	+60'	16°	15°13'	+60'	17°	16°10'	+60'	17°	17°08'	+60'	17°	18°05'	+60'	17°	19°03'	+60'	17°	20°00'	+60'	15°	20
21	15°15'	+60'	16°	16°13'	+60'	17°	17°10'	+60'	17°	18°08'	+60'	17°	19°05'	+60'	17°	20°03'	+60'	17°	21°00'	+60'	14°	21
22	16°15'	+60'	16°	17°13'	+60'	16°	18°10'	+60'	17°	19°08'	+60'	17°	20°05'	+60'	17°	21°03'	+60'	17°	22°00'	+60'	12°	22
23	17°15'	+60'	16°	18°13'	+60'	16°	19°10'	+60'	17°	20°08'	+60'	17°	21°05'	+60'	17°	22°03'	+60'	17°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

163° 197° LHA — Latitude SAME as DECLINATION — 163° 197° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

16° 344° LHA — Latitude CONTRARY to Declination — 16° 344° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°46'	-60'	164°	4°48'	-60'	164°	3°51'	-60'	164°	2°53'	-60'	164°	1°55'	-60'	164°	0°58'	-60'	164°	0°00'	-60'	164°	0
1	4°46'	-60'	164°	3°48'	-60'	164°	2°51'	-60'	164°	1°53'	-60'	164°	0°55'	-60'	164°	0°02'	+60'	16°	1°00'	+60'	16°	1
2	3°46'	-60'	164°	2°48'	-60'	164°	1°51'	-60'	164°	0°53'	-60'	164°	0°05'	+60'	16°	1°02'	+60'	16°	2°00'	+60'	25°	2
3	2°46'	-60'	164°	1°48'	-60'	164°	0°51'	-60'	164°	0°07'	+60'	16°	1°05'	+60'	16°	2°02'	+60'	16°	3°00'	+60'	37°	3
4	1°46'	-60'	164°	0°48'	-60'	164°	0°09'	+60'	16°	1°07'	+60'	16°	2°05'	+60'	16°	3°02'	+60'	16°	4°00'	+60'	25°	4
5	0°46'	-60'	164°	0°12'	+60'	16°	1°09'	+60'	16°	2°07'	+60'	16°	3°05'	+60'	16°	4°02'	+60'	16°	5°00'	+60'	25°	5
6	0°14'	+60'	16°	1°12'	+60'	16°	2°09'	+60'	16°	3°07'	+60'	16°	4°05'	+60'	16°	5°02'	+60'	16°	6°00'	+60'	24°	6
7	1°14'	+60'	16°	2°12'	+60'	16°	3°09'	+60'	16°	4°07'	+60'	16°	5°05'	+60'	16°	6°02'	+60'	16°	7°00'	+60'	0°	7
8	2°14'	+60'	16°	3°12'	+60'	16°	4°09'	+60'	16°	5°07'	+60'	16°	6°05'	+60'	16°	7°02'	+60'	16°	8°00'	+60'	0°	8
9	3°14'	+60'	16°	4°11'	+60'	16°	5°09'	+60'	16°	6°07'	+60'	16°	7°05'	+60'	16°	8°02'	+60'	16°	9°00'	+60'	63°	9
10	4°14'	+60'	16°	5°11'	+60'	16°	6°09'	+60'	16°	7°07'	+60'	16°	8°05'	+60'	16°	9°02'	+60'	16°	10°00'	+60'	23°	10
11	5°14'	+60'	16°	6°11'	+60'	16°	7°09'	+60'	16°	8°07'	+60'	16°	9°05'	+60'	16°	10°02'	+60'	16°	11°00'	+60'	23°	11
12	6°14'	+60'	16°	7°11'	+60'	16°	8°09'	+60'	16°	9°07'	+60'	16°	10°05'	+60'	16°	11°02'	+60'	16°	12°00'	+60'	62°	12
13	7°14'	+60'	16°	8°11'	+60'	16°	9°09'	+60'	16°	10°07'	+60'	16°	11°05'	+60'	16°	12°02'	+60'	16°	13°00'	+60'	62°	13
14	8°14'	+60'	16°	9°11'	+60'	16°	10°09'	+60'	16°	11°07'	+60'	16°	12°05'	+60'	16°	13°02'	+60'	16°	14°00'	+60'	0°	14
15	9°14'	+60'	16°	10°11'	+60'	16°	11°09'	+60'	16°	12°07'	+60'	16°	13°05'	+60'	16°	14°02'	+60'	16°	15°00'	+60'	20°	15
16	10°14'	+60'	16°	11°11'	+60'	16°	12°09'	+60'	16°	13°07'	+60'	16°	14°05'	+60'	16°	15°02'	+60'	16°	16°00'	+60'	19°	16
17	11°14'	+60'	16°	12°11'	+60'	16°	13°09'	+60'	16°	14°07'	+60'	16°	15°05'	+60'	16°	16°02'	+60'	16°	17°00'	+60'	19°	17
18	12°14'	+60'	16°	13°11'	+60'	16°	14°09'	+60'	16°	15°07'	+60'	16°	16°05'	+60'	16°	17°02'	+60'	16°	18°00'	+60'	18°	18
19	13°14'	+60'	16°	14°11'	+60'	16°	15°09'	+60'	16°	16°07'	+60'	16°	17°05'	+60'	16°	18°02'	+60'	16°	19°00'	+60'	17°	19
20	14°13'	+60'	15°	15°11'	+60'	16°	16°09'	+60'	16°	17°07'	+60'	16°	18°05'	+60'	16°	19°02'	+60'	16°	20°00'	+60'	15°	20
21	15°13'	+60'	15°	16°11'	+60'	16°	17°09'	+60'	16°	18°07'	+60'	16°	19°05'	+60'	16°	20°02'	+60'	16°	21°00'	+60'	14°	21
22	16°13'	+60'	15°	17°11'	+60'	16°	18°09'	+60'	16°	19°07'	+60'	16°	20°05'	+60'	16°	21°02'	+60'	16°	22°00'	+60'	12°	22
23	17°13'	+60'	15°	18°11'	+60'	15°	19°09'	+60'	16°	20°07'	+60'	16°	21°05'	+60'	16°	22°02'	+60'	16°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

164° 196° LHA — Latitude SAME as DECLINATION — 164° 196° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

15° 345° LHA — Latitude CONTRARY to Declination — 15° 345° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°48'	-60'	165°	4°50'	-60'	165°	3°52'	-60'	165°	2°54'	-60'	165°	1°56'	-60'	165°	0°58'	-60'	165°	0°00'	-60'	165°	0
1	4°48'	-60'	165°	3°50'	-60'	165°	2°52'	-60'	165°	1°54'	-60'	165°	0°56'	-60'	165°	0°02'	+60'	15°	1°00'	+60'	16°	1
2	3°48'	-60'	165°	2°50'	-60'	165°	1°52'	-60'	165°	0°54'	-60'	165°	0°04'	+60'	15°	1°02'	+60'	15°	2°00'	+60'	0°	2
3	2°48'	-60'	165°	1°50'	-60'	165°	0°52'	-60'	165°	0°06'	+60'	15°	1°04'	+60'	15°	2°02'	+60'	15°	3°00'	+60'	25°	3
4	1°48'	-60'	165°	0°50'	-60'	165°	0°08'	+60'	15°	1°06'	+60'	15°	2°04'	+60'	15°	3°02'	+60'	15°	4°00'	+60'	25°	4
5	0°48'	-60'	165°	0°10'	+60'	15°	1°08'	+60'	15°	2°06'	+60'	15°	3°04'	+60'	15°	4°02'	+60'	15°	5°00'	+60'	25°	5
6	0°12'	+60'	15°	1°10'	+60'	15°	2°08'	+60'	15°	3°06'	+60'	15°	4°04'	+60'	15°	5°02'	+60'	15°	6°00'	+60'	24°	6
7	1°12'	+60'	15°	2°10'	+60'	15°	3°08'	+60'	15°	4°06'	+60'	15°	5°04'	+60'	15°	6°02'	+60'	15°	7°00'	+60'	0°	7
8	2°12'	+60'	15°	3°10'	+60'	15°	4°08'	+60'	15°	5°06'	+60'	15°	6°04'	+60'	15°	7°02'	+60'	15°	8°00'	+60'	0°	8
9	3°12'	+60'	15°	4°10'	+60'	15°	5°08'	+60'	15°	6°06'	+60'	15°	7°04'	+60'	15°	8°02'	+60'	15°	9°00'	+60'	63°	9
10	4°12'	+60'	15°	5°10'	+60'	15°	6°08'	+60'	15°	7°06'	+60'	15°	8°04'	+60'	15°	9°02'	+60'	15°	10°00'	+60'	23°	10
11	5°12'	+60'	15°	6°10'	+60'	15°	7°08'	+60'	15°	8°06'	+60'	15°	9°04'	+60'	15°	10°02'	+60'	15°	11°00'	+60'	23°	11
12	6°12'	+60'	15°	7°10'	+60'	15°	8°08'	+60'	15°	9°06'	+60'	15°	10°04'	+60'	15°	11°02'	+60'	15°	12°00'	+60'	62°	12
13	7°12'	+60'	15°	8°10'	+60'	15°	9°08'	+60'	15°	10°06'	+60'	15°	11°04'	+60'	15°	12°02'	+60'	15°	13°00'	+60'	62°	13
14	8°12'	+60'	15°	9°10'	+60'	15°	10°08'	+60'	15°	11°06'	+60'	15°	12°04'	+60'	15°	13°02'	+60'	15°	14°00'	+60'	0°	14
15	9°12'	+60'	15°	10°10'	+60'	15°	11°08'	+60'	15°	12°06'	+60'	15°	13°04'	+60'	15°	14°02'	+60'	15°	15°00'	+60'	20°	15
16	10°12'	+60'	15°	11°10'	+60'	15°	12°08'	+60'	15°	13°06'	+60'	15°	14°04'	+60'	15°	15°02'	+60'	15°	16°00'	+60'	19°	16
17	11°12'	+60'	15°	12°10'	+60'	15°	13°08'	+60'	15°	14°06'	+60'	15°	15°04'	+60'	15°	16°02'	+60'	15°	17°00'	+60'	19°	17
18	12°12'	+60'	15°	13°10'	+60'	15°	14°08'	+60'	15°	15°06'	+60'	15°	16°04'	+60'	15°	17°02'	+60'	15°	18°00'	+60'	18°	18
19	13°12'	+60'	15°	14°10'	+60'	15°	15°08'	+60'	15°	16°06'	+60'	15°	17°04'	+60'	15°	18°02'	+60'	15°	19°00'	+60'	17°	19
20	14°12'	+60'	15°	15°10'	+60'	15°	16°08'	+60'	15°	17°06'	+60'	15°	18°04'	+60'	15°	19°02'	+60'	15°	20°00'	+60'	15°	20
21	15°12'	+60'	15°	16°10'	+60'	15°	17°08'	+60'	15°	18°06'	+60'	15°	19°04'	+60'	15°	20°02'	+60'	15°	21°00'	+60'	14°	21
22	16°12'	+60'	14°	17°10'	+60'	15°	18°08'	+60'	15°	19°06'	+60'	15°	20°04'	+60'	15°	21°02'	+60'	15°	22°00'	+60'	12°	22
23	17°12'	+60'	14°	18°10'	+60'	15°	19°08'	+60'	15°	20°06'	+60'	15°	21°04'	+60'	15°	22°02'	+60'	15°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

165° 195° LHA — Latitude SAME as DECLINATION — 165° 195° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

14° 346° LHA — Latitude CONTRARY to Declination — 14° 346° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°49'	-60'	166°	4°51'	-60'	166°	3°53'	-60'	166°	2°55'	-60'	166°	1°56'	-60'	166°	0°58'	-60'	166°	0°00'	-60'	166°	0
1	4°49'	-60'	166°	3°51'	-60'	166°	2°53'	-60'	166°	1°55'	-60'	166°	0°56'	-60'	166°	0°02'	+60'	14°	1°00'	+60'	16°	1
2	3°49'	-60'	166°	2°51'	-60'	166°	1°53'	-60'	166°	0°55'	-60'	166°	0°04'	+60'	14°	1°02'	+60'	14°	2°00'	+60'	0°	2
3	2°49'	-60'	166°	1°51'	-60'	166°	0°53'	-60'	166°	0°05'	+60'	14°	1°04'	+60'	14°	2°02'	+60'	14°	3°00'	+60'	25°	3
4	1°49'	-60'	166°	0°51'	-60'	166°	0°07'	+60'	14°	1°05'	+60'	14°	2°04'	+60'	14°	3°02'	+60'	14°	4°00'	+60'	25°	4
5	0°49'	-60'	166°	0°09'	+60'	14°	1°07'	+60'	14°	2°05'	+60'	14°	3°04'	+60'	14°	4°02'	+60'	14°	5°00'	+60'	25°	5
6	0°11'	+60'	14°	1°09'	+60'	14°	2°07'	+60'	14°	3°05'	+60'	14°	4°04'	+60'	14°	5°02'	+60'	14°	6°00'	+60'	24°	6
7	1°11'	+60'	14°	2°09'	+60'	14°	3°07'	+60'	14°	4°05'	+60'	14°	5°04'	+60'	14°	6°02'	+60'	14°	7°00'	+60'	0°	7
8	2°11'	+60'	14°	3°09'	+60'	14°	4°07'	+60'	14°	5°05'	+60'	14°	6°04'	+60'	14°	7°02'	+60'	14°	8°00'	+60'	0°	8
9	3°11'	+60'	14°	4°09'	+60'	14°	5°07'	+60'	14°	6°05'	+60'	14°	7°04'	+60'	14°	8°02'	+60'	14°	9°00'	+60'	63°	9
10	4°11'	+60'	14°	5°09'	+60'	14°	6°07'	+60'	14°	7°05'	+60'	14°	8°04'	+60'	14°	9°02'	+60'	14°	10°00'	+60'	23°	10
11	5°11'	+60'	14°	6°09'	+60'	14°	7°07'	+60'	14°	8°05'	+60'	14°	9°04'	+60'	14°	10°02'	+60'	14°	11°00'	+60'	23°	11
12	6°10'	+60'	14°	7°09'	+60'	14°	8°07'	+60'	14°	9°05'	+60'	14°	10°04'	+60'	14°	11°02'	+60'	14°	12°00'	+60'	62°	12
13	7°10'	+60'	14°	8°09'	+60'	14°	9°07'	+60'	14°	10°05'	+60'	14°	11°04'	+60'	14°	12°02'	+60'	14°	13°00'	+60'	62°	13
14	8°10'	+60'	14°	9°09'	+60'	14°	10°07'	+60'	14°	11°05'	+60'	14°	12°04'	+60'	14°	13°02'	+60'	14°	14°00'	+60'	0°	14
15	9°10'	+60'	14°	10°09'	+60'	14°	11°07'	+60'	14°	12°05'	+60'	14°	13°04'	+60'	14°	14°02'	+60'	14°	15°00'	+60'	20°	15
16	10°10'	+60'	14°	11°09'	+60'	14°	12°07'	+60'	14°	13°05'	+60'	14°	14°04'	+60'	14°	15°02'	+60'	14°	16°00'	+60'	19°	16
17	11°10'	+60'	14°	12°09'	+60'	14°	13°07'	+60'	14°	14°05'	+60'	14°	15°04'	+60'	14°	16°02'	+60'	14°	17°00'	+60'	19°	17
18	12°10'	+60'	14°	13°09'	+60'	14°	14°07'	+60'	14°	15°05'	+60'	14°	16°04'	+60'	14°	17°02'	+60'	14°	18°00'	+60'	18°	18
19	13°10'	+60'	14°	14°09'	+60'	14°	15°07'	+60'	14°	16°05'	+60'	14°	17°04'	+60'	14°	18°02'	+60'	14°	19°00'	+60'	17°	19
20	14°10'	+60'	14°	15°09'	+60'	14°	16°07'	+60'	14°	17°05'	+60'	14°	18°04'	+60'	14°	19°02'	+60'	14°	20°00'	+60'	15°	20
21	15°10'	+60'	14°	16°09'	+60'	14°	17°07'	+60'	14°	18°05'	+60'	14°	19°04'	+60'	14°	20°02'	+60'	14°	21°00'	+60'	14°	21
22	16°10'	+60'	14°	17°09'	+60'	14°	18°07'	+60'	14°	19°05'	+60'	14°	20°04'	+60'	14°	21°02'	+60'	14°	22°00'	+60'	12°	22
23	17°10'	+60'	13°	18°09'	+60'	14°	19°07'	+60'	14°	20°05'	+60'	14°	21°04'	+60'	14°	22°02'	+60'	14°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

166° 194° LHA — Latitude SAME as DECLINATION — 166° 194° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

13° 347° LHA — Latitude CONTRARY to Declination — 13° 347° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°51'	-60'	167°	4°52'	-60'	167°	3°54'	-60'	167°	2°55'	-60'	167°	1°57'	-60'	167°	0°58'	-60'	167°	0°00'	-60'	167°	0
1	4°51'	-60'	167°	3°52'	-60'	167°	2°54'	-60'	167°	1°55'	-60'	167°	0°57'	-60'	167°	0°02'	+60'	13°	1°00'	+60'	16°	1
2	3°51'	-60'	167°	2°52'	-60'	167°	1°54'	-60'	167°	0°55'	-60'	167°	0°03'	+60'	13°	1°02'	+60'	13°	2°00'	+60'	0°	2
3	2°51'	-60'	167°	1°52'	-60'	167°	0°54'	-60'	167°	0°05'	+60'	13°	1°03'	+60'	13°	2°02'	+60'	13°	3°00'	+60'	25°	3
4	1°51'	-60'	167°	0°52'	-60'	167°	0°06'	+60'	13°	1°05'	+60'	13°	2°03'	+60'	13°	3°02'	+60'	13°	4°00'	+60'	25°	4
5	0°51'	-60'	167°	0°08'	+60'	13°	1°06'	+60'	13°	2°05'	+60'	13°	3°03'	+60'	13°	4°02'	+60'	13°	5°00'	+60'	25°	5
6	0°09'	+60'	13°	1°08'	+60'	13°	2°06'	+60'	13°	3°05'	+60'	13°	4°03'	+60'	13°	5°02'	+60'	13°	6°00'	+60'	24°	6
7	1°09'	+60'	13°	2°08'	+60'	13°	3°06'	+60'	13°	4°05'	+60'	13°	5°03'	+60'	13°	6°02'	+60'	13°	7°00'	+60'	0°	7
8	2°09'	+60'	13°	3°08'	+60'	13°	4°06'	+60'	13°	5°05'	+60'	13°	6°03'	+60'	13°	7°02'	+60'	13°	8°00'	+60'	0°	8
9	3°09'	+60'	13°	4°08'	+60'	13°	5°06'	+60'	13°	6°05'	+60'	13°	7°03'	+60'	13°	8°02'	+60'	13°	9°00'	+60'	63°	9
10	4°09'	+60'	13°	5°08'	+60'	13°	6°06'	+60'	13°	7°05'	+60'	13°	8°03'	+60'	13°	9°02'	+60'	13°	10°00'	+60'	23°	10
11	5°09'	+60'	13°	6°08'	+60'	13°	7°06'	+60'	13°	8°05'	+60'	13°	9°03'	+60'	13°	10°02'	+60'	13°	11°00'	+60'	23°	11
12	6°09'	+60'	13°	7°08'	+60'	13°	8°06'	+60'	13°	9°05'	+60'	13°	10°03'	+60'	13°	11°02'	+60'	13°	12°00'	+60'	62°	12
13	7°09'	+60'	13°	8°08'	+60'	13°	9°06'	+60'	13°	10°05'	+60'	13°	11°03'	+60'	13°	12°02'	+60'	13°	13°00'	+60'	62°	13
14	8°09'	+60'	13°	9°08'	+60'	13°	10°06'	+60'	13°	11°05'	+60'	13°	12°03'	+60'	13°	13°02'	+60'	13°	14°00'	+60'	0°	14
15	9°09'	+60'	13°	10°08'	+60'	13°	11°06'	+60'	13°	12°05'	+60'	13°	13°03'	+60'	13°	14°02'	+60'	13°	15°00'	+60'	20°	15
16	10°09'	+60'	13°	11°08'	+60'	13°	12°06'	+60'	13°	13°05'	+60'	13°	14°03'	+60'	13°	15°02'	+60'	13°	16°00'	+60'	19°	16
17	11°09'	+60'	13°	12°08'	+60'	13°	13°06'	+60'	13°	14°05'	+60'	13°	15°03'	+60'	13°	16°02'	+60'	13°	17°00'	+60'	19°	17
18	12°09'	+60'	13°	13°07'	+60'	13°	14°06'	+60'	13°	15°05'	+60'	13°	16°03'	+60'	13°	17°02'	+60'	13°	18°00'	+60'	18°	18
19	13°09'	+60'	13°	14°07'	+60'	13°	15°06'	+60'	13°	16°05'	+60'	13°	17°03'	+60'	13°	18°02'	+60'	13°	19°00'	+60'	17°	19
20	14°09'	+60'	13°	15°07'	+60'	13°	16°06'	+60'	13°	17°05'	+60'	13°	18°03'	+60'	13°	19°02'	+60'	13°	20°00'	+60'	15°	20
21	15°09'	+60'	13°	16°07'	+60'	13°	17°06'	+60'	13°	18°05'	+60'	13°	19°03'	+60'	13°	20°02'	+60'	13°	21°00'	+60'	14°	21
22	16°09'	+60'	13°	17°07'	+60'	13°	18°06'	+60'	13°	19°05'	+60'	13°	20°03'	+60'	13°	21°02'	+60'	13°	22°00'	+60'	12°	22
23	17°09'	+60'	13°	18°07'	+60'	13°	19°06'	+60'	13°	20°05'	+60'	13°	21°03'	+60'	13°	22°02'	+60'	13°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

167° 193° LHA — Latitude SAME as DECLINATION — 167° 193° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

12° 348° LHA — Latitude CONTRARY to Declination — 12° 348° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°52'	-60'	168°	4°53'	-60'	168°	3°55'	-60'	168°	2°56'	-60'	168°	1°57'	-60'	168°	0°59'	-60'	168°	0°00'	-60'	168°	0
1	4°52'	-60'	168°	3°53'	-60'	168°	2°55'	-60'	168°	1°56'	-60'	168°	0°57'	-60'	168°	0°01'	+60'	12°	1°00'	+60'	16°	1
2	3°52'	-60'	168°	2°53'	-60'	168°	1°55'	-60'	168°	0°56'	-60'	168°	0°03'	+60'	12°	1°01'	+60'	12°	2°00'	+60'	0°	2
3	2°52'	-60'	168°	1°53'	-60'	168°	0°55'	-60'	168°	0°04'	+60'	12°	1°03'	+60'	12°	2°01'	+60'	12°	3°00'	+60'	25°	3
4	1°52'	-60'	168°	0°53'	-60'	168°	0°05'	+60'	12°	1°04'	+60'	12°	2°03'	+60'	12°	3°01'	+60'	12°	4°00'	+60'	25°	4
5	0°52'	-60'	168°	0°07'	+60'	12°	1°05'	+60'	12°	2°04'	+60'	12°	3°03'	+60'	12°	4°01'	+60'	12°	5°00'	+60'	25°	5
6	0°08'	+60'	12°	1°07'	+60'	12°	2°05'	+60'	12°	3°04'	+60'	12°	4°03'	+60'	12°	5°01'	+60'	12°	6°00'	+60'	24°	6
7	1°08'	+60'	12°	2°07'	+60'	12°	3°05'	+60'	12°	4°04'	+60'	12°	5°03'	+60'	12°	6°01'	+60'	12°	7°00'	+60'	0°	7
8	2°08'	+60'	12°	3°06'	+60'	12°	4°05'	+60'	12°	5°04'	+60'	12°	6°03'	+60'	12°	7°01'	+60'	12°	8°00'	+60'	0°	8
9	3°08'	+60'	12°	4°06'	+60'	12°	5°05'	+60'	12°	6°04'	+60'	12°	7°03'	+60'	12°	8°01'	+60'	12°	9°00'	+60'	63°	9
10	4°08'	+60'	12°	5°06'	+60'	12°	6°05'	+60'	12°	7°04'	+60'	12°	8°03'	+60'	12°	9°01'	+60'	12°	10°00'	+60'	23°	10
11	5°08'	+60'	12°	6°06'	+60'	12°	7°05'	+60'	12°	8°04'	+60'	12°	9°03'	+60'	12°	10°01'	+60'	12°	11°00'	+60'	23°	11
12	6°08'	+60'	12°	7°06'	+60'	12°	8°05'	+60'	12°	9°04'	+60'	12°	10°03'	+60'	12°	11°01'	+60'	12°	12°00'	+60'	62°	12
13	7°08'	+60'	12°	8°06'	+60'	12°	9°05'	+60'	12°	10°04'	+60'	12°	11°03'	+60'	12°	12°01'	+60'	12°	13°00'	+60'	62°	13
14	8°08'	+60'	12°	9°06'	+60'	12°	10°05'	+60'	12°	11°04'	+60'	12°	12°03'	+60'	12°	13°01'	+60'	12°	14°00'	+60'	0°	14
15	9°08'	+60'	12°	10°06'	+60'	12°	11°05'	+60'	12°	12°04'	+60'	12°	13°03'	+60'	12°	14°01'	+60'	12°	15°00'	+60'	20°	15
16	10°08'	+60'	12°	11°06'	+60'	12°	12°05'	+60'	12°	13°04'	+60'	12°	14°03'	+60'	12°	15°01'	+60'	12°	16°00'	+60'	19°	16
17	11°08'	+60'	12°	12°06'	+60'	12°	13°05'	+60'	12°	14°04'	+60'	12°	15°03'	+60'	12°	16°01'	+60'	12°	17°00'	+60'	19°	17
18	12°08'	+60'	12°	13°06'	+60'	12°	14°05'	+60'	12°	15°04'	+60'	12°	16°03'	+60'	12°	17°01'	+60'	12°	18°00'	+60'	18°	18
19	13°08'	+60'	12°	14°06'	+60'	12°	15°05'	+60'	12°	16°04'	+60'	12°	17°03'	+60'	12°	18°01'	+60'	12°	19°00'	+60'	17°	19
20	14°08'	+60'	12°	15°06'	+60'	12°	16°05'	+60'	12°	17°04'	+60'	12°	18°03'	+60'	12°	19°01'	+60'	12°	20°00'	+60'	15°	20
21	15°08'	+60'	12°	16°06'	+60'	12°	17°05'	+60'	12°	18°04'	+60'	12°	19°03'	+60'	12°	20°01'	+60'	12°	21°00'	+60'	14°	21
22	16°08'	+60'	12°	17°06'	+60'	12°	18°05'	+60'	12°	19°04'	+60'	12°	20°03'	+60'	12°	21°01'	+60'	12°	22°00'	+60'	12°	22
23	17°08'	+60'	12°	18°06'	+60'	12°	19°05'	+60'	12°	20°04'	+60'	12°	21°03'	+60'	12°	22°01'	+60'	12°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

168° 192° LHA — Latitude SAME as DECLINATION — 168° 192° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

11° 349° LHA — Latitude CONTRARY to Declination — 11° 349° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°53'	-60'	169°	4°54'	-60'	169°	3°56'	-60'	169°	2°57'	-60'	169°	1°58'	-60'	169°	0°59'	-60'	169°	0°00'	-60'	169°	0
1	4°53'	-60'	169°	3°54'	-60'	169°	2°56'	-60'	169°	1°57'	-60'	169°	0°58'	-60'	169°	0°01'	+60'	11°	1°00'	+60'	16°	1
2	3°53'	-60'	169°	2°54'	-60'	169°	1°56'	-60'	169°	0°57'	-60'	169°	0°02'	+60'	11°	1°01'	+60'	11°	2°00'	+60'	0°	2
3	2°53'	-60'	169°	1°54'	-60'	169°	0°56'	-60'	169°	0°03'	+60'	11°	1°02'	+60'	11°	2°01'	+60'	11°	3°00'	+60'	25°	3
4	1°53'	-60'	169°	0°55'	-60'	169°	0°04'	+60'	11°	1°03'	+60'	11°	2°02'	+60'	11°	3°01'	+60'	11°	4°00'	+60'	25°	4
5	0°53'	-60'	169°	0°05'	+60'	11°	1°04'	+60'	11°	2°03'	+60'	11°	3°02'	+60'	11°	4°01'	+60'	11°	5°00'	+60'	25°	5
6	0°07'	+60'	11°	1°05'	+60'	11°	2°04'	+60'	11°	3°03'	+60'	11°	4°02'	+60'	11°	5°01'	+60'	11°	6°00'	+60'	24°	6
7	1°07'	+60'	11°	2°05'	+60'	11°	3°04'	+60'	11°	4°03'	+60'	11°	5°02'	+60'	11°	6°01'	+60'	11°	7°00'	+60'	0°	7
8	2°07'	+60'	11°	3°05'	+60'	11°	4°04'	+60'	11°	5°03'	+60'	11°	6°02'	+60'	11°	7°01'	+60'	11°	8°00'	+60'	0°	8
9	3°07'	+60'	11°	4°05'	+60'	11°	5°04'	+60'	11°	6°03'	+60'	11°	7°02'	+60'	11°	8°01'	+60'	11°	9°00'	+60'	63°	9
10	4°07'	+60'	11°	5°05'	+60'	11°	6°04'	+60'	11°	7°03'	+60'	11°	8°02'	+60'	11°	9°01'	+60'	11°	10°00'	+60'	23°	10
11	5°07'	+60'	11°	6°05'	+60'	11°	7°04'	+60'	11°	8°03'	+60'	11°	9°02'	+60'	11°	10°01'	+60'	11°	11°00'	+60'	23°	11
12	6°06'	+60'	11°	7°05'	+60'	11°	8°04'	+60'	11°	9°03'	+60'	11°	10°02'	+60'	11°	11°01'	+60'	11°	12°00'	+60'	62°	12
13	7°06'	+60'	11°	8°05'	+60'	11°	9°04'	+60'	11°	10°03'	+60'	11°	11°02'	+60'	11°	12°01'	+60'	11°	13°00'	+60'	62°	13
14	8°06'	+60'	11°	9°05'	+60'	11°	10°04'	+60'	11°	11°03'	+60'	11°	12°02'	+60'	11°	13°01'	+60'	11°	14°00'	+60'	0°	14
15	9°06'	+60'	11°	10°05'	+60'	11°	11°04'	+60'	11°	12°03'	+60'	11°	13°02'	+60'	11°	14°01'	+60'	11°	15°00'	+60'	20°	15
16	10°06'	+60'	11°	11°05'	+60'	11°	12°04'	+60'	11°	13°03'	+60'	11°	14°02'	+60'	11°	15°01'	+60'	11°	16°00'	+60'	19°	16
17	11°06'	+60'	11°	12°05'	+60'	11°	13°04'	+60'	11°	14°03'	+60'	11°	15°02'	+60'	11°	16°01'	+60'	11°	17°00'	+60'	19°	17
18	12°06'	+60'	11°	13°05'	+60'	11°	14°04'	+60'	11°	15°03'	+60'	11°	16°02'	+60'	11°	17°01'	+60'	11°	18°00'	+60'	18°	18
19	13°06'	+60'	11°	14°05'	+60'	11°	15°04'	+60'	11°	16°03'	+60'	11°	17°02'	+60'	11°	18°01'	+60'	11°	19°00'	+60'	17°	19
20	14°06'	+60'	11°	15°05'	+60'	11°	16°04'	+60'	11°	17°03'	+60'	11°	18°02'	+60'	11°	19°01'	+60'	11°	20°00'	+60'	15°	20
21	15°06'	+60'	11°	16°05'	+60'	11°	17°04'	+60'	11°	18°03'	+60'	11°	19°02'	+60'	11°	20°01'	+60'	11°	21°00'	+60'	14°	21
22	16°06'	+60'	11°	17°05'	+60'	11°	18°04'	+60'	11°	19°03'	+60'	11°	20°02'	+60'	11°	21°01'	+60'	11°	22°00'	+60'	12°	22
23	17°06'	+60'	11°	18°05'	+60'	11°	19°04'	+60'	11°	20°03'	+60'	11°	21°02'	+60'	11°	22°01'	+60'	11°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

169° 191° LHA — Latitude SAME as DECLINATION — 169° 191° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

10° 350° LHA — Latitude CONTRARY to Declination — 10° 350° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°55'	-60'	170°	4°55'	-60'	170°	3°56'	-60'	170°	2°57'	-60'	170°	1°58'	-60'	170°	0°59'	-60'	170°	0°00'	-60'	170°	0
1	4°55'	-60'	170°	3°55'	-60'	170°	2°56'	-60'	170°	1°57'	-60'	170°	0°58'	-60'	170°	0°01'	+60'	10°	1°00'	+60'	16°	1
2	3°55'	-60'	170°	2°55'	-60'	170°	1°56'	-60'	170°	0°57'	-60'	170°	0°02'	+60'	10°	1°01'	+60'	10°	2°00'	+60'	0°	2
3	2°55'	-60'	170°	1°55'	-60'	170°	0°56'	-60'	170°	0°03'	+60'	10°	1°02'	+60'	10°	2°01'	+60'	10°	3°00'	+60'	25°	3
4	1°55'	-60'	170°	0°55'	-60'	170°	0°04'	+60'	10°	1°03'	+60'	10°	2°02'	+60'	10°	3°01'	+60'	10°	4°00'	+60'	25°	4
5	0°55'	-60'	170°	0°05'	+60'	10°	1°04'	+60'	10°	2°03'	+60'	10°	3°02'	+60'	10°	4°01'	+60'	10°	5°00'	+60'	25°	5
6	0°05'	+60'	10°	1°05'	+60'	10°	2°04'	+60'	10°	3°03'	+60'	10°	4°02'	+60'	10°	5°01'	+60'	10°	6°00'	+60'	24°	6
7	1°05'	+60'	10°	2°05'	+60'	10°	3°04'	+60'	10°	4°03'	+60'	10°	5°02'	+60'	10°	6°01'	+60'	10°	7°00'	+60'	0°	7
8	2°05'	+60'	10°	3°05'	+60'	10°	4°04'	+60'	10°	5°03'	+60'	10°	6°02'	+60'	10°	7°01'	+60'	10°	8°00'	+60'	0°	8
9	3°05'	+60'	10°	4°05'	+60'	10°	5°04'	+60'	10°	6°03'	+60'	10°	7°02'	+60'	10°	8°01'	+60'	10°	9°00'	+60'	63°	9
10	4°05'	+60'	10°	5°05'	+60'	10°	6°04'	+60'	10°	7°03'	+60'	10°	8°02'	+60'	10°	9°01'	+60'	10°	10°00'	+60'	23°	10
11	5°05'	+60'	10°	6°04'	+60'	10°	7°04'	+60'	10°	8°03'	+60'	10°	9°02'	+60'	10°	10°01'	+60'	10°	11°00'	+60'	23°	11
12	6°05'	+60'	10°	7°04'	+60'	10°	8°04'	+60'	10°	9°03'	+60'	10°	10°02'	+60'	10°	11°01'	+60'	10°	12°00'	+60'	62°	12
13	7°05'	+60'	10°	8°04'	+60'	10°	9°04'	+60'	10°	10°03'	+60'	10°	11°02'	+60'	10°	12°01'	+60'	10°	13°00'	+60'	62°	13
14	8°05'	+60'	10°	9°04'	+60'	10°	10°04'	+60'	10°	11°03'	+60'	10°	12°02'	+60'	10°	13°01'	+60'	10°	14°00'	+60'	0°	14
15	9°05'	+60'	10°	10°04'	+60'	10°	11°04'	+60'	10°	12°03'	+60'	10°	13°02'	+60'	10°	14°01'	+60'	10°	15°00'	+60'	20°	15
16	10°05'	+60'	10°	11°04'	+60'	10°	12°04'	+60'	10°	13°03'	+60'	10°	14°02'	+60'	10°	15°01'	+60'	10°	16°00'	+60'	19°	16
17	11°05'	+60'	10°	12°04'	+60'	10°	13°04'	+60'	10°	14°03'	+60'	10°	15°02'	+60'	10°	16°01'	+60'	10°	17°00'	+60'	19°	17
18	12°05'	+60'	10°	13°04'	+60'	10°	14°04'	+60'	10°	15°03'	+60'	10°	16°02'	+60'	10°	17°01'	+60'	10°	18°00'	+60'	18°	18
19	13°05'	+60'	10°	14°04'	+60'	10°	15°04'	+60'	10°	16°03'	+60'	10°	17°02'	+60'	10°	18°01'	+60'	10°	19°00'	+60'	17°	19
20	14°05'	+60'	10°	15°04'	+60'	10°	16°04'	+60'	10°	17°03'	+60'	10°	18°02'	+60'	10°	19°01'	+60'	10°	20°00'	+60'	15°	20
21	15°05'	+60'	10°	16°04'	+60'	10°	17°04'	+60'	10°	18°03'	+60'	10°	19°02'	+60'	10°	20°01'	+60'	10°	21°00'	+60'	14°	21
22	16°05'	+60'	10°	17°04'	+60'	10°	18°04'	+60'	10°	19°03'	+60'	10°	20°02'	+60'	10°	21°01'	+60'	10°	22°00'	+60'	12°	22
23	17°05'	+60'	10°	18°04'	+60'	10°	19°04'	+60'	10°	20°03'	+60'	10°	21°02'	+60'	10°	22°01'	+60'	10°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

170° 190° LHA — Latitude SAME as DECLINATION — 170° 190° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

9° 351° LHA — Latitude CONTRARY to Declination — 9° 351° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°56'	-60'	171°	4°56'	-60'	171°	3°57'	-60'	171°	2°58'	-60'	171°	1°59'	-60'	171°	0°59'	-60'	171°	0°00'	-60'	171°	0
1	4°56'	-60'	171°	3°56'	-60'	171°	2°57'	-60'	171°	1°58'	-60'	171°	0°59'	-60'	171°	0°01'	+60'	9°	1°00'	+60'	16°	1
2	3°56'	-60'	171°	2°56'	-60'	171°	1°57'	-60'	171°	0°58'	-60'	171°	0°01'	+60'	9°	1°01'	+60'	9°	2°00'	+60'	0°	2
3	2°56'	-60'	171°	1°56'	-60'	171°	0°57'	-60'	171°	0°02'	+60'	9°	1°01'	+60'	9°	2°01'	+60'	9°	3°00'	+60'	25°	3
4	1°56'	-60'	171°	0°56'	-60'	171°	0°03'	+60'	9°	1°02'	+60'	9°	2°01'	+60'	9°	3°01'	+60'	9°	4°00'	+60'	25°	4
5	0°56'	-60'	171°	0°04'	+60'	9°	1°03'	+60'	9°	2°02'	+60'	9°	3°01'	+60'	9°	4°01'	+60'	9°	5°00'	+60'	25°	5
6	0°04'	+60'	9°	1°04'	+60'	9°	2°03'	+60'	9°	3°02'	+60'	9°	4°01'	+60'	9°	5°01'	+60'	9°	6°00'	+60'	24°	6
7	1°04'	+60'	9°	2°04'	+60'	9°	3°03'	+60'	9°	4°02'	+60'	9°	5°01'	+60'	9°	6°01'	+60'	9°	7°00'	+60'	0°	7
8	2°04'	+60'	9°	3°04'	+60'	9°	4°03'	+60'	9°	5°02'	+60'	9°	6°01'	+60'	9°	7°01'	+60'	9°	8°00'	+60'	0°	8
9	3°04'	+60'	9°	4°04'	+60'	9°	5°03'	+60'	9°	6°02'	+60'	9°	7°01'	+60'	9°	8°01'	+60'	9°	9°00'	+60'	63°	9
10	4°04'	+60'	9°	5°04'	+60'	9°	6°03'	+60'	9°	7°02'	+60'	9°	8°01'	+60'	9°	9°01'	+60'	9°	10°00'	+60'	23°	10
11	5°04'	+60'	9°	6°04'	+60'	9°	7°03'	+60'	9°	8°02'	+60'	9°	9°01'	+60'	9°	10°01'	+60'	9°	11°00'	+60'	23°	11
12	6°04'	+60'	9°	7°04'	+60'	9°	8°03'	+60'	9°	9°02'	+60'	9°	10°01'	+60'	9°	11°01'	+60'	9°	12°00'	+60'	62°	12
13	7°04'	+60'	9°	8°04'	+60'	9°	9°03'	+60'	9°	10°02'	+60'	9°	11°01'	+60'	9°	12°01'	+60'	9°	13°00'	+60'	62°	13
14	8°04'	+60'	9°	9°04'	+60'	9°	10°03'	+60'	9°	11°02'	+60'	9°	12°01'	+60'	9°	13°01'	+60'	9°	14°00'	+60'	0°	14
15	9°04'	+60'	9°	10°04'	+60'	9°	11°03'	+60'	9°	12°02'	+60'	9°	13°01'	+60'	9°	14°01'	+60'	9°	15°00'	+60'	20°	15
16	10°04'	+60'	9°	11°04'	+60'	9°	12°03'	+60'	9°	13°02'	+60'	9°	14°01'	+60'	9°	15°01'	+60'	9°	16°00'	+60'	19°	16
17	11°04'	+60'	9°	12°04'	+60'	9°	13°03'	+60'	9°	14°02'	+60'	9°	15°01'	+60'	9°	16°01'	+60'	9°	17°00'	+60'	19°	17
18	12°04'	+60'	9°	13°04'	+60'	9°	14°03'	+60'	9°	15°02'	+60'	9°	16°01'	+60'	9°	17°01'	+60'	9°	18°00'	+60'	18°	18
19	13°04'	+60'	9°	14°04'	+60'	9°	15°03'	+60'	9°	16°02'	+60'	9°	17°01'	+60'	9°	18°01'	+60'	9°	19°00'	+60'	17°	19
20	14°04'	+60'	9°	15°04'	+60'	9°	16°03'	+60'	9°	17°02'	+60'	9°	18°01'	+60'	9°	19°01'	+60'	9°	20°00'	+60'	15°	20
21	15°04'	+60'	9°	16°04'	+60'	9°	17°03'	+60'	9°	18°02'	+60'	9°	19°01'	+60'	9°	20°01'	+60'	9°	21°00'	+60'	14°	21
22	16°04'	+60'	9°	17°04'	+60'	9°	18°03'	+60'	9°	19°02'	+60'	9°	20°01'	+60'	9°	21°01'	+60'	9°	22°00'	+60'	12°	22
23	17°04'	+60'	9°	18°04'	+60'	9°	19°03'	+60'	9°	20°02'	+60'	9°	21°01'	+60'	9°	22°01'	+60'	9°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

171° 189° LHA — Latitude SAME as DECLINATION — 171° 189° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

8° 352° LHA — Latitude CONTRARY to Declination — 8° 352° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°56'	-60'	172°	4°57'	-60'	172°	3°58'	-60'	172°	2°58'	-60'	172°	1°59'	-60'	172°	0°59'	-60'	172°	0°00'	-60'	172°	0
1	4°56'	-60'	172°	3°57'	-60'	172°	2°58'	-60'	172°	1°58'	-60'	172°	0°59'	-60'	172°	0°01'	+60'	8°	1°00'	+60'	16°	1
2	3°56'	-60'	172°	2°57'	-60'	172°	1°58'	-60'	172°	0°58'	-60'	172°	0°01'	+60'	8°	1°01'	+60'	8°	2°00'	+60'	0°	2
3	2°57'	-60'	172°	1°57'	-60'	172°	0°58'	-60'	172°	0°02'	+60'	8°	1°01'	+60'	8°	2°01'	+60'	8°	3°00'	+60'	25°	3
4	1°57'	-60'	172°	0°57'	-60'	172°	0°02'	+60'	8°	1°02'	+60'	8°	2°01'	+60'	8°	3°01'	+60'	8°	4°00'	+60'	25°	4
5	0°57'	-60'	172°	0°03'	+60'	8°	1°02'	+60'	8°	2°02'	+60'	8°	3°01'	+60'	8°	4°01'	+60'	8°	5°00'	+60'	25°	5
6	0°03'	+60'	8°	1°03'	+60'	8°	2°02'	+60'	8°	3°02'	+60'	8°	4°01'	+60'	8°	5°01'	+60'	8°	6°00'	+60'	24°	6
7	1°03'	+60'	8°	2°03'	+60'	8°	3°02'	+60'	8°	4°02'	+60'	8°	5°01'	+60'	8°	6°01'	+60'	8°	7°00'	+60'	0°	7
8	2°03'	+60'	8°	3°03'	+60'	8°	4°02'	+60'	8°	5°02'	+60'	8°	6°01'	+60'	8°	7°01'	+60'	8°	8°00'	+60'	0°	8
9	3°03'	+60'	8°	4°03'	+60'	8°	5°02'	+60'	8°	6°02'	+60'	8°	7°01'	+60'	8°	8°01'	+60'	8°	9°00'	+60'	63°	9
10	4°03'	+60'	8°	5°03'	+60'	8°	6°02'	+60'	8°	7°02'	+60'	8°	8°01'	+60'	8°	9°01'	+60'	8°	10°00'	+60'	23°	10
11	5°03'	+60'	8°	6°03'	+60'	8°	7°02'	+60'	8°	8°02'	+60'	8°	9°01'	+60'	8°	10°01'	+60'	8°	11°00'	+60'	23°	11
12	6°03'	+60'	8°	7°03'	+60'	8°	8°02'	+60'	8°	9°02'	+60'	8°	10°01'	+60'	8°	11°01'	+60'	8°	12°00'	+60'	62°	12
13	7°03'	+60'	8°	8°03'	+60'	8°	9°02'	+60'	8°	10°02'	+60'	8°	11°01'	+60'	8°	12°01'	+60'	8°	13°00'	+60'	62°	13
14	8°03'	+60'	8°	9°03'	+60'	8°	10°02'	+60'	8°	11°02'	+60'	8°	12°01'	+60'	8°	13°01'	+60'	8°	14°00'	+60'	0°	14
15	9°03'	+60'	8°	10°03'	+60'	8°	11°02'	+60'	8°	12°02'	+60'	8°	13°01'	+60'	8°	14°01'	+60'	8°	15°00'	+60'	20°	15
16	10°03'	+60'	8°	11°03'	+60'	8°	12°02'	+60'	8°	13°02'	+60'	8°	14°01'	+60'	8°	15°01'	+60'	8°	16°00'	+60'	19°	16
17	11°03'	+60'	8°	12°03'	+60'	8°	13°02'	+60'	8°	14°02'	+60'	8°	15°01'	+60'	8°	16°01'	+60'	8°	17°00'	+60'	19°	17
18	12°03'	+60'	8°	13°03'	+60'	8°	14°02'	+60'	8°	15°02'	+60'	8°	16°01'	+60'	8°	17°01'	+60'	8°	18°00'	+60'	18°	18
19	13°03'	+60'	8°	14°03'	+60'	8°	15°02'	+60'	8°	16°02'	+60'	8°	17°01'	+60'	8°	18°01'	+60'	8°	19°00'	+60'	17°	19
20	14°03'	+60'	8°	15°03'	+60'	8°	16°02'	+60'	8°	17°02'	+60'	8°	18°01'	+60'	8°	19°01'	+60'	8°	20°00'	+60'	15°	20
21	15°03'	+60'	8°	16°03'	+60'	8°	17°02'	+60'	8°	18°02'	+60'	8°	19°01'	+60'	8°	20°01'	+60'	8°	21°00'	+60'	14°	21
22	16°03'	+60'	8°	17°03'	+60'	8°	18°02'	+60'	8°	19°02'	+60'	8°	20°01'	+60'	8°	21°01'	+60'	8°	22°00'	+60'	12°	22
23	17°03'	+60'	8°	18°03'	+60'	8°	19°02'	+60'	8°	20°02'	+60'	8°	21°01'	+60'	8°	22°01'	+60'	8°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

172° 188° LHA — Latitude SAME as DECLINATION — 172° 188° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

7° 353° LHA — Latitude CONTRARY to Declination — 7° 353° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°57'	-60'	173°	4°58'	-60'	173°	3°58'	-60'	173°	2°59'	-60'	173°	1°59'	-60'	173°	1°00'	-60'	173°	0°00'	-60'	173°	0
1	4°57'	-60'	173°	3°58'	-60'	173°	2°58'	-60'	173°	1°59'	-60'	173°	0°59'	-60'	173°	0°00'	+60'	7°	1°00'	+60'	0°	1
2	3°57'	-60'	173°	2°58'	-60'	173°	1°58'	-60'	173°	0°59'	-60'	173°	0°01'	+60'	7°	1°00'	+60'	7°	2°00'	+60'	0°	2
3	2°57'	-60'	173°	1°58'	-60'	173°	0°58'	-60'	173°	0°01'	+60'	7°	1°01'	+60'	7°	2°00'	+60'	7°	3°00'	+60'	25°	3
4	1°57'	-60'	173°	0°58'	-60'	173°	0°02'	+60'	7°	1°01'	+60'	7°	2°01'	+60'	7°	3°00'	+60'	7°	4°00'	+60'	25°	4
5	0°57'	-60'	173°	0°02'	+60'	7°	1°02'	+60'	7°	2°01'	+60'	7°	3°01'	+60'	7°	4°00'	+60'	7°	5°00'	+60'	25°	5
6	0°03'	+60'	7°	1°02'	+60'	7°	2°02'	+60'	7°	3°01'	+60'	7°	4°01'	+60'	7°	5°00'	+60'	7°	6°00'	+60'	24°	6
7	1°03'	+60'	7°	2°02'	+60'	7°	3°02'	+60'	7°	4°01'	+60'	7°	5°01'	+60'	7°	6°00'	+60'	7°	7°00'	+60'	0°	7
8	2°03'	+60'	7°	3°02'	+60'	7°	4°02'	+60'	7°	5°01'	+60'	7°	6°01'	+60'	7°	7°00'	+60'	7°	8°00'	+60'	0°	8
9	3°03'	+60'	7°	4°02'	+60'	7°	5°02'	+60'	7°	6°01'	+60'	7°	7°01'	+60'	7°	8°00'	+60'	7°	9°00'	+60'	63°	9
10	4°03'	+60'	7°	5°02'	+60'	7°	6°02'	+60'	7°	7°01'	+60'	7°	8°01'	+60'	7°	9°00'	+60'	7°	10°00'	+60'	23°	10
11	5°03'	+60'	7°	6°02'	+60'	7°	7°02'	+60'	7°	8°01'	+60'	7°	9°01'	+60'	7°	10°00'	+60'	7°	11°00'	+60'	23°	11
12	6°03'	+60'	7°	7°02'	+60'	7°	8°02'	+60'	7°	9°01'	+60'	7°	10°01'	+60'	7°	11°00'	+60'	7°	12°00'	+60'	62°	12
13	7°03'	+60'	7°	8°02'	+60'	7°	9°02'	+60'	7°	10°01'	+60'	7°	11°01'	+60'	7°	12°00'	+60'	7°	13°00'	+60'	62°	13
14	8°03'	+60'	7°	9°02'	+60'	7°	10°02'	+60'	7°	11°01'	+60'	7°	12°01'	+60'	7°	13°00'	+60'	7°	14°00'	+60'	0°	14
15	9°03'	+60'	7°	10°02'	+60'	7°	11°02'	+60'	7°	12°01'	+60'	7°	13°01'	+60'	7°	14°00'	+60'	7°	15°00'	+60'	20°	15
16	10°03'	+60'	7°	11°02'	+60'	7°	12°02'	+60'	7°	13°01'	+60'	7°	14°01'	+60'	7°	15°00'	+60'	7°	16°00'	+60'	19°	16
17	11°03'	+60'	7°	12°02'	+60'	7°	13°02'	+60'	7°	14°01'	+60'	7°	15°01'	+60'	7°	16°00'	+60'	7°	17°00'	+60'	19°	17
18	12°03'	+60'	7°	13°02'	+60'	7°	14°02'	+60'	7°	15°01'	+60'	7°	16°01'	+60'	7°	17°00'	+60'	7°	18°00'	+60'	18°	18
19	13°03'	+60'	7°	14°02'	+60'	7°	15°02'	+60'	7°	16°01'	+60'	7°	17°01'	+60'	7°	18°00'	+60'	7°	19°00'	+60'	17°	19
20	14°03'	+60'	7°	15°02'	+60'	7°	16°02'	+60'	7°	17°01'	+60'	7°	18°01'	+60'	7°	19°00'	+60'	7°	20°00'	+60'	15°	20
21	15°03'	+60'	7°	16°02'	+60'	7°	17°02'	+60'	7°	18°01'	+60'	7°	19°01'	+60'	7°	20°00'	+60'	7°	21°00'	+60'	14°	21
22	16°03'	+60'	7°	17°02'	+60'	7°	18°02'	+60'	7°	19°01'	+60'	7°	20°01'	+60'	7°	21°00'	+60'	7°	22°00'	+60'	12°	22
23	17°03'	+60'	7°	18°02'	+60'	7°	19°02'	+60'	7°	20°01'	+60'	7°	21°01'	+60'	7°	22°00'	+60'	7°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

173° 187° LHA — Latitude SAME as DECLINATION — 173° 187° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

6° 354° LHA — Latitude CONTRARY to Declination — 6° 354° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°58'	-60'	174°	4°58'	-60'	174°	3°59'	-60'	174°	2°59'	-60'	174°	1°59'	-60'	174°	1°00'	-60'	174°	0°00'	-60'	174°	0
1	4°58'	-60'	174°	3°58'	-60'	174°	2°59'	-60'	174°	1°59'	-60'	174°	0°59'	-60'	174°	0°00'	+60'	6°	1°00'	+60'	0°	1
2	3°58'	-60'	174°	2°58'	-60'	174°	1°59'	-60'	174°	0°59'	-60'	174°	0°01'	+60'	6°	1°00'	+60'	6°	2°00'	+60'	0°	2
3	2°58'	-60'	174°	1°58'	-60'	174°	0°59'	-60'	174°	0°01'	+60'	6°	1°01'	+60'	6°	2°00'	+60'	6°	3°00'	+60'	25°	3
4	1°58'	-60'	174°	0°58'	-60'	174°	0°01'	+60'	6°	1°01'	+60'	6°	2°01'	+60'	6°	3°00'	+60'	6°	4°00'	+60'	25°	4
5	0°58'	-60'	174°	0°02'	+60'	6°	1°01'	+60'	6°	2°01'	+60'	6°	3°01'	+60'	6°	4°00'	+60'	6°	5°00'	+60'	25°	5
6	0°02'	+60'	6°	1°02'	+60'	6°	2°01'	+60'	6°	3°01'	+60'	6°	4°01'	+60'	6°	5°00'	+60'	6°	6°00'	+60'	24°	6
7	1°02'	+60'	6°	2°02'	+60'	6°	3°01'	+60'	6°	4°01'	+60'	6°	5°01'	+60'	6°	6°00'	+60'	6°	7°00'	+60'	0°	7
8	2°02'	+60'	6°	3°02'	+60'	6°	4°01'	+60'	6°	5°01'	+60'	6°	6°01'	+60'	6°	7°00'	+60'	6°	8°00'	+60'	0°	8
9	3°02'	+60'	6°	4°02'	+60'	6°	5°01'	+60'	6°	6°01'	+60'	6°	7°01'	+60'	6°	8°00'	+60'	6°	9°00'	+60'	63°	9
10	4°02'	+60'	6°	5°02'	+60'	6°	6°01'	+60'	6°	7°01'	+60'	6°	8°01'	+60'	6°	9°00'	+60'	6°	10°00'	+60'	23°	10
11	5°02'	+60'	6°	6°02'	+60'	6°	7°01'	+60'	6°	8°01'	+60'	6°	9°01'	+60'	6°	10°00'	+60'	6°	11°00'	+60'	23°	11
12	6°02'	+60'	6°	7°02'	+60'	6°	8°01'	+60'	6°	9°01'	+60'	6°	10°01'	+60'	6°	11°00'	+60'	6°	12°00'	+60'	62°	12
13	7°02'	+60'	6°	8°02'	+60'	6°	9°01'	+60'	6°	10°01'	+60'	6°	11°01'	+60'	6°	12°00'	+60'	6°	13°00'	+60'	62°	13
14	8°02'	+60'	6°	9°02'	+60'	6°	10°01'	+60'	6°	11°01'	+60'	6°	12°01'	+60'	6°	13°00'	+60'	6°	14°00'	+60'	0°	14
15	9°02'	+60'	6°	10°02'	+60'	6°	11°01'	+60'	6°	12°01'	+60'	6°	13°01'	+60'	6°	14°00'	+60'	6°	15°00'	+60'	20°	15
16	10°02'	+60'	6°	11°02'	+60'	6°	12°01'	+60'	6°	13°01'	+60'	6°	14°01'	+60'	6°	15°00'	+60'	6°	16°00'	+60'	19°	16
17	11°02'	+60'	6°	12°02'	+60'	6°	13°01'	+60'	6°	14°01'	+60'	6°	15°01'	+60'	6°	16°00'	+60'	6°	17°00'	+60'	19°	17
18	12°02'	+60'	6°	13°02'	+60'	6°	14°01'	+60'	6°	15°01'	+60'	6°	16°01'	+60'	6°	17°00'	+60'	6°	18°00'	+60'	18°	18
19	13°02'	+60'	6°	14°02'	+60'	6°	15°01'	+60'	6°	16°01'	+60'	6°	17°01'	+60'	6°	18°00'	+60'	6°	19°00'	+60'	17°	19
20	14°02'	+60'	6°	15°02'	+60'	6°	16°01'	+60'	6°	17°01'	+60'	6°	18°01'	+60'	6°	19°00'	+60'	6°	20°00'	+60'	15°	20
21	15°02'	+60'	6°	16°02'	+60'	6°	17°01'	+60'	6°	18°01'	+60'	6°	19°01'	+60'	6°	20°00'	+60'	6°	21°00'	+60'	14°	21
22	16°02'	+60'	6°	17°02'	+60'	6°	18°01'	+60'	6°	19°01'	+60'	6°	20°01'	+60'	6°	21°00'	+60'	6°	22°00'	+60'	12°	22
23	17°02'	+60'	6°	18°02'	+60'	6°	19°01'	+60'	6°	20°01'	+60'	6°	21°01'	+60'	6°	22°00'	+60'	6°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

174° 186° LHA — Latitude SAME as DECLINATION — 174° 186° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

5° 355° LHA — Latitude CONTRARY to Declination — 5° 355° LHA

Dec°	84			85			86			87			88			89			90			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°59'	-60'	175°	4°59'	-60'	175°	3°59'	-60'	175°	2°59'	-60'	175°	2°00'	-60'	175°	1°00'	-60'	175°	0°00'	-60'	175°	0
1	4°59'	-60'	175°	3°59'	-60'	175°	2°59'	-60'	175°	1°59'	-60'	175°	1°00'	-60'	175°	0°00'	+60'	5°	1°00'	+60'	0°	1
2	3°59'	-60'	175°	2°59'	-60'	175°	1°59'	-60'	175°	0°59'	-60'	175°	0°00'	+60'	5°	1°00'	+60'	5°	2°00'	+60'	0°	2
3	2°59'	-60'	175°	1°59'	-60'	175°	0°59'	-60'	175°	0°01'	+60'	5°	1°00'	+60'	5°	2°00'	+60'	5°	3°00'	+60'	25°	3
4	1°59'	-60'	175°	0°59'	-60'	175°	0°01'	+60'	5°	1°01'	+60'	5°	2°00'	+60'	5°	3°00'	+60'	5°	4°00'	+60'	25°	4
5	0°59'	-60'	175°	0°01'	+60'	5°	1°01'	+60'	5°	2°01'	+60'	5°	3°00'	+60'	5°	4°00'	+60'	5°	5°00'	+60'	25°	5
6	0°01'	+60'	5°	1°01'	+60'	5°	2°01'	+60'	5°	3°01'	+60'	5°	4°00'	+60'	5°	5°00'	+60'	5°	6°00'	+60'	24°	6
7	1°01'	+60'	5°	2°01'	+60'	5°	3°01'	+60'	5°	4°01'	+60'	5°	5°00'	+60'	5°	6°00'	+60'	5°	7°00'	+60'	0°	7
8	2°01'	+60'	5°	3°01'	+60'	5°	4°01'	+60'	5°	5°01'	+60'	5°	6°00'	+60'	5°	7°00'	+60'	5°	8°00'	+60'	0°	8
9	3°01'	+60'	5°	4°01'	+60'	5°	5°01'	+60'	5°	6°01'	+60'	5°	7°00'	+60'	5°	8°00'	+60'	5°	9°00'	+60'	63°	9
10	4°01'	+60'	5°	5°01'	+60'	5°	6°01'	+60'	5°	7°01'	+60'	5°	8°00'	+60'	5°	9°00'	+60'	5°	10°00'	+60'	23°	10
11	5°01'	+60'	5°	6°01'	+60'	5°	7°01'	+60'	5°	8°01'	+60'	5°	9°00'	+60'	5°	10°00'	+60'	5°	11°00'	+60'	23°	11
12	6°01'	+60'	5°	7°01'	+60'	5°	8°01'	+60'	5°	9°01'	+60'	5°	10°00'	+60'	5°	11°00'	+60'	5°	12°00'	+60'	62°	12
13	7°01'	+60'	5°	8°01'	+60'	5°	9°01'	+60'	5°	10°01'	+60'	5°	11°00'	+60'	5°	12°00'	+60'	5°	13°00'	+60'	62°	13
14	8°01'	+60'	5°	9°01'	+60'	5°	10°01'	+60'	5°	11°01'	+60'	5°	12°00'	+60'	5°	13°00'	+60'	5°	14°00'	+60'	0°	14
15	9°01'	+60'	5°	10°01'	+60'	5°	11°01'	+60'	5°	12°01'	+60'	5°	13°00'	+60'	5°	14°00'	+60'	5°	15°00'	+60'	20°	15
16	10°01'	+60'	5°	11°01'	+60'	5°	12°01'	+60'	5°	13°01'	+60'	5°	14°00'	+60'	5°	15°00'	+60'	5°	16°00'	+60'	19°	16
17	11°01'	+60'	5°	12°01'	+60'	5°	13°01'	+60'	5°	14°01'	+60'	5°	15°00'	+60'	5°	16°00'	+60'	5°	17°00'	+60'	19°	17
18	12°01'	+60'	5°	13°01'	+60'	5°	14°01'	+60'	5°	15°01'	+60'	5°	16°00'	+60'	5°	17°00'	+60'	5°	18°00'	+60'	18°	18
19	13°01'	+60'	5°	14°01'	+60'	5°	15°01'	+60'	5°	16°01'	+60'	5°	17°00'	+60'	5°	18°00'	+60'	5°	19°00'	+60'	17°	19
20	14°01'	+60'	5°	15°01'	+60'	5°	16°01'	+60'	5°	17°01'	+60'	5°	18°00'	+60'	5°	19°00'	+60'	5°	20°00'	+60'	15°	20
21	15°01'	+60'	5°	16°01'	+60'	5°	17°01'	+60'	5°	18°01'	+60'	5°	19°00'	+60'	5°	20°00'	+60'	5°	21°00'	+60'	14°	21
22	16°01'	+60'	5°	17°01'	+60'	5°	18°01'	+60'	5°	19°01'	+60'	5°	20°00'	+60'	5°	21°00'	+60'	5°	22°00'	+60'	12°	22
23	17°01'	+60'	5°	18°01'	+60'	5°	19°01'	+60'	5°	20°01'	+60'	5°	21°00'	+60'	5°	22°00'	+60'	5°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

175° 185° LHA — Latitude SAME as DECLINATION — 175° 185° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

4° 356° LHA — **Latitude CONTRARY to Declination** — **4° 356° LHA**

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	5°59'	-60'	176°	4°59'	-60'	176°	3°59'	-60'	176°	3°00'	-60'	176°	2°00'	-60'	176°	1°00'	-60'	176°	0°00'	-60'	176°	0
1	4°59'	-60'	176°	3°59'	-60'	176°	2°59'	-60'	176°	2°00'	-60'	176°	1°00'	-60'	176°	0°00'	+60'	4°	1°00'	+60'	0°	1
2	3°59'	-60'	176°	2°59'	-60'	176°	1°59'	-60'	176°	1°00'	-60'	176°	0°00'	+60'	4°	1°00'	+60'	4°	2°00'	+60'	0°	2
3	2°59'	-60'	176°	1°59'	-60'	176°	0°59'	-60'	176°	0°00'	+60'	4°	1°00'	+60'	4°	2°00'	+60'	4°	3°00'	+60'	25°	3
4	1°59'	-60'	176°	0°59'	-60'	176°	0°01'	+60'	4°	1°00'	+60'	4°	2°00'	+60'	4°	3°00'	+60'	4°	4°00'	+60'	25°	4
5	0°59'	-60'	176°	0°01'	+60'	4°	1°01'	+60'	4°	2°00'	+60'	4°	3°00'	+60'	4°	4°00'	+60'	4°	5°00'	+60'	25°	5
6	0°01'	+60'	4°	1°01'	+60'	4°	2°01'	+60'	4°	3°00'	+60'	4°	4°00'	+60'	4°	5°00'	+60'	4°	6°00'	+60'	24°	6
7	1°01'	+60'	4°	2°01'	+60'	4°	3°01'	+60'	4°	4°00'	+60'	4°	5°00'	+60'	4°	6°00'	+60'	4°	7°00'	+60'	0°	7
8	2°01'	+60'	4°	3°01'	+60'	4°	4°01'	+60'	4°	5°00'	+60'	4°	6°00'	+60'	4°	7°00'	+60'	4°	8°00'	+60'	0°	8
9	3°01'	+60'	4°	4°01'	+60'	4°	5°01'	+60'	4°	6°00'	+60'	4°	7°00'	+60'	4°	8°00'	+60'	4°	9°00'	+60'	63°	9
10	4°01'	+60'	4°	5°01'	+60'	4°	6°01'	+60'	4°	7°00'	+60'	4°	8°00'	+60'	4°	9°00'	+60'	4°	10°00'	+60'	23°	10
11	5°01'	+60'	4°	6°01'	+60'	4°	7°01'	+60'	4°	8°00'	+60'	4°	9°00'	+60'	4°	10°00'	+60'	4°	11°00'	+60'	23°	11
12	6°01'	+60'	4°	7°01'	+60'	4°	8°01'	+60'	4°	9°00'	+60'	4°	10°00'	+60'	4°	11°00'	+60'	4°	12°00'	+60'	62°	12
13	7°01'	+60'	4°	8°01'	+60'	4°	9°01'	+60'	4°	10°00'	+60'	4°	11°00'	+60'	4°	12°00'	+60'	4°	13°00'	+60'	62°	13
14	8°01'	+60'	4°	9°01'	+60'	4°	10°01'	+60'	4°	11°00'	+60'	4°	12°00'	+60'	4°	13°00'	+60'	4°	14°00'	+60'	0°	14
15	9°01'	+60'	4°	10°01'	+60'	4°	11°01'	+60'	4°	12°00'	+60'	4°	13°00'	+60'	4°	14°00'	+60'	4°	15°00'	+60'	20°	15
16	10°01'	+60'	4°	11°01'	+60'	4°	12°01'	+60'	4°	13°00'	+60'	4°	14°00'	+60'	4°	15°00'	+60'	4°	16°00'	+60'	19°	16
17	11°01'	+60'	4°	12°01'	+60'	4°	13°01'	+60'	4°	14°00'	+60'	4°	15°00'	+60'	4°	16°00'	+60'	4°	17°00'	+60'	19°	17
18	12°01'	+60'	4°	13°01'	+60'	4°	14°01'	+60'	4°	15°00'	+60'	4°	16°00'	+60'	4°	17°00'	+60'	4°	18°00'	+60'	18°	18
19	13°01'	+60'	4°	14°01'	+60'	4°	15°01'	+60'	4°	16°00'	+60'	4°	17°00'	+60'	4°	18°00'	+60'	4°	19°00'	+60'	17°	19
20	14°01'	+60'	4°	15°01'	+60'	4°	16°01'	+60'	4°	17°00'	+60'	4°	18°00'	+60'	4°	19°00'	+60'	4°	20°00'	+60'	15°	20
21	15°01'	+60'	4°	16°01'	+60'	4°	17°01'	+60'	4°	18°00'	+60'	4°	19°00'	+60'	4°	20°00'	+60'	4°	21°00'	+60'	14°	21
22	16°01'	+60'	4°	17°01'	+60'	4°	18°01'	+60'	4°	19°00'	+60'	4°	20°00'	+60'	4°	21°00'	+60'	4°	22°00'	+60'	12°	22
23	17°01'	+60'	4°	18°01'	+60'	4°	19°01'	+60'	4°	20°00'	+60'	4°	21°00'	+60'	4°	22°00'	+60'	4°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

176° 184° LHA — **Latitude SAME as DECLINATION** — **176° 184° LHA**

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

3° 357° LHA — **Latitude CONTRARY to Declination** — **3° 357° LHA**

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	6°00'	-60'	177°	5°00'	-60'	177°	4°00'	-60'	177°	3°00'	-60'	177°	2°00'	-60'	177°	1°00'	-60'	177°	0°00'	-60'	177°	0
1	5°00'	-60'	177°	4°00'	-60'	177°	3°00'	-60'	177°	2°00'	-60'	177°	1°00'	-60'	177°	0°00'	+60'	3°	1°00'	+60'	0°	1
2	4°00'	-60'	177°	3°00'	-60'	177°	2°00'	-60'	177°	1°00'	-60'	177°	0°00'	+60'	3°	1°00'	+60'	3°	2°00'	+60'	0°	2
3	3°00'	-60'	177°	2°00'	-60'	177°	1°00'	-60'	177°	0°00'	+60'	3°	1°00'	+60'	3°	2°00'	+60'	3°	3°00'	+60'	25°	3
4	2°00'	-60'	177°	1°00'	-60'	177°	0°00'	+60'	3°	1°00'	+60'	3°	2°00'	+60'	3°	3°00'	+60'	3°	4°00'	+60'	25°	4
5	1°00'	-60'	177°	0°00'	+60'	3°	1°00'	+60'	3°	2°00'	+60'	3°	3°00'	+60'	3°	4°00'	+60'	3°	5°00'	+60'	25°	5
6	0°00'	+60'	3°	1°00'	+60'	3°	2°00'	+60'	3°	3°00'	+60'	3°	4°00'	+60'	3°	5°00'	+60'	3°	6°00'	+60'	24°	6
7	1°00'	+60'	3°	2°00'	+60'	3°	3°00'	+60'	3°	4°00'	+60'	3°	5°00'	+60'	3°	6°00'	+60'	3°	7°00'	+60'	0°	7
8	2°00'	+60'	3°	3°00'	+60'	3°	4°00'	+60'	3°	5°00'	+60'	3°	6°00'	+60'	3°	7°00'	+60'	3°	8°00'	+60'	0°	8
9	3°00'	+60'	3°	4°00'	+60'	3°	5°00'	+60'	3°	6°00'	+60'	3°	7°00'	+60'	3°	8°00'	+60'	3°	9°00'	+60'	63°	9
10	4°00'	+60'	3°	5°00'	+60'	3°	6°00'	+60'	3°	7°00'	+60'	3°	8°00'	+60'	3°	9°00'	+60'	3°	10°00'	+60'	23°	10
11	5°00'	+60'	3°	6°00'	+60'	3°	7°00'	+60'	3°	8°00'	+60'	3°	9°00'	+60'	3°	10°00'	+60'	3°	11°00'	+60'	23°	11
12	6°00'	+60'	3°	7°00'	+60'	3°	8°00'	+60'	3°	9°00'	+60'	3°	10°00'	+60'	3°	11°00'	+60'	3°	12°00'	+60'	62°	12
13	7°00'	+60'	3°	8°00'	+60'	3°	9°00'	+60'	3°	10°00'	+60'	3°	11°00'	+60'	3°	12°00'	+60'	3°	13°00'	+60'	62°	13
14	8°00'	+60'	3°	9°00'	+60'	3°	10°00'	+60'	3°	11°00'	+60'	3°	12°00'	+60'	3°	13°00'	+60'	3°	14°00'	+60'	0°	14
15	9°00'	+60'	3°	10°00'	+60'	3°	11°00'	+60'	3°	12°00'	+60'	3°	13°00'	+60'	3°	14°00'	+60'	3°	15°00'	+60'	20°	15
16	10°00'	+60'	3°	11°00'	+60'	3°	12°00'	+60'	3°	13°00'	+60'	3°	14°00'	+60'	3°	15°00'	+60'	3°	16°00'	+60'	19°	16
17	11°00'	+60'	3°	12°00'	+60'	3°	13°00'	+60'	3°	14°00'	+60'	3°	15°00'	+60'	3°	16°00'	+60'	3°	17°00'	+60'	19°	17
18	12°00'	+60'	3°	13°00'	+60'	3°	14°00'	+60'	3°	15°00'	+60'	3°	16°00'	+60'	3°	17°00'	+60'	3°	18°00'	+60'	18°	18
19	13°00'	+60'	3°	14°00'	+60'	3°	15°00'	+60'	3°	16°00'	+60'	3°	17°00'	+60'	3°	18°00'	+60'	3°	19°00'	+60'	17°	19
20	14°00'	+60'	3°	15°00'	+60'	3°	16°00'	+60'	3°	17°00'	+60'	3°	18°00'	+60'	3°	19°00'	+60'	3°	20°00'	+60'	15°	20
21	15°00'	+60'	3°	16°00'	+60'	3°	17°00'	+60'	3°	18°00'	+60'	3°	19°00'	+60'	3°	20°00'	+60'	3°	21°00'	+60'	14°	21
22	16°00'	+60'	3°	17°00'	+60'	3°	18°00'	+60'	3°	19°00'	+60'	3°	20°00'	+60'	3°	21°00'	+60'	3°	22°00'	+60'	12°	22
23	17°00'	+60'	3°	18°00'	+60'	3°	19°00'	+60'	3°	20°00'	+60'	3°	21°00'	+60'	3°	22°00'	+60'	3°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

177° 183° LHA — **Latitude SAME as DECLINATION** — **177° 183° LHA**

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

2° 358° LHA — Latitude CONTRARY to Declination — 2° 358° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	6°00'	-60'	178°	5°00'	-60'	178°	4°00'	-60'	178°	3°00'	-60'	178°	2°00'	-60'	178°	1°00'	-60'	178°	0°00'	-60'	178°	0
1	5°00'	-60'	178°	4°00'	-60'	178°	3°00'	-60'	178°	2°00'	-60'	178°	1°00'	-60'	178°	0°00'	+60'	2°	1°00'	+60'	0°	1
2	4°00'	-60'	178°	3°00'	-60'	178°	2°00'	-60'	178°	1°00'	-60'	178°	0°00'	+60'	2°	1°00'	+60'	2°	2°00'	+60'	0°	2
3	3°00'	-60'	178°	2°00'	-60'	178°	1°00'	-60'	178°	0°00'	+60'	2°	1°00'	+60'	2°	2°00'	+60'	2°	3°00'	+60'	25°	3
4	2°00'	-60'	178°	1°00'	-60'	178°	0°00'	+60'	2°	1°00'	+60'	2°	2°00'	+60'	2°	3°00'	+60'	2°	4°00'	+60'	25°	4
5	1°00'	-60'	178°	0°00'	+60'	2°	1°00'	+60'	2°	2°00'	+60'	2°	3°00'	+60'	2°	4°00'	+60'	2°	5°00'	+60'	25°	5
6	0°00'	+60'	2°	1°00'	+60'	2°	2°00'	+60'	2°	3°00'	+60'	2°	4°00'	+60'	2°	5°00'	+60'	2°	6°00'	+60'	24°	6
7	1°00'	+60'	2°	2°00'	+60'	2°	3°00'	+60'	2°	4°00'	+60'	2°	5°00'	+60'	2°	6°00'	+60'	2°	7°00'	+60'	0°	7
8	2°00'	+60'	2°	3°00'	+60'	2°	4°00'	+60'	2°	5°00'	+60'	2°	6°00'	+60'	2°	7°00'	+60'	2°	8°00'	+60'	0°	8
9	3°00'	+60'	2°	4°00'	+60'	2°	5°00'	+60'	2°	6°00'	+60'	2°	7°00'	+60'	2°	8°00'	+60'	2°	9°00'	+60'	63°	9
10	4°00'	+60'	2°	5°00'	+60'	2°	6°00'	+60'	2°	7°00'	+60'	2°	8°00'	+60'	2°	9°00'	+60'	2°	10°00'	+60'	23°	10
11	5°00'	+60'	2°	6°00'	+60'	2°	7°00'	+60'	2°	8°00'	+60'	2°	9°00'	+60'	2°	10°00'	+60'	2°	11°00'	+60'	23°	11
12	6°00'	+60'	2°	7°00'	+60'	2°	8°00'	+60'	2°	9°00'	+60'	2°	10°00'	+60'	2°	11°00'	+60'	2°	12°00'	+60'	62°	12
13	7°00'	+60'	2°	8°00'	+60'	2°	9°00'	+60'	2°	10°00'	+60'	2°	11°00'	+60'	2°	12°00'	+60'	2°	13°00'	+60'	62°	13
14	8°00'	+60'	2°	9°00'	+60'	2°	10°00'	+60'	2°	11°00'	+60'	2°	12°00'	+60'	2°	13°00'	+60'	2°	14°00'	+60'	0°	14
15	9°00'	+60'	2°	10°00'	+60'	2°	11°00'	+60'	2°	12°00'	+60'	2°	13°00'	+60'	2°	14°00'	+60'	2°	15°00'	+60'	20°	15
16	10°00'	+60'	2°	11°00'	+60'	2°	12°00'	+60'	2°	13°00'	+60'	2°	14°00'	+60'	2°	15°00'	+60'	2°	16°00'	+60'	19°	16
17	11°00'	+60'	2°	12°00'	+60'	2°	13°00'	+60'	2°	14°00'	+60'	2°	15°00'	+60'	2°	16°00'	+60'	2°	17°00'	+60'	19°	17
18	12°00'	+60'	2°	13°00'	+60'	2°	14°00'	+60'	2°	15°00'	+60'	2°	16°00'	+60'	2°	17°00'	+60'	2°	18°00'	+60'	18°	18
19	13°00'	+60'	2°	14°00'	+60'	2°	15°00'	+60'	2°	16°00'	+60'	2°	17°00'	+60'	2°	18°00'	+60'	2°	19°00'	+60'	17°	19
20	14°00'	+60'	2°	15°00'	+60'	2°	16°00'	+60'	2°	17°00'	+60'	2°	18°00'	+60'	2°	19°00'	+60'	2°	20°00'	+60'	15°	20
21	15°00'	+60'	2°	16°00'	+60'	2°	17°00'	+60'	2°	18°00'	+60'	2°	19°00'	+60'	2°	20°00'	+60'	2°	21°00'	+60'	14°	21
22	16°00'	+60'	2°	17°00'	+60'	2°	18°00'	+60'	2°	19°00'	+60'	2°	20°00'	+60'	2°	21°00'	+60'	2°	22°00'	+60'	12°	22
23	17°00'	+60'	2°	18°00'	+60'	2°	19°00'	+60'	2°	20°00'	+60'	2°	21°00'	+60'	2°	22°00'	+60'	2°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

178° 182° LHA — Latitude SAME as DECLINATION — 178° 182° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

1° 359° LHA — Latitude CONTRARY to Declination — 1° 359° LHA

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	6°00'	-60'	179°	5°00'	-60'	179°	4°00'	-60'	179°	3°00'	-60'	179°	2°00'	-60'	179°	1°00'	-60'	179°	0°00'	-60'	179°	0
1	5°00'	-60'	179°	4°00'	-60'	179°	3°00'	-60'	179°	2°00'	-60'	179°	1°00'	-60'	179°	0°00'	+60'	1°	1°00'	+60'	0°	1
2	4°00'	-60'	179°	3°00'	-60'	179°	2°00'	-60'	179°	1°00'	-60'	179°	0°00'	+60'	1°	1°00'	+60'	1°	2°00'	+60'	0°	2
3	3°00'	-60'	179°	2°00'	-60'	179°	1°00'	-60'	179°	0°00'	+60'	1°	1°00'	+60'	1°	2°00'	+60'	1°	3°00'	+60'	25°	3
4	2°00'	-60'	179°	1°00'	-60'	179°	0°00'	+60'	1°	1°00'	+60'	1°	2°00'	+60'	1°	3°00'	+60'	1°	4°00'	+60'	25°	4
5	1°00'	-60'	179°	0°00'	+60'	1°	1°00'	+60'	1°	2°00'	+60'	1°	3°00'	+60'	1°	4°00'	+60'	1°	5°00'	+60'	25°	5
6	0°00'	+60'	1°	1°00'	+60'	1°	2°00'	+60'	1°	3°00'	+60'	1°	4°00'	+60'	1°	5°00'	+60'	1°	6°00'	+60'	24°	6
7	1°00'	+60'	1°	2°00'	+60'	1°	3°00'	+60'	1°	4°00'	+60'	1°	5°00'	+60'	1°	6°00'	+60'	1°	7°00'	+60'	0°	7
8	2°00'	+60'	1°	3°00'	+60'	1°	4°00'	+60'	1°	5°00'	+60'	1°	6°00'	+60'	1°	7°00'	+60'	1°	8°00'	+60'	0°	8
9	3°00'	+60'	1°	4°00'	+60'	1°	5°00'	+60'	1°	6°00'	+60'	1°	7°00'	+60'	1°	8°00'	+60'	1°	9°00'	+60'	63°	9
10	4°00'	+60'	1°	5°00'	+60'	1°	6°00'	+60'	1°	7°00'	+60'	1°	8°00'	+60'	1°	9°00'	+60'	1°	10°00'	+60'	23°	10
11	5°00'	+60'	1°	6°00'	+60'	1°	7°00'	+60'	1°	8°00'	+60'	1°	9°00'	+60'	1°	10°00'	+60'	1°	11°00'	+60'	23°	11
12	6°00'	+60'	1°	7°00'	+60'	1°	8°00'	+60'	1°	9°00'	+60'	1°	10°00'	+60'	1°	11°00'	+60'	1°	12°00'	+60'	62°	12
13	7°00'	+60'	1°	8°00'	+60'	1°	9°00'	+60'	1°	10°00'	+60'	1°	11°00'	+60'	1°	12°00'	+60'	1°	13°00'	+60'	62°	13
14	8°00'	+60'	1°	9°00'	+60'	1°	10°00'	+60'	1°	11°00'	+60'	1°	12°00'	+60'	1°	13°00'	+60'	1°	14°00'	+60'	0°	14
15	9°00'	+60'	1°	10°00'	+60'	1°	11°00'	+60'	1°	12°00'	+60'	1°	13°00'	+60'	1°	14°00'	+60'	1°	15°00'	+60'	20°	15
16	10°00'	+60'	1°	11°00'	+60'	1°	12°00'	+60'	1°	13°00'	+60'	1°	14°00'	+60'	1°	15°00'	+60'	1°	16°00'	+60'	19°	16
17	11°00'	+60'	1°	12°00'	+60'	1°	13°00'	+60'	1°	14°00'	+60'	1°	15°00'	+60'	1°	16°00'	+60'	1°	17°00'	+60'	19°	17
18	12°00'	+60'	1°	13°00'	+60'	1°	14°00'	+60'	1°	15°00'	+60'	1°	16°00'	+60'	1°	17°00'	+60'	1°	18°00'	+60'	18°	18
19	13°00'	+60'	1°	14°00'	+60'	1°	15°00'	+60'	1°	16°00'	+60'	1°	17°00'	+60'	1°	18°00'	+60'	1°	19°00'	+60'	17°	19
20	14°00'	+60'	1°	15°00'	+60'	1°	16°00'	+60'	1°	17°00'	+60'	1°	18°00'	+60'	1°	19°00'	+60'	1°	20°00'	+60'	15°	20
21	15°00'	+60'	1°	16°00'	+60'	1°	17°00'	+60'	1°	18°00'	+60'	1°	19°00'	+60'	1°	20°00'	+60'	1°	21°00'	+60'	14°	21
22	16°00'	+60'	1°	17°00'	+60'	1°	18°00'	+60'	1°	19°00'	+60'	1°	20°00'	+60'	1°	21°00'	+60'	1°	22°00'	+60'	12°	22
23	17°00'	+60'	1°	18°00'	+60'	1°	19°00'	+60'	1°	20°00'	+60'	1°	21°00'	+60'	1°	22°00'	+60'	1°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

179° 181° LHA — Latitude SAME as DECLINATION — 179° 181° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . Zn = Z LHA < 180° . . Zn= 360-Z

0° 360° LHA — **Latitude CONTRARY to Declination** — **0° 360° LHA**

	84			85			86			87			88			89			90			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	6°00'	-60'	180°	5°00'	-60'	180°	4°00'	-60'	180°	3°00'	-60'	180°	2°00'	-60'	180°	1°00'	-60'	180°	0°00'	-60'	180°	0
1	5°00'	-60'	180°	4°00'	-60'	180°	3°00'	-60'	180°	2°00'	-60'	180°	1°00'	-60'	180°	0°00'	-60'	180°	1°00'	+60'	0°	1
2	4°00'	-60'	180°	3°00'	-60'	180°	2°00'	-60'	180°	1°00'	-60'	180°	0°00'	-60'	180°	1°00'	+60'	0°	2°00'	+60'	0°	2
3	3°00'	-60'	180°	2°00'	-60'	180°	1°00'	-60'	180°	0°00'	-60'	180°	1°00'	+60'	0°	2°00'	+60'	0°	3°00'	+60'	25°	3
4	2°00'	-60'	180°	1°00'	-60'	180°	0°00'	+60'	0°	1°00'	+60'	0°	2°00'	+60'	0°	3°00'	+60'	0°	4°00'	+60'	25°	4
5	1°00'	-60'	180°	0°00'	+60'	0°	1°00'	+60'	0°	2°00'	+60'	0°	3°00'	+60'	0°	4°00'	+60'	0°	5°00'	+60'	25°	5
6	0°00'	+60'	0°	1°00'	+60'	0°	2°00'	+60'	0°	3°00'	+60'	0°	4°00'	+60'	0°	5°00'	+60'	0°	6°00'	+60'	24°	6
7	1°00'	+60'	0°	2°00'	+60'	0°	3°00'	+60'	0°	4°00'	+60'	0°	5°00'	+60'	0°	6°00'	+60'	0°	7°00'	+60'	0°	7
8	2°00'	+60'	0°	3°00'	+60'	0°	4°00'	+60'	0°	5°00'	+60'	0°	6°00'	+60'	0°	7°00'	+60'	0°	8°00'	+60'	0°	8
9	3°00'	+60'	0°	4°00'	+60'	0°	5°00'	+60'	0°	6°00'	+60'	0°	7°00'	+60'	0°	8°00'	+60'	0°	9°00'	+60'	63°	9
10	4°00'	+60'	0°	5°00'	+60'	0°	6°00'	+60'	0°	7°00'	+60'	0°	8°00'	+60'	0°	9°00'	+60'	0°	10°00'	+60'	23°	10
11	5°00'	+60'	0°	6°00'	+60'	0°	7°00'	+60'	0°	8°00'	+60'	0°	9°00'	+60'	0°	10°00'	+60'	0°	11°00'	+60'	23°	11
12	6°00'	+60'	0°	7°00'	+60'	0°	8°00'	+60'	0°	9°00'	+60'	0°	10°00'	+60'	0°	11°00'	+60'	0°	12°00'	+60'	62°	12
13	7°00'	+60'	0°	8°00'	+60'	0°	9°00'	+60'	0°	10°00'	+60'	0°	11°00'	+60'	0°	12°00'	+60'	0°	13°00'	+60'	62°	13
14	8°00'	+60'	0°	9°00'	+60'	0°	10°00'	+60'	0°	11°00'	+60'	0°	12°00'	+60'	0°	13°00'	+60'	0°	14°00'	+60'	0°	14
15	9°00'	+60'	0°	10°00'	+60'	0°	11°00'	+60'	0°	12°00'	+60'	0°	13°00'	+60'	0°	14°00'	+60'	0°	15°00'	+60'	20°	15
16	10°00'	+60'	0°	11°00'	+60'	0°	12°00'	+60'	0°	13°00'	+60'	0°	14°00'	+60'	0°	15°00'	+60'	0°	16°00'	+60'	19°	16
17	11°00'	+60'	0°	12°00'	+60'	0°	13°00'	+60'	0°	14°00'	+60'	0°	15°00'	+60'	0°	16°00'	+60'	0°	17°00'	+60'	19°	17
18	12°00'	+60'	0°	13°00'	+60'	0°	14°00'	+60'	0°	15°00'	+60'	0°	16°00'	+60'	0°	17°00'	+60'	0°	18°00'	+60'	18°	18
19	13°00'	+60'	0°	14°00'	+60'	0°	15°00'	+60'	0°	16°00'	+60'	0°	17°00'	+60'	0°	18°00'	+60'	0°	19°00'	+60'	17°	19
20	14°00'	+60'	0°	15°00'	+60'	0°	16°00'	+60'	0°	17°00'	+60'	0°	18°00'	+60'	0°	19°00'	+60'	0°	20°00'	+60'	15°	20
21	15°00'	+60'	0°	16°00'	+60'	0°	17°00'	+60'	0°	18°00'	+60'	0°	19°00'	+60'	0°	20°00'	+60'	0°	21°00'	+60'	14°	21
22	16°00'	+60'	0°	17°00'	+60'	0°	18°00'	+60'	0°	19°00'	+60'	0°	20°00'	+60'	0°	21°00'	+60'	0°	22°00'	+60'	12°	22
23	17°00'	+60'	0°	18°00'	+60'	0°	19°00'	+60'	0°	20°00'	+60'	0°	21°00'	+60'	0°	22°00'	+60'	0°	23°00'	+60'	90°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	84			85			86			87			88			89			90			

180° 180° LHA — **Latitude SAME as DECLINATION** — **180° 180° LHA**

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

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