

Integer

Sight Reduction Tables

Latitude  $7^{\circ}$  to  $13^{\circ}$

## 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.



2° 358° LHA

Latitude SAME as Declination

2° 358° LHA

Table with columns for Dec° (0-23) and LHA (7-13). Each cell contains three coordinates (Hc°, d', Z°) for each hour.

2° 358° LHA

Latitude SAME as Declination

2° 358° LHA

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

3° 357° LHA

Latitude SAME as Declination

3° 357° LHA

Table with columns for Dec° (0-23) and LHA (7-13). Each cell contains three coordinates (Hc°, d', Z°) for each hour.

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

12° 348° LHA

**Latitude SAME as Declination**

12° 348° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	76°08'	+29'	120°	75°37'	+32'	123°	75°02'	+35'	126°	74°26'	+38'	129°	73°47'	+40'	132°	73°06'	+42'	134°	72°23'	+44'	137°	0
1	76°37'	+25'	116°	76°09'	+29'	120°	75°37'	+32'	123°	75°03'	+35'	126°	74°27'	+38'	129°	73°48'	+40'	132°	73°07'	+42'	134°	1
2	77°02'	+22'	112°	76°38'	+26'	116°	76°10'	+29'	120°	75°38'	+32'	123°	75°04'	+35'	126°	74°28'	+38'	129°	73°49'	+40'	132°	2
3	77°24'	+17'	108°	77°03'	+22'	112°	76°39'	+26'	116°	76°11'	+29'	120°	75°40'	+33'	123°	75°06'	+35'	126°	74°29'	+38'	129°	3
4	77°41'	+13'	103°	77°25'	+17'	108°	77°05'	+22'	112°	76°40'	+26'	116°	76°12'	+29'	120°	75°41'	+33'	123°	75°07'	+36'	126°	4
5	77°54'	+08'	99°	77°42'	+13'	103°	77°26'	+18'	108°	77°06'	+22'	112°	76°42'	+26'	116°	76°14'	+30'	120°	75°43'	+33'	123°	5
6	78°02'	+03'	94°	77°55'	+08'	99°	77°44'	+13'	103°	77°28'	+18'	108°	77°08'	+22'	112°	76°43'	+26'	116°	76°15'	+30'	119°	6
7	78°05'	-02'	89°	78°04'	+03'	94°	77°57'	+08'	99°	77°46'	+13'	103°	77°30'	+18'	108°	77°09'	+22'	112°	76°45'	+26'	116°	7
8	78°04'	-07'	84°	78°07'	-02'	89°	78°05'	+03'	94°	77°59'	+09'	99°	77°48'	+13'	103°	77°32'	+18'	108°	77°11'	+22'	112°	8
9	77°57'	-11'	80°	78°05'	-07'	84°	78°09'	-02'	89°	78°07'	+04'	94°	78°01'	+09'	99°	77°50'	+14'	103°	77°34'	+18'	108°	9
10	77°46'	-16'	75°	77°59'	-11'	80°	78°07'	-06'	84°	78°11'	-01'	89°	78°10'	+04'	94°	78°03'	+09'	98°	77°52'	+14'	103°	10
11	77°30'	-20'	70°	77°48'	-16'	75°	78°01'	-11'	79°	78°10'	-06'	84°	78°13'	-01'	89°	78°12'	+04'	94°	78°06'	+09'	98°	11
12	77°09'	-24'	66°	77°32'	-20'	70°	77°50'	-16'	75°	78°03'	-11'	79°	78°12'	-06'	84°	78°16'	-01'	89°	78°15'	+04'	94°	12
13	76°45'	-28'	62°	77°11'	-24'	66°	77°34'	-20'	70°	77°52'	-16'	75°	78°06'	-11'	79°	78°15'	-06'	84°	78°19'	-01'	89°	13
14	76°17'	-31'	58°	76°47'	-28'	62°	77°14'	-24'	66°	77°36'	-20'	70°	77°55'	-16'	74°	78°08'	-11'	79°	78°17'	-06'	84°	14
15	75°46'	-34'	55°	76°19'	-31'	58°	76°49'	-28'	62°	77°16'	-24'	66°	77°39'	-20'	70°	77°57'	-16'	74°	78°11'	-11'	79°	15
16	75°12'	-37'	51°	75°48'	-34'	55°	76°22'	-31'	58°	76°52'	-28'	62°	77°19'	-24'	65°	77°42'	-20'	70°	78°00'	-16'	74°	16
17	74°36'	-39'	48°	75°14'	-37'	51°	75°51'	-34'	54°	76°24'	-31'	58°	76°54'	-28'	61°	77°21'	-24'	65°	77°45'	-20'	69°	17
18	73°57'	-41'	46°	74°38'	-39'	48°	75°17'	-37'	51°	75°53'	-34'	54°	76°27'	-31'	58°	76°57'	-28'	61°	77°24'	-24'	65°	18
19	73°16'	-43'	43°	73°59'	-41'	45°	74°40'	-39'	48°	75°19'	-37'	51°	75°56'	-34'	54°	76°29'	-31'	57°	77°00'	-28'	61°	19
20	72°33'	-44'	41°	73°18'	-43'	43°	74°01'	-41'	45°	74°42'	-39'	48°	75°22'	-37'	51°	75°58'	-34'	54°	76°32'	-31'	57°	20
21	71°49'	-46'	38°	72°35'	-44'	40°	73°20'	-43'	43°	74°03'	-41'	45°	74°45'	-39'	48°	75°24'	-37'	50°	76°01'	-34'	53°	21
22	71°03'	-47'	36°	71°51'	-46'	38°	72°37'	-44'	40°	73°22'	-43'	42°	74°06'	-41'	45°	74°48'	-39'	47°	75°27'	-37'	50°	22
23	70°16'	-48'	35°	71°05'	-47'	36°	71°53'	-46'	38°	72°40'	-44'	40°	73°25'	-43'	42°	74°09'	-41'	44°	74°51'	-39'	47°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	75°16'	+27'	118°	74°46'	+30'	121°	74°14'	+33'	124°	73°39'	+36'	127°	73°02'	+38'	130°	72°23'	+40'	132°	71°42'	+42'	134°	0
1	75°43'	+24'	114°	75°17'	+27'	118°	74°47'	+30'	121°	74°15'	+33'	124°	73°40'	+36'	127°	73°03'	+38'	130°	72°24'	+40'	132°	1
2	76°07'	+20'	110°	75°44'	+24'	114°	75°18'	+27'	118°	74°48'	+31'	121°	74°16'	+34'	124°	73°41'	+36'	127°	73°04'	+38'	129°	2
3	76°27'	+16'	107°	76°08'	+20'	110°	75°45'	+24'	114°	75°19'	+28'	118°	74°50'	+31'	121°	74°18'	+34'	124°	73°43'	+36'	127°	3
4	76°43'	+12'	102°	76°28'	+16'	106°	76°09'	+20'	110°	75°47'	+24'	114°	75°20'	+28'	118°	74°51'	+31'	121°	74°19'	+34'	124°	4
5	76°55'	+08'	98°	76°44'	+12'	102°	76°30'	+16'	106°	76°11'	+21'	110°	75°48'	+24'	114°	75°22'	+28'	117°	74°53'	+31'	121°	5
6	77°03'	+03'	94°	76°57'	+08'	98°	76°46'	+12'	102°	76°31'	+17'	106°	76°13'	+21'	110°	75°50'	+25'	114°	75°24'	+28'	117°	6
7	77°06'	-01'	89°	77°04'	+03'	94°	76°58'	+08'	98°	76°48'	+12'	102°	76°33'	+17'	106°	76°15'	+21'	110°	75°52'	+25'	114°	7
8	77°04'	-06'	85°	77°08'	-01'	89°	77°06'	+03'	93°	77°00'	+08'	98°	76°50'	+13'	102°	76°35'	+17'	106°	76°17'	+21'	110°	8
9	76°58'	-10'	80°	77°06'	-06'	85°	77°10'	-01'	89°	77°08'	+03'	93°	77°03'	+08'	98°	76°52'	+13'	102°	76°38'	+17'	106°	9
10	76°48'	-15'	76°	77°00'	-10'	80°	77°08'	-06'	84°	77°12'	-01'	89°	77°11'	+04'	93°	77°05'	+08'	98°	76°55'	+13'	102°	10
11	76°33'	-19'	72°	76°50'	-15'	76°	77°03'	-10'	80°	77°11'	-06'	84°	77°14'	-01'	89°	77°13'	+04'	93°	77°08'	+08'	98°	11
12	76°15'	-22'	68°	76°35'	-19'	72°	76°52'	-15'	76°	77°05'	-10'	80°	77°13'	-06'	84°	77°17'	-01'	89°	77°16'	+04'	93°	12
13	75°52'	-26'	64°	76°17'	-22'	68°	76°38'	-19'	71°	76°55'	-14'	76°	77°08'	-10'	80°	77°16'	-06'	84°	77°20'	-01'	89°	13
14	75°26'	-29'	60°	75°54'	-26'	64°	76°19'	-22'	67°	76°40'	-19'	71°	76°58'	-14'	75°	77°11'	-10'	80°	77°19'	-05'	84°	14
15	74°57'	-32'	57°	75°28'	-29'	60°	75°57'	-26'	63°	76°22'	-22'	67°	76°43'	-19'	71°	77°01'	-14'	75°	77°14'	-10'	79°	15
16	74°25'	-35'	54°	74°59'	-32'	57°	75°31'	-29'	60°	75°59'	-26'	63°	76°25'	-22'	67°	76°46'	-18'	71°	77°04'	-14'	75°	16
17	73°50'	-37'	51°	74°27'	-35'	53°	75°02'	-32'	56°	75°34'	-29'	60°	76°02'	-26'	63°	76°28'	-22'	67°	76°50'	-18'	71°	17
18	73°13'	-39'	48°	73°53'	-37'	50°	74°30'	-35'	53°	75°04'	-32'	56°	75°36'	-29'	59°	76°05'	-26'	63°	76°31'	-22'	67°	18
19	72°34'	-41'	45°	73°16'	-39'	48°	73°55'	-37'	50°	74°32'	-35'	53°	75°07'	-32'	56°	75°40'	-29'	59°	76°09'	-26'	63°	19
20	71°53'	-43'	43°	72°37'	-41'	45°	73°18'	-39'	47°	73°58'	-37'	50°	74°35'	-35'	53°	75°10'	-32'	56°	75°43'	-29'	59°	20
21	71°11'	-44'	41°	71°56'	-43'	43°	72°39'	-41'	45°	73°21'	-39'	47°	74°01'	-37'	50°	74°38'	-35'	52°	75°14'	-32'	55°	21
22	70°27'	-45'	39°	71°13'	-44'	40°	71°58'	-43'	42°	72°42'	-41'	45°	73°24'	-39'	47°	74°04'	-37'	49°	74°42'	-35'	52°	22
23	69°42'	-46'	37°	70°29'	-45'	38°	71°16'	-44'	40°	72°01'	-43'	42°	72°45'	-41'	44°	73°27'	-39'	47°	74°07'	-37'	49°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	74°23'	+26'	116°	73°55'	+29'	119°	73°24'	+32'	122°	72°51'	+34'	125°	72°16'	+37'	127°	71°38'	+39'	130°	70°59'	+41'	132°	0
1	74°48'	+22'	113°	74°24'	+26'	116°	73°56'	+29'	119°	73°25'	+32'	122°	72°52'	+34'	125°	72°17'	+37'	127°	71°40'	+39'	130°	1
2	75°11'	+19'	109°	74°49'	+23'	113°	74°25'	+26'	116°	73°57'	+29'	119°	73°27'	+32'	122°	72°54'	+34'	125°	72°18'	+37'	127°	2
3	75°30'	+15'	105°	75°12'	+19'	109°	74°51'	+23'	112°	74°26'	+26'	116°	73°59'	+29'	119°	73°28'	+32'	122°	72°55'	+35'	125°	3
4	75°45'	+11'	101°	75°31'	+15'	105°	75°13'	+19'	109°	74°52'	+23'	112°	74°28'	+26'	116°	74°00'	+29'	119°	73°30'	+32'	122°	4
5	75°56'	+07'	97°	75°46'	+11'	101°	75°33'	+15'	105°	75°15'	+19'	109°	74°54'	+23'	112°	74°30'	+26'	116°	74°02'	+30'	119°	5
6	76°03'	+03'	93°	75°58'	+07'	97°	75°48'	+12'	101°	75°34'	+16'	105°	75°17'	+20'	109°	74°56'	+23'	112°	74°32'	+27'	116°	6
7	76°06'	-01'	89°	76°05'	+03'	93°	76°00'	+07'	97°	75°50'	+12'	101°	75°37'	+16'	105°	75°19'	+20'	109°	74°58'	+23'	112°	7
8	76°05'	-05'	85°	76°08'	-01'	89°	76°07'	+03'	93°	76°02'	+08'	97°	75°52'	+12'	101°	75°39'	+16'	105°	75°22'	+20'	109°	8
9	76°00'	-10'	81°	76°07'	-05'	85°	76°10'	-01'	89°	76°09'	+03'	93°	76°04'	+08'	97°	75°55'	+12'	101°	75°41'	+16'	105°	9
10	75°50'	-14'	77°	76°02'	-09'	81°	76°09'	-05'	85°	76°13'	-01'	89°	76°12'	+04'	93°	76°07'	+08'	97°	75°58'	+12'	101°	10
11	75°37'	-17'	73°	75°52'	-13'	77°	76°04'	-09'	81°	76°12'	-05'	85°	76°16'	-01'	89°	76°15'	+04'	93°	76°10'	+08'	97°	11
12	75°19'	-21'	69°	75°39'	-17'	73°	75°55'	-13'	76°	76°07'	-09'	80°	76°15'	-05'	84°	76°18'	-01'	89°	76°18'	+04'	93°	12
13	74°58'	-24'	65°	75°22'	-21'	69°	75°41'	-17'	73°	75°58'	-13'	76°	76°10'	-09'	80°	76°18'	-05'	84°	76°22'	-01'	88°	13
14	74°34'	-27'	62°	75°01'	-24'	65°	75°24'	-21'	69°	75°44'	-17'	72°	76°01'	-13'	76°	76°13'	-09'	80°	76°21'	-05'	84°	14
15	74°07'	-30'	59°	74°36'	-27'	62°	75°03'	-24'	65°	75°27'	-21'	68°	75°47'	-17'	72°	76°04'	-13'	76°	76°16'	-09'	80°	15
16	73°36'	-33'	55°	74°09'	-30'	58°	74°39'	-27'	61°	75°06'	-24'	65°	75°30'	-21'	68°	75°51'	-17'	72°	76°07'	-13'	76°	16
17	73°04'	-35'	53°	73°39'	-33'	55°	74°12'	-30'	58°	74°42'	-27'	61°	75°10'	-24'	65°	75°34'	-21'	68°	75°54'	-17'	72°	17
18	72°29'	-37'	50°	73°06'	-35'	52°	73°42'	-33'	55°	74°15'	-30'	58°	74°45'	-27'	61°	75°13'	-24'	64°	75°37'	-21'	68°	18
19	71°51'	-39'	47°	72°31'	-37'	50°	73°09'	-35'	52°	73°45'	-33'	55°	74°18'	-30'	58°	74°49'	-27'	61°	75°16'	-24'	64°	19
20	71°12'	-41'	45°	71°54'	-39'	47°	72°34'	-37'	49°	73°12'	-35'	52°	73°48'	-33'	55°	74°21'	-30'	57°	74°52'	-27'	61°	20
21	70°31'	-42'	43°	71°15'	-41'	45°	71°57'	-39'	47°	72°37'	-37'	49°	73°15'	-35'	52°	73°51'	-33'	54°	74°25'	-30'	57°	21
22	69°49'	-44'	41°	70°34'	-42'	42°	71°18'	-41'	44°	72°00'	-39'	47°	72°40'	-37'	49°	73°19'	-35'	51°	73°55'	-33'	54°	22
23	69°05'	-45'	39°	69°52'	-44'	40°	70°37'	-42'	42°	71°20'	-41'	44°	72°03'	-39'	46°	72°43'	-37'	49°	73°22'	-35'	51°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	73°29'	+24'	114°	73°03'	+27'	117°	72°34'	+30'	120°	72°02'	+33'	123°	71°28'	+35'	125°	70°53'	+37'	128°	70°15'	+39'	130°	0
1	73°53'	+21'	111°	73°30'	+24'	114°	73°04'	+27'	117°	72°35'	+30'	120°	72°03'	+33'	123°	71°30'	+35'	125°	70°54'	+37'	128°	1
2	74°14'	+18'	108°	73°54'	+21'	111°	73°31'	+25'	114°	73°05'	+28'	117°	72°36'	+30'	120°	72°05'	+33'	123°	71°31'	+35'	125°	2
3	74°32'	+14'	104°	74°16'	+18'	108°	73°56'	+21'	111°	73°33'	+25'	114°	73°07'	+28'	117°	72°38'	+31'	120°	72°07'	+33'	123°	3
4	74°46'	+11'	101°	74°34'	+14'	104°	74°17'	+18'	108°	73°57'	+22'	111°	73°34'	+25'	114°	73°08'	+28'	117°	72°40'	+31'	120°	4
5	74°57'	+07'	97°	74°48'	+11'	100°	74°35'	+15'	104°	74°19'	+18'	107°	73°59'	+22'	111°	73°36'	+25'	114°	73°11'	+28'	117°	5
6	75°04'	+03'	93°	74°59'	+07'	97°	74°50'	+11'	100°	74°37'	+15'	104°	74°21'	+18'	107°	74°01'	+22'	111°	73°39'	+25'	114°	6
7	75°07'	-01'	89°	75°06'	+03'	93°	75°01'	+07'	97°	74°52'	+11'	100°	74°39'	+15'	104°	74°23'	+19'	107°	74°04'	+22'	111°	7
8	75°06'	-05'	85°	75°09'	-01'	89°	75°08'	+03'	93°	75°03'	+07'	96°	74°54'	+11'	100°	74°42'	+15'	104°	74°26'	+19'	107°	8
9	75°01'	-09'	81°	75°08'	-05'	85°	75°11'	-01'	89°	75°10'	+03'	93°	75°06'	+07'	96°	74°57'	+11'	100°	74°45'	+15'	104°	9
10	74°52'	-13'	78°	75°03'	-09'	81°	75°10'	-05'	85°	75°14'	-01'	89°	75°13'	+03'	92°	75°09'	+08'	96°	75°00'	+12'	100°	10
11	74°39'	-16'	74°	74°54'	-12'	77°	75°06'	-09'	81°	75°13'	-05'	85°	75°17'	00'	89°	75°16'	+04'	92°	75°12'	+08'	96°	11
12	74°23'	-20'	70°	74°42'	-16'	74°	74°57'	-12'	77°	75°09'	-08'	81°	75°16'	-04'	85°	75°20'	00'	88°	75°19'	+04'	92°	12
13	74°04'	-23'	67°	74°26'	-19'	70°	74°45'	-16'	73°	75°00'	-12'	77°	75°12'	-08'	81°	75°19'	-04'	84°	75°23'	00'	88°	13
14	73°41'	-26'	63°	74°07'	-23'	67°	74°29'	-19'	70°	74°48'	-16'	73°	75°03'	-12'	77°	75°15'	-08'	81°	75°23'	-04'	84°	14
15	73°15'	-29'	60°	73°44'	-26'	63°	74°09'	-23'	66°	74°32'	-19'	70°	74°51'	-16'	73°	75°07'	-12'	77°	75°19'	-08'	80°	15
16	72°47'	-31'	57°	73°18'	-28'	60°	73°47'	-26'	63°	74°13'	-23'	66°	74°35'	-19'	69°	74°55'	-16'	73°	75°11'	-12'	77°	16
17	72°16'	-33'	54°	72°50'	-31'	57°	73°21'	-28'	60°	73°50'	-26'	63°	74°16'	-23'	66°	74°39'	-19'	69°	74°59'	-16'	73°	17
18	71°42'	-36'	52°	72°19'	-33'	54°	72°53'	-31'	57°	73°24'	-28'	60°	73°53'	-26'	63°	74°20'	-23'	66°	74°43'	-19'	69°	18
19	71°07'	-37'	49°	71°45'	-35'	51°	72°22'	-33'	54°	72°56'	-31'	56°	73°28'	-28'	59°	73°57'	-26'	62°	74°24'	-23'	65°	19
20	70°29'	-39'	47°	71°10'	-37'	49°	71°48'	-35'	51°	72°25'	-33'	54°	72°59'	-31'	56°	73°32'	-28'	59°	74°01'	-26'	62°	20
21	69°50'	-41'	45°	70°32'	-39'	46°	71°13'	-37'	49°	71°52'	-35'	51°	72°28'	-33'	53°	73°03'	-31'	56°	73°35'	-28'	59°	21
22	69°10'	-42'	42°	69°53'	-41'	44°	70°35'	-39'	46°	71°16'	-37'	48°	71°55'	-36'	51°	72°32'	-33'	53°	73°07'	-31'	56°	22
23	68°27'	-44'	40°	69°12'	-42'	42°	69°56'	-41'	44°	70°39'	-39'	46°	71°20'	-37'	48°	71°59'	-36'	50°	72°36'	-33'	53°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	72°34'	+23'	113°	72°09'	+26'	116°	71°42'	+29'	119°	71°12'	+31'	121°	70°40'	+34'	124°	70°06'	+36'	126°	69°30'	+38'	128°	0
1	72°57'	+20'	110°	72°35'	+23'	113°	72°11'	+26'	116°	71°43'	+29'	119°	71°13'	+31'	121°	70°41'	+34'	124°	70°07'	+36'	126°	1
2	73°17'	+17'	107°	72°59'	+20'	110°	72°37'	+23'	113°	72°12'	+26'	116°	71°45'	+29'	118°	71°15'	+32'	121°	70°43'	+34'	123°	2
3	73°34'	+14'	103°	73°19'	+17'	107°	73°00'	+20'	110°	72°38'	+23'	113°	72°14'	+26'	116°	71°47'	+29'	118°	71°17'	+32'	121°	3
4	73°48'	+10'	100°	73°36'	+14'	103°	73°20'	+17'	106°	73°02'	+21'	110°	72°40'	+24'	113°	72°16'	+27'	115°	71°49'	+29'	118°	4
5	73°58'	+07'	96°	73°49'	+10'	100°	73°38'	+14'	103°	73°22'	+17'	106°	73°04'	+21'	109°	72°42'	+24'	113°	72°18'	+27'	115°	5
6	74°04'	+03'	93°	74°00'	+07'	96°	73°52'	+10'	100°	73°40'	+14'	103°	73°25'	+18'	106°	73°06'	+21'	109°	72°45'	+24'	112°	6
7	74°07'	-01'	89°	74°06'	+03'	93°	74°02'	+07'	96°	73°54'	+11'	99°	73°42'	+14'	103°	73°27'	+18'	106°	73°09'	+21'	109°	7
8	74°06'	-04'	85°	74°09'	-01'	89°	74°09'	+03'	92°	74°04'	+07'	96°	73°56'	+11'	99°	73°45'	+14'	103°	73°30'	+18'	106°	8
9	74°02'	-08'	82°	74°09'	-04'	85°	74°12'	-01'	89°	74°11'	+03'	92°	74°07'	+07'	96°	73°59'	+11'	99°	73°48'	+15'	103°	9
10	73°54'	-12'	78°	74°04'	-08'	82°	74°11'	-04'	85°	74°15'	00'	89°	74°14'	+03'	92°	74°10'	+07'	96°	74°02'	+11'	99°	10
11	73°42'	-15'	75°	73°56'	-12'	78°	74°07'	-08'	81°	74°14'	-04'	85°	74°18'	00'	88°	74°17'	+04'	92°	74°14'	+07'	96°	11
12	73°27'	-18'	71°	73°45'	-15'	74°	73°59'	-11'	78°	74°10'	-08'	81°	74°17'	-04'	85°	74°21'	00'	88°	74°21'	+04'	92°	12
13	73°09'	-21'	68°	73°30'	-18'	71°	73°48'	-15'	74°	74°02'	-11'	78°	74°14'	-08'	81°	74°21'	-04'	85°	74°25'	+00'	88°	13
14	72°48'	-24'	65°	73°12'	-21'	68°	73°33'	-18'	71°	73°51'	-15'	74°	74°06'	-11'	77°	74°17'	-08'	81°	74°25'	-04'	84°	14
15	72°23'	-27'	62°	72°50'	-24'	64°	73°15'	-21'	67°	73°36'	-18'	71°	73°55'	-15'	74°	74°10'	-11'	77°	74°21'	-07'	81°	15
16	71°56'	-29'	59°	72°26'	-27'	61°	72°54'	-24'	64°	73°18'	-21'	67°	73°40'	-18'	70°	73°58'	-15'	74°	74°14'	-11'	77°	16
17	71°27'	-32'	56°	71°59'	-29'	58°	72°30'	-27'	61°	72°57'	-24'	64°	73°22'	-21'	67°	73°44'	-18'	70°	74°03'	-15'	73°	17
18	70°55'	-34'	53°	71°30'	-32'	56°	72°03'	-29'	58°	72°33'	-27'	61°	73°01'	-24'	64°	73°26'	-21'	67°	73°48'	-18'	70°	18
19	70°21'	-36'	51°	70°58'	-34'	53°	71°33'	-32'	55°	72°06'	-29'	58°	72°37'	-27'	61°	73°05'	-24'	64°	73°30'	-21'	67°	19
20	69°45'	-38'	48°	70°24'	-36'	51°	71°02'	-34'	53°	71°37'	-32'	55°	72°10'	-29'	58°	72°41'	-27'	60°	73°09'	-24'	63°	20
21	69°08'	-39'	46°	69°49'	-38'	48°	70°28'	-36'	50°	71°05'	-34'	53°	71°41'	-32'	55°	72°14'	-29'	57°	72°45'	-27'	60°	21
22	68°29'	-41'	44°	69°11'	-39'	46°	69°52'	-38'	48°	70°31'	-36'	50°	71°09'	-34'	52°	71°45'	-32'	55°	72°18'	-29'	57°	22
23	67°48'	-42'	42°	68°32'	-41'	44°	69°14'	-39'	46°	69°56'	-38'	48°	70°35'	-36'	50°	71°13'	-34'	52°	71°49'	-32'	54°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	71°39'	+22'	112°	71°16'	+25'	114°	70°50'	+27'	117°	70°21'	+30'	120°	69°50'	+32'	122°	69°18'	+34'	124°	68°43'	+36'	126°	0
1	72°01'	+19'	109°	71°40'	+22'	112°	71°17'	+25'	114°	70°51'	+28'	117°	70°23'	+30'	119°	69°52'	+32'	122°	69°19'	+35'	124°	1
2	72°20'	+16'	106°	72°02'	+19'	109°	71°42'	+22'	111°	71°19'	+25'	114°	70°53'	+28'	117°	70°24'	+30'	119°	69°54'	+33'	122°	2
3	72°36'	+13'	102°	72°22'	+16'	106°	72°04'	+19'	109°	71°44'	+22'	111°	71°20'	+25'	114°	70°55'	+28'	117°	70°26'	+30'	119°	3
4	72°49'	+10'	99°	72°38'	+13'	102°	72°23'	+16'	105°	72°06'	+20'	108°	71°46'	+23'	111°	71°23'	+25'	114°	70°57'	+28'	117°	4
5	72°59'	+06'	96°	72°51'	+10'	99°	72°40'	+13'	102°	72°26'	+17'	105°	72°08'	+20'	108°	71°48'	+23'	111°	71°25'	+26'	114°	5
6	73°05'	+03'	92°	73°01'	+06'	96°	72°53'	+10'	99°	72°42'	+13'	102°	72°28'	+17'	105°	72°11'	+20'	108°	71°51'	+23'	111°	6
7	73°08'	-01'	89°	73°07'	+03'	92°	73°03'	+07'	96°	72°55'	+10'	99°	72°45'	+14'	102°	72°31'	+17'	105°	72°14'	+20'	108°	7
8	73°07'	-04'	86°	73°10'	00'	89°	73°10'	+03'	92°	73°06'	+07'	95°	72°58'	+10'	99°	72°48'	+14'	102°	72°34'	+17'	105°	8
9	73°03'	-07'	82°	73°10'	-04'	85°	73°13'	00'	89°	73°12'	+03'	92°	73°09'	+07'	95°	73°01'	+10'	99°	72°51'	+14'	102°	9
10	72°55'	-11'	79°	73°06'	-07'	82°	73°12'	-04'	85°	73°16'	00'	89°	73°15'	+03'	92°	73°12'	+07'	95°	73°05'	+11'	98°	10
11	72°45'	-14'	75°	72°58'	-11'	79°	73°09'	-07'	82°	73°15'	-04'	85°	73°19'	00'	88°	73°19'	+04'	92°	73°15'	+07'	95°	11
12	72°31'	-17'	72°	72°48'	-14'	75°	73°01'	-11'	78°	73°12'	-07'	82°	73°19'	-04'	85°	73°22'	+00'	88°	73°23'	+04'	92°	12
13	72°14'	-20'	69°	72°34'	-17'	72°	72°51'	-14'	75°	73°05'	-10'	78°	73°15'	-07'	81°	73°23'	-03'	85°	73°26'	+00'	88°	13
14	71°53'	-23'	66°	72°17'	-20'	69°	72°37'	-17'	72°	72°54'	-14'	75°	73°08'	-10'	78°	73°19'	-07'	81°	73°27'	-03'	85°	14
15	71°31'	-25'	63°	71°57'	-23'	66°	72°20'	-20'	69°	72°40'	-17'	72°	72°58'	-14'	75°	73°12'	-10'	78°	73°23'	-07'	81°	15
16	71°05'	-28'	60°	71°34'	-25'	63°	72°00'	-23'	65°	72°24'	-20'	68°	72°44'	-17'	71°	73°02'	-14'	74°	73°17'	-10'	78°	16
17	70°37'	-30'	57°	71°08'	-28'	60°	71°37'	-25'	62°	72°04'	-23'	65°	72°28'	-20'	68°	72°49'	-17'	71°	73°06'	-13'	74°	17
18	70°07'	-32'	55°	70°40'	-30'	57°	71°12'	-28'	60°	71°41'	-25'	62°	72°08'	-23'	65°	72°32'	-20'	68°	72°53'	-17'	71°	18
19	69°35'	-34'	52°	70°10'	-32'	55°	70°44'	-30'	57°	71°16'	-28'	59°	71°45'	-25'	62°	72°12'	-23'	65°	72°36'	-20'	68°	19
20	69°00'	-36'	50°	69°38'	-34'	52°	70°14'	-32'	54°	70°48'	-30'	57°	71°20'	-28'	59°	71°49'	-25'	62°	72°17'	-23'	64°	20
21	68°24'	-38'	48°	69°04'	-36'	50°	69°42'	-34'	52°	70°18'	-32'	54°	70°52'	-30'	56°	71°24'	-28'	59°	71°54'	-25'	61°	21
22	67°47'	-39'	46°	68°28'	-38'	48°	69°07'	-36'	50°	69°46'	-34'	52°	70°22'	-32'	54°	70°56'	-30'	56°	71°29'	-28'	59°	22
23	67°07'	-41'	44°	67°50'	-39'	46°	68°31'	-38'	47°	69°11'	-36'	49°	69°50'	-34'	51°	70°26'	-32'	53°	71°01'	-30'	56°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	70°44'	+21'	111°	70°21'	+24'	113°	69°57'	+26'	116°	69°29'	+29'	118°	69°00'	+31'	120°	68°29'	+33'	123°	67°55'	+35'	125°	0
1	71°05'	+18'	108°	70°45'	+21'	110°	70°23'	+24'	113°	69°58'	+26'	116°	69°31'	+29'	118°	69°02'	+31'	120°	68°30'	+33'	123°	1
2	71°23'	+15'	105°	71°06'	+18'	108°	70°47'	+21'	110°	70°24'	+24'	113°	70°00'	+27'	115°	69°33'	+29'	118°	69°04'	+31'	120°	2
3	71°38'	+12'	102°	71°24'	+15'	105°	71°08'	+18'	107°	70°48'	+21'	110°	70°26'	+24'	113°	70°02'	+27'	115°	69°35'	+29'	118°	3
4	71°50'	+09'	99°	71°40'	+12'	102°	71°26'	+16'	104°	71°10'	+19'	107°	70°51'	+22'	110°	70°29'	+24'	113°	70°04'	+27'	115°	4
5	71°59'	+06'	95°	71°52'	+09'	98°	71°42'	+13'	101°	71°28'	+16'	104°	71°12'	+19'	107°	70°53'	+22'	110°	70°31'	+25'	113°	5
6	72°05'	+03'	92°	72°01'	+06'	95°	71°54'	+10'	98°	71°44'	+13'	101°	71°31'	+16'	104°	71°15'	+19'	107°	70°56'	+22'	110°	6
7	72°08'	00'	89°	72°08'	+03'	92°	72°04'	+06'	95°	71°57'	+10'	98°	71°47'	+13'	101°	71°34'	+16'	104°	71°18'	+19'	107°	7
8	72°08'	-04'	86°	72°11'	00'	89°	72°10'	+03'	92°	72°07'	+07'	95°	72°00'	+10'	98°	71°50'	+13'	101°	71°37'	+16'	104°	8
9	72°04'	-07'	82°	72°10'	-04'	85°	72°13'	00'	89°	72°13'	+03'	92°	72°10'	+07'	95°	72°03'	+10'	98°	71°53'	+13'	101°	9
10	71°57'	-10'	79°	72°07'	-07'	82°	72°13'	-03'	85°	72°17'	+00'	88°	72°17'	+03'	92°	72°13'	+07'	95°	72°07'	+10'	98°	10
11	71°47'	-13'	76°	72°00'	-10'	79°	72°10'	-07'	82°	72°17'	-03'	85°	72°20'	+00'	88°	72°20'	+04'	91°	72°17'	+07'	95°	11
12	71°34'	-16'	73°	71°50'	-13'	76°	72°03'	-10'	79°	72°13'	-07'	82°	72°20'	-03'	85°	72°24'	+00'	88°	72°24'	+04'	91°	12
13	71°18'	-19'	70°	71°37'	-16'	73°	71°53'	-13'	76°	72°07'	-10'	79°	72°17'	-06'	82°	72°24'	-03'	85°	72°28'	+00'	88°	13
14	70°59'	-22'	67°	71°21'	-19'	70°	71°41'	-16'	72°	71°57'	-13'	75°	72°11'	-10'	78°	72°21'	-06'	82°	72°28'	-03'	85°	14
15	70°37'	-24'	64°	71°02'	-22'	67°	71°25'	-19'	69°	71°44'	-16'	72°	72°01'	-13'	75°	72°15'	-09'	78°	72°26'	-06'	81°	15
16	70°13'	-27'	61°	70°41'	-24'	64°	71°06'	-21'	66°	71°29'	-19'	69°	71°48'	-16'	72°	72°05'	-13'	75°	72°19'	-09'	78°	16
17	69°47'	-29'	59°	70°17'	-26'	61°	70°44'	-24'	64°	71°10'	-21'	66°	71°33'	-19'	69°	71°53'	-16'	72°	72°10'	-12'	75°	17
18	69°18'	-31'	56°	69°50'	-29'	58°	70°20'	-26'	61°	70°49'	-24'	63°	71°14'	-21'	66°	71°37'	-19'	69°	71°58'	-16'	72°	18
19	68°47'	-33'	54°	69°21'	-31'	56°	69°54'	-29'	58°	70°25'	-26'	61°	70°53'	-24'	63°	71°19'	-21'	66°	71°42'	-18'	69°	19
20	68°14'	-35'	52°	68°51'	-33'	54°	69°25'	-31'	56°	69°58'	-29'	58°	70°29'	-26'	60°	70°57'	-24'	63°	71°24'	-21'	66°	20
21	67°40'	-36'	49°	68°18'	-35'	51°	68°55'	-33'	53°	69°30'	-31'	55°	70°03'	-29'	58°	70°34'	-26'	60°	71°02'	-24'	63°	21
22	67°03'	-38'	47°	67°43'	-36'	49°	68°22'	-35'	51°	68°59'	-33'	53°	69°34'	-31'	55°	70°07'	-29'	57°	70°39'	-26'	60°	22
23	66°26'	-39'	45°	67°07'	-38'	47°	67°47'	-36'	49°	68°26'	-35'	51°	69°03'	-33'	53°	69°39'	-31'	55°	70°12'	-29'	57°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	69°48'	+20'	109°	69°27'	+23'	112°	69°03'	+25'	114°	68°37'	+28'	117°	68°09'	+30'	119°	67°39'	+32'	121°	67°07'	+34'	123°	0
1	70°08'	+17'	107°	69°49'	+20'	109°	69°28'	+23'	112°	69°04'	+25'	114°	68°39'	+28'	117°	68°11'	+30'	119°	67°41'	+32'	121°	1
2	70°25'	+15'	104°	70°09'	+17'	107°	69°51'	+20'	109°	69°30'	+23'	112°	69°06'	+26'	114°	68°41'	+28'	117°	68°13'	+30'	119°	2
3	70°40'	+12'	101°	70°27'	+15'	104°	70°11'	+18'	106°	69°53'	+20'	109°	69°32'	+23'	112°	69°09'	+26'	114°	68°43'	+28'	116°	3
4	70°51'	+09'	98°	70°41'	+12'	101°	70°29'	+15'	104°	70°13'	+18'	106°	69°55'	+21'	109°	69°34'	+23'	111°	69°11'	+26'	114°	4
5	71°00'	+06'	95°	70°53'	+09'	98°	70°44'	+12'	101°	70°31'	+15'	103°	70°16'	+18'	106°	69°58'	+21'	109°	69°37'	+24'	111°	5
6	71°06'	+03'	92°	71°02'	+06'	95°	70°56'	+09'	98°	70°46'	+12'	101°	70°34'	+15'	103°	70°19'	+18'	106°	70°01'	+21'	109°	6
7	71°09'	00'	89°	71°08'	+03'	92°	71°05'	+06'	95°	70°58'	+09'	98°	70°49'	+12'	100°	70°37'	+16'	103°	70°22'	+18'	106°	7
8	71°08'	-03'	86°	71°11'	00'	89°	71°11'	+03'	92°	71°08'	+06'	95°	71°02'	+10'	97°	70°52'	+13'	100°	70°40'	+16'	103°	8
9	71°05'	-06'	83°	71°11'	-03'	86°	71°14'	+00'	89°	71°14'	+03'	91°	71°11'	+07'	94°	71°05'	+10'	97°	70°56'	+13'	100°	9
10	70°58'	-09'	80°	71°08'	-06'	82°	71°14'	-03'	85°	71°17'	+00'	88°	71°18'	+03'	91°	71°15'	+07'	94°	71°09'	+10'	97°	10
11	70°49'	-12'	77°	71°02'	-09'	79°	71°11'	-06'	82°	71°18'	-03'	85°	71°21'	+00'	88°	71°21'	+04'	91°	71°19'	+07'	94°	11
12	70°37'	-15'	74°	70°52'	-12'	76°	71°05'	-09'	79°	71°15'	-06'	82°	71°21'	-03'	85°	71°25'	+01'	88°	71°26'	+04'	91°	12
13	70°22'	-18'	71°	70°40'	-15'	73°	70°56'	-12'	76°	71°09'	-09'	79°	71°19'	-06'	82°	71°26'	-03'	85°	71°29'	+01'	88°	13
14	70°04'	-20'	68°	70°25'	-18'	70°	70°44'	-15'	73°	71°00'	-12'	76°	71°13'	-09'	79°	71°23'	-06'	82°	71°30'	-02'	85°	14
15	69°43'	-23'	65°	70°07'	-20'	68°	70°29'	-18'	70°	70°48'	-15'	73°	71°04'	-12'	76°	71°17'	-09'	79°	71°28'	-06'	82°	15
16	69°21'	-25'	63°	69°47'	-23'	65°	70°11'	-20'	67°	70°33'	-18'	70°	70°52'	-15'	73°	71°09'	-12'	76°	71°22'	-09'	78°	16
17	68°55'	-27'	60°	69°24'	-25'	62°	69°51'	-23'	65°	70°16'	-20'	67°	70°38'	-17'	70°	70°57'	-15'	73°	71°14'	-12'	75°	17
18	68°28'	-29'	58°	68°59'	-27'	60°	69°28'	-25'	62°	69°55'	-23'	64°	70°20'	-20'	67°	70°42'	-17'	70°	71°02'	-14'	72°	18
19	67°58'	-31'	55°	68°32'	-29'	57°	69°03'	-27'	59°	69°33'	-25'	62°	70°00'	-23'	64°	70°25'	-20'	67°	70°48'	-17'	69°	19
20	67°27'	-33'	53°	68°02'	-31'	55°	68°36'	-29'	57°	69°08'	-27'	59°	69°37'	-25'	61°	70°05'	-23'	64°	70°30'	-20'	66°	20
21	66°54'	-35'	51°	67°31'	-33'	53°	68°07'	-31'	55°	68°41'	-29'	57°	69°13'	-27'	59°	69°42'	-25'	61°	70°10'	-22'	64°	21
22	66°19'	-36'	49°	66°58'	-35'	50°	67°35'	-33'	52°	68°11'	-31'	54°	68°45'	-29'	56°	69°18'	-27'	59°	69°48'	-25'	61°	22
23	65°43'	-38'	47°	66°23'	-36'	48°	67°02'	-35'	50°	67°40'	-33'	52°	68°16'	-31'	54°	68°50'	-29'	56°	69°23'	-27'	58°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	68°51'	+19'	109°	68°31'	+22'	111°	68°09'	+24'	113°	67°44'	+26'	116°	67°17'	+29'	118°	66°48'	+31'	120°	66°18'	+33'	122°	0
1	69°11'	+17'	106°	68°53'	+19'	108°	68°33'	+22'	111°	68°10'	+24'	113°	67°46'	+27'	115°	67°19'	+29'	118°	66°50'	+31'	120°	1
2	69°27'	+14'	103°	69°12'	+17'	106°	68°55'	+19'	108°	68°35'	+22'	111°	68°12'	+25'	113°	67°48'	+27'	115°	67°21'	+29'	117°	2
3	69°41'	+11'	100°	69°29'	+14'	103°	69°14'	+17'	106°	68°57'	+20'	108°	68°37'	+22'	110°	68°15'	+25'	113°	67°50'	+27'	115°	3
4	69°52'	+08'	98°	69°43'	+11'	100°	69°31'	+14'	103°	69°16'	+17'	105°	68°59'	+20'	108°	68°39'	+22'	110°	68°17'	+25'	113°	4
5	70°01'	+06'	95°	69°54'	+09'	97°	69°45'	+12'	100°	69°34'	+15'	103°	69°19'	+17'	105°	69°02'	+20'	108°	68°42'	+23'	110°	5
6	70°06'	+03'	92°	70°03'	+06'	94°	69°57'	+09'	97°	69°48'	+12'	100°	69°36'	+15'	103°	69°22'	+18'	105°	69°05'	+20'	108°	6
7	70°09'	00'	89°	70°09'	+03'	92°	70°06'	+06'	94°	70°00'	+09'	97°	69°51'	+12'	100°	69°40'	+15'	102°	69°25'	+18'	105°	7
8	70°09'	-03'	86°	70°12'	+00'	89°	70°12'	+03'	91°	70°09'	+06'	94°	70°03'	+09'	97°	69°55'	+12'	100°	69°43'	+15'	102°	8
9	70°06'	-06'	83°	70°12'	-03'	86°	70°15'	+00'	88°	70°15'	+03'	91°	70°12'	+06'	94°	70°07'	+09'	97°	69°58'	+12'	99°	9
10	70°00'	-09'	80°	70°09'	-06'	83°	70°15'	-03'	85°	70°18'	+00'	88°	70°19'	+03'	91°	70°16'	+07'	94°	70°11'	+10'	97°	10
11	69°51'	-12'	77°	70°03'	-09'	80°	70°12'	-06'	83°	70°19'	-03'	85°	70°22'	+01'	88°	70°23'	+04'	91°	70°20'	+07'	94°	11
12	69°40'	-14'	74°	69°55'	-11'	77°	70°07'	-08'	80°	70°16'	-05'	82°	70°23'	-02'	85°	70°26'	+01'	88°	70°27'	+04'	91°	12
13	69°25'	-17'	71°	69°43'	-14'	74°	69°58'	-11'	77°	70°11'	-08'	79°	70°20'	-05'	82°	70°27'	-02'	85°	70°31'	+01'	88°	13
14	69°09'	-19'	69°	69°29'	-17'	71°	69°47'	-14'	74°	70°02'	-11'	76°	70°15'	-08'	79°	70°25'	-05'	82°	70°32'	-02'	85°	14
15	68°49'	-22'	66°	69°12'	-19'	69°	69°33'	-17'	71°	69°51'	-14'	74°	70°07'	-11'	76°	70°20'	-08'	79°	70°30'	-05'	82°	15
16	68°27'	-24'	64°	68°53'	-22'	66°	69°16'	-19'	68°	69°37'	-16'	71°	69°56'	-14'	73°	70°12'	-11'	76°	70°25'	-08'	79°	16
17	68°04'	-26'	61°	68°31'	-24'	63°	68°57'	-22'	66°	69°21'	-19'	68°	69°42'	-16'	71°	70°01'	-14'	73°	70°17'	-11'	76°	17
18	67°37'	-28'	59°	68°08'	-26'	61°	68°36'	-24'	63°	69°02'	-21'	65°	69°26'	-19'	68°	69°47'	-16'	70°	70°06'	-14'	73°	18
19	67°09'	-30'	56°	67°42'	-28'	58°	68°12'	-26'	61°	68°41'	-24'	63°	69°07'	-21'	65°	69°31'	-19'	68°	69°53'	-16'	70°	19
20	66°39'	-32'	54°	67°13'	-30'	56°	67°46'	-28'	58°	68°17'	-26'	60°	68°45'	-24'	63°	69°12'	-21'	65°	69°36'	-19'	67°	20
21	66°07'	-33'	52°	66°43'	-32'	54°	67°18'	-30'	56°	67°51'	-28'	58°	68°22'	-26'	60°	68°51'	-24'	62°	69°18'	-21'	65°	21
22	65°34'	-35'	50°	66°12'	-33'	52°	66°48'	-32'	54°	67°23'	-30'	56°	67°56'	-28'	58°	68°27'	-26'	60°	68°56'	-24'	62°	22
23	64°59'	-36'	48°	65°38'	-35'	50°	66°16'	-33'	51°	66°53'	-32'	53°	67°28'	-30'	55°	68°01'	-28'	57°	68°33'	-26'	59°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	67°55'	+18'	108°	67°36'	+21'	110°	67°14'	+23'	112°	66°50'	+25'	114°	66°25'	+28'	116°	65°57'	+30'	118°	65°27'	+32'	120°	0
1	68°13'	+16'	105°	67°56'	+18'	107°	67°37'	+21'	110°	67°16'	+23'	112°	66°52'	+26'	114°	66°27'	+28'	116°	65°59'	+30'	118°	1
2	68°29'	+13'	102°	68°15'	+16'	105°	67°58'	+19'	107°	67°39'	+21'	110°	67°18'	+24'	112°	66°55'	+26'	114°	66°29'	+28'	116°	2
3	68°42'	+11'	100°	68°31'	+14'	102°	68°17'	+16'	105°	68°00'	+19'	107°	67°42'	+21'	109°	67°20'	+24'	112°	66°57'	+26'	114°	3
4	68°53'	+08'	97°	68°44'	+11'	100°	68°33'	+14'	102°	68°19'	+17'	105°	68°03'	+19'	107°	67°44'	+22'	109°	67°23'	+24'	112°	4
5	69°01'	+05'	94°	68°55'	+08'	97°	68°47'	+11'	99°	68°36'	+14'	102°	68°22'	+17'	104°	68°06'	+19'	107°	67°47'	+22'	109°	5
6	69°07'	+03'	92°	69°04'	+06'	94°	68°58'	+09'	97°	68°50'	+11'	99°	68°39'	+14'	102°	68°25'	+17'	104°	68°09'	+20'	107°	6
7	69°09'	00'	89°	69°09'	+03'	91°	69°07'	+06'	94°	69°01'	+09'	97°	68°53'	+12'	99°	68°42'	+14'	102°	68°29'	+17'	104°	7
8	69°09'	-03'	86°	69°12'	+00'	89°	69°13'	+03'	91°	69°10'	+06'	94°	69°05'	+09'	96°	68°57'	+12'	99°	68°46'	+15'	102°	8
9	69°07'	-05'	83°	69°13'	-03'	86°	69°16'	+00'	88°	69°16'	+03'	91°	69°14'	+06'	94°	69°08'	+09'	96°	69°01'	+12'	99°	9
10	69°01'	-08'	80°	69°10'	-05'	83°	69°16'	-02'	86°	69°19'	+01'	88°	69°20'	+04'	91°	69°18'	+06'	93°	69°13'	+09'	96°	10
11	68°53'	-11'	78°	69°05'	-08'	80°	69°14'	-05'	83°	69°20'	-02'	85°	69°23'	+01'	88°	69°24'	+04'	91°	69°22'	+07'	93°	11
12	68°42'	-13'	75°	68°57'	-11'	77°	69°08'	-08'	80°	69°18'	-05'	82°	69°24'	-02'	85°	69°28'	+01'	88°	69°29'	+04'	90°	12
13	68°29'	-16'	72°	68°46'	-13'	75°	69°01'	-11'	77°	69°13'	-08'	80°	69°22'	-05'	82°	69°29'	-02'	85°	69°33'	+01'	88°	13
14	68°13'	-18'	70°	68°33'	-16'	72°	68°50'	-13'	74°	69°05'	-10'	77°	69°17'	-08'	79°	69°27'	-05'	82°	69°34'	-02'	85°	14
15	67°55'	-21'	67°	68°17'	-18'	69°	68°37'	-16'	72°	68°55'	-13'	74°	69°10'	-10'	77°	69°22'	-07'	79°	69°32'	-05'	82°	15
16	67°34'	-23'	65°	67°59'	-21'	67°	68°21'	-18'	69°	68°42'	-16'	71°	68°59'	-13'	74°	69°15'	-10'	76°	69°28'	-07'	79°	16
17	67°11'	-25'	62°	67°38'	-23'	64°	68°03'	-20'	66°	68°26'	-18'	69°	68°47'	-15'	71°	69°05'	-13'	74°	69°20'	-10'	76°	17
18	66°46'	-27'	60°	67°15'	-25'	62°	67°43'	-23'	64°	68°08'	-20'	66°	68°31'	-18'	69°	68°52'	-15'	71°	69°10'	-13'	73°	18
19	66°19'	-29'	58°	66°51'	-27'	60°	67°20'	-25'	62°	67°48'	-23'	64°	68°13'	-20'	66°	68°37'	-18'	68°	68°58'	-15'	71°	19
20	65°51'	-31'	55°	66°24'	-29'	57°	66°55'	-27'	59°	67°25'	-25'	61°	67°53'	-22'	63°	68°19'	-20'	66°	68°42'	-18'	68°	20
21	65°20'	-32'	53°	65°55'	-30'	55°	66°29'	-29'	57°	67°00'	-27'	59°	67°31'	-25'	61°	67°59'	-22'	63°	68°25'	-20'	65°	21
22	64°48'	-34'	51°	65°25'	-32'	53°	66°00'	-30'	55°	66°34'	-29'	57°	67°06'	-27'	59°	67°36'	-25'	61°	68°05'	-22'	63°	22
23	64°14'	-35'	49°	64°52'	-34'	51°	65°30'	-32'	53°	66°05'	-30'	54°	66°39'	-29'	56°	67°12'	-27'	58°	67°42'	-25'	60°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°58'	+18'	107°	66°40'	+20'	109°	66°19'	+22'	111°	65°56'	+25'	113°	65°32'	+27'	115°	65°05'	+29'	117°	64°37'	+31'	119°	0
1	67°16'	+15'	104°	67°00'	+18'	107°	66°41'	+20'	109°	66°21'	+23'	111°	65°58'	+25'	113°	65°34'	+27'	115°	65°07'	+29'	117°	1
2	67°31'	+13'	102°	67°17'	+15'	104°	67°01'	+18'	106°	66°43'	+20'	109°	66°23'	+23'	111°	66°01'	+25'	113°	65°36'	+27'	115°	2
3	67°44'	+10'	99°	67°33'	+13'	102°	67°19'	+16'	104°	67°04'	+18'	106°	66°46'	+21'	109°	66°26'	+23'	111°	66°03'	+25'	113°	3
4	67°54'	+08'	97°	67°46'	+11'	99°	67°35'	+13'	101°	67°22'	+16'	104°	67°06'	+18'	106°	66°49'	+21'	108°	66°29'	+23'	111°	4
5	68°02'	+05'	94°	67°56'	+08'	96°	67°48'	+11'	99°	67°38'	+14'	101°	67°25'	+16'	104°	67°10'	+19'	106°	66°52'	+21'	108°	5
6	68°07'	+03'	91°	68°05'	+06'	94°	67°59'	+08'	96°	67°51'	+11'	99°	67°41'	+14'	101°	67°28'	+16'	104°	67°13'	+19'	106°	6
7	68°10'	+00'	89°	68°10'	+03'	91°	68°08'	+06'	94°	68°02'	+09'	96°	67°55'	+11'	99°	67°45'	+14'	101°	67°32'	+17'	103°	7
8	68°10'	-02'	86°	68°13'	+00'	88°	68°13'	+03'	91°	68°11'	+06'	93°	68°06'	+09'	96°	67°59'	+12'	98°	67°49'	+14'	101°	8
9	68°08'	-05'	83°	68°13'	-02'	86°	68°16'	+01'	88°	68°17'	+03'	91°	68°15'	+06'	93°	68°10'	+09'	96°	68°03'	+12'	98°	9
10	68°02'	-08'	81°	68°11'	-05'	83°	68°17'	-02'	86°	68°20'	+01'	88°	68°21'	+04'	91°	68°19'	+06'	93°	68°15'	+09'	96°	10
11	67°55'	-10'	78°	68°06'	-07'	80°	68°15'	-05'	83°	68°21'	-02'	85°	68°25'	+01'	88°	68°25'	+04'	90°	68°24'	+07'	93°	11
12	67°45'	-13'	75°	67°59'	-10'	78°	68°10'	-07'	80°	68°19'	-05'	83°	68°25'	-02'	85°	68°29'	+01'	88°	68°30'	+04'	90°	12
13	67°32'	-15'	73°	67°49'	-12'	75°	68°03'	-10'	78°	68°15'	-07'	80°	68°24'	-04'	82°	68°30'	-02'	85°	68°34'	+01'	87°	13
14	67°17'	-17'	70°	67°36'	-15'	73°	67°53'	-12'	75°	68°07'	-10'	77°	68°19'	-07'	80°	68°29'	-04'	82°	68°36'	-01'	85°	14
15	67°00'	-20'	68°	67°21'	-17'	70°	67°41'	-15'	72°	67°58'	-12'	75°	68°12'	-10'	77°	68°25'	-07'	80°	68°34'	-04'	82°	15
16	66°40'	-22'	65°	67°04'	-19'	68°	67°26'	-17'	70°	67°45'	-15'	72°	68°03'	-12'	74°	68°18'	-09'	77°	68°30'	-07'	79°	16
17	66°18'	-24'	63°	66°44'	-22'	65°	67°09'	-19'	67°	67°31'	-17'	69°	67°51'	-15'	72°	68°08'	-12'	74°	68°23'	-09'	77°	17
18	65°54'	-26'	61°	66°23'	-24'	63°	66°49'	-22'	65°	67°14'	-19'	67°	67°36'	-17'	69°	67°56'	-14'	72°	68°14'	-12'	74°	18
19	65°29'	-28'	59°	65°59'	-26'	61°	66°28'	-24'	62°	66°55'	-21'	65°	67°19'	-19'	67°	67°42'	-17'	69°	68°02'	-14'	71°	19
20	65°01'	-29'	56°	65°34'	-27'	58°	66°04'	-26'	60°	66°33'	-24'	62°	67°00'	-21'	64°	67°25'	-19'	66°	67°48'	-17'	69°	20
21	64°32'	-31'	54°	65°06'	-29'	56°	65°39'	-27'	58°	66°10'	-25'	60°	66°39'	-23'	62°	67°06'	-21'	64°	67°31'	-19'	66°	21
22	64°01'	-32'	52°	64°37'	-31'	54°	65°11'	-29'	56°	65°44'	-27'	58°	66°15'	-25'	60°	66°45'	-23'	62°	67°12'	-21'	64°	22
23	63°28'	-34'	51°	64°06'	-32'	52°	64°42'	-31'	54°	65°17'	-29'	56°	65°50'	-27'	57°	66°21'	-25'	59°	66°51'	-23'	61°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°01'	+17'	106°	65°43'	+19'	108°	65°23'	+22'	110°	65°02'	+24'	112°	64°38'	+26'	114°	64°13'	+28'	116°	63°45'	+30'	118°	0
1	66°18'	+15'	104°	66°02'	+17'	106°	65°45'	+19'	108°	65°25'	+22'	110°	65°04'	+24'	112°	64°40'	+26'	114°	64°15'	+28'	116°	1
2	66°32'	+12'	101°	66°20'	+15'	103°	66°05'	+17'	106°	65°47'	+20'	108°	65°28'	+22'	110°	65°06'	+24'	112°	64°43'	+26'	114°	2
3	66°45'	+10'	99°	66°34'	+13'	101°	66°22'	+15'	103°	66°07'	+18'	105°	65°50'	+20'	108°	65°31'	+22'	110°	65°09'	+24'	112°	3
4	66°55'	+08'	96°	66°47'	+10'	99°	66°37'	+13'	101°	66°25'	+15'	103°	66°10'	+18'	105°	65°53'	+20'	107°	65°34'	+22'	110°	4
5	67°02'	+05'	94°	66°57'	+08'	96°	66°50'	+10'	98°	66°40'	+13'	101°	66°28'	+16'	103°	66°13'	+18'	105°	65°56'	+20'	107°	5
6	67°08'	+03'	91°	67°05'	+05'	94°	67°00'	+08'	96°	66°53'	+11'	98°	66°43'	+13'	101°	66°31'	+16'	103°	66°17'	+18'	105°	6
7	67°10'	+00'	89°	67°11'	+03'	91°	67°08'	+06'	93°	67°04'	+08'	96°	66°57'	+11'	98°	66°47'	+14'	100°	66°35'	+16'	103°	7
8	67°11'	-02'	86°	67°14'	+00'	88°	67°14'	+03'	91°	67°12'	+06'	93°	67°07'	+09'	96°	67°01'	+11'	98°	66°51'	+14'	100°	8
9	67°08'	-05'	83°	67°14'	-02'	86°	67°17'	+01'	88°	67°18'	+03'	91°	67°16'	+06'	93°	67°12'	+09'	95°	67°05'	+11'	98°	9
10	67°04'	-07'	81°	67°12'	-05'	83°	67°18'	-02'	86°	67°21'	+01'	88°	67°22'	+04'	90°	67°20'	+06'	93°	67°16'	+09'	95°	10
11	66°57'	-10'	78°	67°07'	-07'	81°	67°16'	-04'	83°	67°22'	-02'	85°	67°26'	+01'	88°	67°27'	+04'	90°	67°25'	+07'	93°	11
12	66°47'	-12'	76°	67°01'	-09'	78°	67°12'	-07'	80°	67°20'	-04'	83°	67°27'	-01'	85°	67°31'	+01'	88°	67°32'	+04'	90°	12
13	66°35'	-14'	73°	66°51'	-12'	76°	67°05'	-09'	78°	67°16'	-07'	80°	67°25'	-04'	83°	67°32'	-01'	85°	67°36'	+01'	87°	13
14	66°21'	-16'	71°	66°39'	-14'	73°	66°56'	-12'	75°	67°10'	-09'	78°	67°21'	-06'	80°	67°31'	-04'	82°	67°37'	-01'	85°	14
15	66°04'	-19'	69°	66°25'	-16'	71°	66°44'	-14'	73°	67°01'	-11'	75°	67°15'	-09'	77°	67°27'	-06'	80°	67°36'	-04'	82°	15
16	65°46'	-21'	66°	66°09'	-19'	68°	66°30'	-16'	70°	66°49'	-14'	73°	67°06'	-11'	75°	67°20'	-09'	77°	67°33'	-06'	80°	16
17	65°25'	-23'	64°	65°50'	-21'	66°	66°14'	-18'	68°	66°35'	-16'	70°	66°55'	-14'	72°	67°12'	-11'	75°	67°27'	-09'	77°	17
18	65°02'	-25'	62°	65°30'	-23'	64°	65°56'	-20'	66°	66°19'	-18'	68°	66°41'	-16'	70°	67°01'	-14'	72°	67°18'	-11'	74°	18
19	64°38'	-26'	60°	65°07'	-24'	61°	65°35'	-22'	63°	66°01'	-20'	65°	66°25'	-18'	67°	66°47'	-16'	70°	67°07'	-13'	72°	19
20	64°11'	-28'	57°	64°43'	-26'	59°	65°13'	-24'	61°	65°41'	-22'	63°	66°07'	-20'	65°	66°31'	-18'	67°	66°53'	-16'	69°	20
21	63°43'	-30'	55°	64°16'	-28'	57°	64°48'	-26'	59°	65°18'	-24'	61°	65°47'	-22'	63°	66°13'	-20'	65°	66°38'	-18'	67°	21
22	63°13'	-31'	54°	63°48'	-30'	55°	64°22'	-28'	57°	64°54'	-26'	59°	65°24'	-24'	61°	65°53'	-22'	62°	66°20'	-20'	64°	22
23	62°42'	-33'	52°	63°19'	-31'	53°	63°54'	-30'	55°	64°28'	-28'	57°	65°00'	-26'	58°	65°31'	-24'	60°	66°00'	-22'	62°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	65°03'	+16'	105°	64°47'	+19'	107°	64°28'	+21'	109°	64°07'	+23'	111°	63°44'	+25'	113°	63°20'	+27'	115°	62°53'	+29'	117°	0
1	65°20'	+14'	103°	65°05'	+17'	105°	64°49'	+19'	107°	64°30'	+21'	109°	64°09'	+23'	111°	63°47'	+25'	113°	63°22'	+27'	115°	1
2	65°34'	+12'	101°	65°22'	+14'	103°	65°07'	+17'	105°	64°51'	+19'	107°	64°32'	+21'	109°	64°12'	+23'	111°	63°49'	+25'	113°	2
3	65°46'	+10'	98°	65°36'	+12'	100°	65°24'	+15'	103°	65°10'	+17'	105°	64°54'	+19'	107°	64°35'	+22'	109°	64°15'	+24'	111°	3
4	65°56'	+07'	96°	65°48'	+10'	98°	65°39'	+12'	100°	65°27'	+15'	102°	65°13'	+17'	105°	64°57'	+20'	107°	64°39'	+22'	109°	4
5	66°03'	+05'	93°	65°58'	+08'	96°	65°51'	+10'	98°	65°42'	+13'	100°	65°30'	+15'	102°	65°16'	+17'	104°	65°00'	+20'	106°	5
6	66°08'	+03'	91°	66°06'	+05'	93°	66°01'	+08'	95°	65°54'	+10'	98°	65°45'	+13'	100°	65°34'	+15'	102°	65°20'	+18'	104°	6
7	66°11'	+00'	89°	66°11'	+03'	91°	66°09'	+06'	93°	66°05'	+08'	95°	65°58'	+11'	98°	65°49'	+13'	100°	65°38'	+16'	102°	7
8	66°11'	-02'	86°	66°14'	+01'	88°	66°15'	+03'	91°	66°13'	+06'	93°	66°09'	+08'	95°	66°02'	+11'	97°	65°54'	+13'	100°	8
9	66°09'	-04'	84°	66°15'	-02'	86°	66°18'	+01'	88°	66°19'	+03'	90°	66°17'	+06'	93°	66°13'	+09'	95°	66°07'	+11'	97°	9
10	66°05'	-07'	81°	66°13'	-04'	83°	66°19'	-02'	86°	66°22'	+01'	88°	66°23'	+04'	90°	66°22'	+06'	92°	66°18'	+09'	95°	10
11	65°58'	-09'	79°	66°09'	-07'	81°	66°17'	-04'	83°	66°23'	-01'	85°	66°27'	+01'	88°	66°28'	+04'	90°	66°27'	+06'	92°	11
12	65°49'	-11'	76°	66°02'	-09'	78°	66°13'	-06'	81°	66°22'	-04'	83°	66°28'	-01'	85°	66°32'	+01'	87°	66°33'	+04'	90°	12
13	65°38'	-13'	74°	65°54'	-11'	76°	66°07'	-09'	78°	66°18'	-06'	80°	66°27'	-04'	83°	66°33'	-01'	85°	66°37'	+02'	87°	13
14	65°24'	-16'	71°	65°42'	-13'	74°	65°58'	-11'	76°	66°12'	-08'	78°	66°23'	-06'	80°	66°32'	-03'	82°	66°39'	-01'	85°	14
15	65°09'	-18'	69°	65°29'	-15'	71°	65°47'	-13'	73°	66°03'	-11'	75°	66°17'	-08'	78°	66°29'	-06'	80°	66°38'	-03'	82°	15
16	64°51'	-20'	67°	65°14'	-18'	69°	65°34'	-15'	71°	65°53'	-13'	73°	66°09'	-11'	75°	66°23'	-08'	77°	66°35'	-06'	80°	16
17	64°31'	-22'	65°	64°56'	-20'	67°	65°19'	-17'	69°	65°40'	-15'	71°	65°58'	-13'	73°	66°15'	-10'	75°	66°30'	-08'	77°	17
18	64°10'	-24'	63°	64°36'	-22'	64°	65°01'	-19'	66°	65°24'	-17'	68°	65°46'	-15'	70°	66°05'	-13'	73°	66°22'	-10'	75°	18
19	63°46'	-25'	60°	64°15'	-23'	62°	64°42'	-21'	64°	65°07'	-19'	66°	65°31'	-17'	68°	65°52'	-15'	70°	66°11'	-13'	72°	19
20	63°21'	-27'	58°	63°51'	-25'	60°	64°20'	-23'	62°	64°48'	-21'	64°	65°13'	-19'	66°	65°37'	-17'	68°	65°59'	-15'	70°	20
21	62°54'	-29'	56°	63°26'	-27'	58°	63°57'	-25'	60°	64°26'	-23'	62°	64°54'	-21'	64°	65°20'	-19'	65°	65°44'	-17'	67°	21
22	62°25'	-30'	55°	62°59'	-29'	56°	63°32'	-27'	58°	64°03'	-25'	60°	64°33'	-23'	61°	65°01'	-21'	63°	65°27'	-19'	65°	22
23	61°55'	-32'	53°	62°31'	-30'	54°	63°05'	-28'	56°	63°38'	-27'	57°	64°10'	-25'	59°	64°40'	-23'	61°	65°08'	-21'	63°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	64°06'	+16'	105°	63°50'	+18'	107°	63°32'	+20'	109°	63°12'	+22'	110°	62°50'	+24'	112°	62°26'	+26'	114°	62°01'	+28'	116°	0
1	64°22'	+14'	102°	64°08'	+16'	104°	63°52'	+18'	106°	63°34'	+20'	108°	63°14'	+22'	110°	62°52'	+24'	112°	62°29'	+26'	114°	1
2	64°35'	+12'	100°	64°24'	+14'	102°	64°10'	+16'	104°	63°54'	+18'	106°	63°36'	+21'	108°	63°17'	+23'	110°	62°55'	+25'	112°	2
3	64°47'	+09'	98°	64°38'	+12'	100°	64°26'	+14'	102°	64°13'	+16'	104°	63°57'	+19'	106°	63°40'	+21'	108°	63°20'	+23'	110°	3
4	64°56'	+07'	96°	64°49'	+10'	98°	64°40'	+12'	100°	64°29'	+14'	102°	64°16'	+17'	104°	64°00'	+19'	106°	63°43'	+21'	108°	4
5	65°04'	+05'	93°	64°59'	+07'	95°	64°52'	+10'	97°	64°44'	+12'	100°	64°33'	+15'	102°	64°19'	+17'	104°	64°04'	+19'	106°	5
6	65°09'	+03'	91°	65°07'	+05'	93°	65°02'	+08'	95°	64°56'	+10'	97°	64°47'	+13'	99°	64°36'	+15'	101°	64°23'	+17'	104°	6
7	65°11'	+00'	88°	65°12'	+03'	91°	65°10'	+05'	93°	65°06'	+08'	95°	65°00'	+10'	97°	64°51'	+13'	99°	64°41'	+15'	101°	7
8	65°12'	-02'	86°	65°15'	+01'	88°	65°16'	+03'	90°	65°14'	+06'	93°	65°10'	+08'	95°	65°04'	+11'	97°	64°56'	+13'	99°	8
9	65°10'	-04'	84°	65°16'	-02'	86°	65°19'	+01'	88°	65°20'	+03'	90°	65°18'	+06'	92°	65°15'	+08'	95°	65°09'	+11'	97°	9
10	65°06'	-06'	81°	65°14'	-04'	83°	65°20'	-01'	86°	65°23'	+01'	88°	65°24'	+04'	90°	65°23'	+06'	92°	65°20'	+09'	94°	10
11	65°00'	-08'	79°	65°10'	-06'	81°	65°18'	-04'	83°	65°24'	-01'	85°	65°28'	+01'	88°	65°29'	+04'	90°	65°28'	+06'	92°	11
12	64°51'	-11'	77°	65°04'	-08'	79°	65°15'	-06'	81°	65°23'	-03'	83°	65°29'	-01'	85°	65°33'	+02'	87°	65°35'	+04'	90°	12
13	64°41'	-13'	74°	64°56'	-10'	76°	65°09'	-08'	78°	65°20'	-06'	81°	65°28'	-03'	83°	65°35'	-01'	85°	65°39'	+02'	87°	13
14	64°28'	-15'	72°	64°45'	-13'	74°	65°01'	-10'	76°	65°14'	-08'	78°	65°25'	-05'	80°	65°34'	-03'	83°	65°41'	00'	85°	14
15	64°13'	-17'	70°	64°33'	-15'	72°	64°50'	-12'	74°	65°06'	-10'	76°	65°20'	-08'	78°	65°31'	-05'	80°	65°40'	-03'	82°	15
16	63°56'	-19'	68°	64°18'	-17'	70°	64°38'	-15'	71°	64°56'	-12'	74°	65°12'	-10'	76°	65°26'	-08'	78°	65°38'	-05'	80°	16
17	63°37'	-21'	65°	64°01'	-19'	67°	64°24'	-17'	69°	64°44'	-14'	71°	65°02'	-12'	73°	65°18'	-10'	75°	65°32'	-07'	77°	17
18	63°17'	-23'	63°	63°43'	-21'	65°	64°07'	-19'	67°	64°29'	-16'	69°	64°50'	-14'	71°	65°09'	-12'	73°	65°25'	-10'	75°	18
19	62°54'	-24'	61°	63°22'	-22'	63°	63°48'	-20'	65°	64°13'	-18'	67°	64°36'	-16'	69°	64°57'	-14'	71°	65°16'	-12'	73°	19
20	62°30'	-26'	59°	63°00'	-24'	61°	63°28'	-22'	63°	63°55'	-20'	65°	64°19'	-18'	66°	64°43'	-16'	68°	65°04'	-14'	70°	20
21	62°04'	-27'	57°	62°36'	-26'	59°	63°06'	-24'	61°	63°34'	-22'	62°	64°01'	-20'	64°	64°26'	-18'	66°	64°50'	-16'	68°	21
22	61°36'	-29'	55°	62°10'	-27'	57°	62°42'	-26'	59°	63°12'	-24'	60°	63°41'	-22'	62°	64°08'	-20'	64°	64°34'	-18'	66°	22
23	61°07'	-30'	54°	61°42'	-29'	55°	62°16'	-27'	57°	62°48'	-26'	58°	63°19'	-24'	60°	63°48'	-22'	62°	64°16'	-20'	64°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	63°08'	+15'	104°	62°53'	+17'	106°	62°35'	+19'	108°	62°16'	+22'	110°	61°55'	+23'	111°	61°32'	+25'	113°	61°08'	+27'	115°	0
1	63°23'	+13'	102°	63°10'	+15'	104°	62°55'	+18'	106°	62°38'	+20'	108°	62°19'	+22'	109°	61°58'	+24'	111°	61°35'	+26'	113°	1
2	63°37'	+11'	100°	63°26'	+13'	102°	63°12'	+16'	104°	62°57'	+18'	106°	62°40'	+20'	107°	62°22'	+22'	109°	62°01'	+24'	111°	2
3	63°48'	+09'	97°	63°39'	+11'	99°	63°28'	+14'	101°	63°15'	+16'	103°	63°00'	+18'	105°	62°44'	+20'	107°	62°25'	+22'	109°	3
4	63°57'	+07'	95°	63°51'	+09'	97°	63°42'	+12'	99°	63°31'	+14'	101°	63°19'	+16'	103°	63°04'	+18'	105°	62°47'	+21'	107°	4
5	64°04'	+05'	93°	64°00'	+07'	95°	63°54'	+10'	97°	63°45'	+12'	99°	63°35'	+14'	101°	63°22'	+17'	103°	63°08'	+19'	105°	5
6	64°09'	+03'	91°	64°07'	+05'	93°	64°03'	+08'	95°	63°57'	+10'	97°	63°49'	+12'	99°	63°39'	+15'	101°	63°26'	+17'	103°	6
7	64°12'	+01'	88°	64°12'	+03'	90°	64°11'	+05'	93°	64°07'	+08'	95°	64°01'	+10'	97°	63°53'	+13'	99°	63°43'	+15'	101°	7
8	64°12'	-02'	86°	64°15'	+01'	88°	64°16'	+03'	90°	64°15'	+06'	92°	64°11'	+08'	94°	64°06'	+10'	96°	63°58'	+13'	98°	8
9	64°11'	-04'	84°	64°16'	-01'	86°	64°20'	+01'	88°	64°21'	+03'	90°	64°20'	+06'	92°	64°16'	+08'	94°	64°11'	+11'	96°	9
10	64°07'	-06'	82°	64°15'	-03'	84°	64°21'	-01'	86°	64°24'	+01'	88°	64°25'	+04'	90°	64°25'	+06'	92°	64°21'	+09'	94°	10
11	64°01'	-08'	79°	64°11'	-06'	81°	64°20'	-03'	83°	64°25'	-01'	85°	64°29'	+02'	87°	64°31'	+04'	90°	64°30'	+06'	92°	11
12	63°53'	-10'	77°	64°06'	-08'	79°	64°16'	-05'	81°	64°25'	-03'	83°	64°31'	-01'	85°	64°35'	+02'	87°	64°36'	+04'	89°	12
13	63°43'	-12'	75°	63°58'	-10'	77°	64°11'	-08'	79°	64°21'	-05'	81°	64°30'	-03'	83°	64°36'	00'	85°	64°41'	+02'	87°	13
14	63°31'	-14'	73°	63°48'	-12'	74°	64°03'	-10'	76°	64°16'	-07'	78°	64°27'	-05'	81°	64°36'	-03'	83°	64°43'	00'	85°	14
15	63°17'	-16'	70°	63°36'	-14'	72°	63°54'	-12'	74°	64°09'	-09'	76°	64°22'	-07'	78°	64°33'	-05'	80°	64°42'	-02'	82°	15
16	63°01'	-18'	68°	63°22'	-16'	70°	63°42'	-14'	72°	63°59'	-12'	74°	64°15'	-09'	76°	64°29'	-07'	78°	64°40'	-05'	80°	16
17	62°43'	-20'	66°	63°06'	-18'	68°	63°28'	-16'	70°	63°48'	-14'	72°	64°06'	-11'	74°	64°22'	-09'	76°	64°35'	-07'	78°	17
18	62°23'	-22'	64°	62°49'	-20'	66°	63°12'	-18'	68°	63°34'	-16'	69°	63°54'	-13'	71°	64°12'	-11'	73°	64°29'	-09'	75°	18
19	62°02'	-23'	62°	62°29'	-21'	64°	62°55'	-20'	66°	63°19'	-18'	67°	63°41'	-15'	69°	64°01'	-13'	71°	64°20'	-11'	73°	19
20	61°38'	-25'	60°	62°08'	-23'	62°	62°35'	-21'	63°	63°01'	-19'	65°	63°25'	-17'	67°	63°48'	-15'	69°	64°09'	-13'	71°	20
21	61°13'	-26'	58°	61°44'	-25'	60°	62°14'	-23'	61°	62°42'	-21'	63°	63°08'	-19'	65°	63°33'	-17'	67°	63°55'	-15'	69°	21
22	60°47'	-28'	56°	61°20'	-26'	58°	61°51'	-25'	59°	62°21'	-23'	61°	62°49'	-21'	63°	63°15'	-19'	65°	63°40'	-17'	66°	22
23	60°19'	-29'	55°	60°53'	-28'	56°	61°26'	-26'	58°	61°58'	-25'	59°	62°28'	-23'	61°	62°56'	-21'	62°	63°23'	-19'	64°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	62°10'	+15'	103°	61°56'	+17'	105°	61°39'	+19'	107°	61°20'	+21'	109°	61°00'	+23'	111°	60°38'	+25'	112°	60°15'	+26'	114°	0
1	62°25'	+13'	101°	62°12'	+15'	103°	61°58'	+17'	105°	61°41'	+19'	107°	61°23'	+21'	109°	61°03'	+23'	110°	60°41'	+25'	112°	1
2	62°38'	+11'	99°	62°27'	+13'	101°	62°15'	+15'	103°	62°00'	+17'	105°	61°44'	+19'	107°	61°26'	+21'	108°	61°06'	+23'	110°	2
3	62°49'	+09'	97°	62°40'	+11'	99°	62°30'	+13'	101°	62°18'	+16'	103°	62°03'	+18'	105°	61°47'	+20'	106°	61°30'	+22'	108°	3
4	62°58'	+07'	95°	62°52'	+09'	97°	62°43'	+11'	99°	62°33'	+14'	101°	62°21'	+16'	103°	62°07'	+18'	104°	61°51'	+20'	106°	4
5	63°05'	+05'	93°	63°01'	+07'	95°	62°55'	+09'	97°	62°47'	+12'	99°	62°37'	+14'	100°	62°25'	+16'	102°	62°11'	+18'	104°	5
6	63°10'	+03'	91°	63°08'	+05'	93°	63°04'	+07'	94°	62°59'	+10'	96°	62°51'	+12'	98°	62°41'	+14'	100°	62°29'	+16'	102°	6
7	63°12'	+01'	88°	63°13'	+03'	90°	63°12'	+05'	92°	63°08'	+08'	94°	63°03'	+10'	96°	62°55'	+12'	98°	62°46'	+14'	100°	7
8	63°13'	-01'	86°	63°16'	+01'	88°	63°17'	+03'	90°	63°16'	+06'	92°	63°13'	+08'	94°	63°07'	+10'	96°	63°00'	+12'	98°	8
9	63°12'	-03'	84°	63°17'	-01'	86°	63°20'	+01'	88°	63°22'	+04'	90°	63°21'	+06'	92°	63°18'	+08'	94°	63°13'	+10'	96°	9
10	63°08'	-05'	82°	63°16'	-03'	84°	63°22'	-01'	86°	63°25'	+01'	88°	63°27'	+04'	90°	63°26'	+06'	92°	63°23'	+08'	94°	10
11	63°03'	-08'	79°	63°13'	-05'	81°	63°21'	-03'	83°	63°27'	-01'	85°	63°30'	+02'	87°	63°32'	+04'	89°	63°32'	+06'	91°	11
12	62°55'	-10'	77°	63°07'	-07'	79°	63°18'	-05'	81°	63°26'	-03'	83°	63°32'	00'	85°	63°36'	+02'	87°	63°38'	+04'	89°	12
13	62°46'	-11'	75°	63°00'	-09'	77°	63°13'	-07'	79°	63°23'	-05'	81°	63°32'	-03'	83°	63°38'	00'	85°	63°42'	+02'	87°	13
14	62°34'	-13'	73°	62°51'	-11'	75°	63°06'	-09'	77°	63°18'	-07'	79°	63°29'	-05'	81°	63°38'	-02'	83°	63°44'	+00'	85°	14
15	62°21'	-15'	71°	62°40'	-13'	73°	62°56'	-11'	75°	63°11'	-09'	76°	63°24'	-07'	78°	63°36'	-04'	80°	63°45'	-02'	82°	15
16	62°06'	-17'	69°	62°26'	-15'	71°	62°45'	-13'	72°	63°03'	-11'	74°	63°18'	-09'	76°	63°31'	-06'	78°	63°42'	-04'	80°	16
17	61°48'	-19'	67°	62°11'	-17'	69°	62°32'	-15'	70°	62°52'	-13'	72°	63°09'	-11'	74°	63°25'	-09'	76°	63°38'	-06'	78°	17
18	61°29'	-21'	65°	61°54'	-19'	66°	62°17'	-17'	68°	62°39'	-15'	70°	62°58'	-13'	72°	63°16'	-11'	74°	63°32'	-08'	76°	18
19	61°09'	-22'	63°	61°35'	-20'	64°	62°01'	-19'	66°	62°24'	-17'	68°	62°46'	-15'	70°	63°06'	-13'	72°	63°24'	-10'	73°	19
20	60°47'	-24'	61°	61°15'	-22'	62°	61°42'	-20'	64°	62°07'	-18'	66°	62°31'	-17'	68°	62°53'	-14'	69°	63°13'	-12'	71°	20
21	60°23'	-25'	59°	60°53'	-24'	61°	61°22'	-22'	62°	61°49'	-20'	64°	62°15'	-18'	66°	62°39'	-16'	67°	63°01'	-14'	69°	21
22	59°57'	-27'	57°	60°29'	-25'	59°	61°00'	-24'	60°	61°29'	-22'	62°	61°56'	-20'	63°	62°22'	-18'	65°	62°47'	-16'	67°	22
23	59°30'	-28'	55°	60°04'	-27'	57°	60°36'	-25'	58°	61°07'	-24'	60°	61°36'	-22'	61°	62°04'	-20'	63°	62°30'	-18'	65°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	61°12'	+14'	103°	60°58'	+16'	105°	60°42'	+18'	106°	60°24'	+20'	108°	60°05'	+22'	110°	59°44'	+24'	111°	59°21'	+26'	113°	0			
1	61°27'	+12'	101°	61°14'	+15'	103°	61°00'	+17'	104°	60°45'	+19'	106°	60°27'	+21'	108°	60°08'	+22'	110°	59°47'	+24'	111°	1			
2	61°39'	+11'	99°	61°29'	+13'	101°	61°17'	+15'	102°	61°03'	+17'	104°	60°48'	+19'	106°	60°30'	+21'	108°	60°11'	+23'	109°	2			
3	61°50'	+09'	97°	61°42'	+11'	99°	61°32'	+13'	100°	61°20'	+15'	102°	61°06'	+17'	104°	60°51'	+19'	106°	60°34'	+21'	107°	3			
4	61°58'	+07'	95°	61°53'	+09'	97°	61°45'	+11'	98°	61°35'	+13'	100°	61°24'	+15'	102°	61°10'	+17'	104°	60°55'	+19'	106°	4			
5	62°05'	+05'	93°	62°02'	+07'	94°	61°56'	+09'	96°	61°48'	+11'	98°	61°39'	+14'	100°	61°28'	+16'	102°	61°14'	+18'	104°	5			
6	62°10'	+03'	90°	62°09'	+05'	92°	62°05'	+07'	94°	62°00'	+09'	96°	61°53'	+12'	98°	61°43'	+14'	100°	61°32'	+16'	102°	6			
7	62°13'	+01'	88°	62°14'	+03'	90°	62°12'	+05'	92°	62°09'	+08'	94°	62°04'	+10'	96°	61°57'	+12'	98°	61°48'	+14'	100°	7			
8	62°14'	-01'	86°	62°17'	+01'	88°	62°18'	+03'	90°	62°17'	+06'	92°	62°14'	+08'	94°	62°09'	+10'	96°	62°02'	+12'	97°	8			
9	62°12'	-03'	84°	62°18'	-01'	86°	62°21'	+01'	88°	62°22'	+04'	90°	62°22'	+06'	92°	62°19'	+08'	93°	62°14'	+10'	95°	9			
10	62°09'	-05'	82°	62°17'	-03'	84°	62°22'	-01'	86°	62°26'	+02'	88°	62°28'	+04'	89°	62°27'	+06'	91°	62°25'	+08'	93°	10			
11	62°04'	-07'	80°	62°14'	-05'	82°	62°22'	-03'	83°	62°28'	00'	85°	62°31'	+02'	87°	62°33'	+04'	89°	62°33'	+06'	91°	11			
12	61°57'	-09'	78°	62°09'	-07'	79°	62°19'	-05'	81°	62°27'	-02'	83°	62°33'	00'	85°	62°37'	+02'	87°	62°40'	+04'	89°	12			
13	61°48'	-11'	75°	62°02'	-09'	77°	62°14'	-07'	79°	62°25'	-04'	81°	62°33'	-02'	83°	62°40'	+00'	85°	62°44'	+02'	87°	13			
14	61°37'	-13'	73°	61°53'	-11'	75°	62°08'	-09'	77°	62°20'	-06'	79°	62°31'	-04'	81°	62°40'	-02'	83°	62°46'	+00'	85°	14			
15	61°24'	-15'	71°	61°43'	-13'	73°	61°59'	-10'	75°	62°14'	-08'	77°	62°27'	-06'	79°	62°38'	-04'	81°	62°47'	-02'	82°	15			
16	61°10'	-16'	69°	61°30'	-14'	71°	61°49'	-12'	73°	62°06'	-10'	75°	62°21'	-08'	76°	62°34'	-06'	78°	62°45'	-04'	80°	16			
17	60°54'	-18'	67°	61°16'	-16'	69°	61°36'	-14'	71°	61°55'	-12'	73°	62°12'	-10'	74°	62°28'	-08'	76°	62°41'	-06'	78°	17			
18	60°35'	-20'	65°	61°00'	-18'	67°	61°22'	-16'	69°	61°43'	-14'	70°	62°02'	-12'	72°	62°20'	-10'	74°	62°35'	-08'	76°	18			
19	60°16'	-21'	63°	60°42'	-20'	65°	61°06'	-18'	67°	61°29'	-16'	68°	61°50'	-14'	70°	62°10'	-12'	72°	62°28'	-10'	74°	19			
20	59°54'	-23'	62°	60°22'	-21'	63°	60°48'	-19'	65°	61°13'	-18'	66°	61°36'	-16'	68°	61°58'	-14'	70°	62°18'	-12'	72°	20			
21	59°31'	-24'	60°	60°01'	-23'	61°	60°29'	-21'	63°	60°56'	-19'	64°	61°21'	-17'	66°	61°44'	-16'	68°	62°06'	-14'	70°	21			
22	59°07'	-26'	58°	59°38'	-24'	59°	60°08'	-23'	61°	60°36'	-21'	62°	61°03'	-19'	64°	61°29'	-17'	66°	61°53'	-15'	67°	22			
23	58°41'	-27'	56°	59°14'	-26'	58°	59°45'	-24'	59°	60°15'	-23'	61°	60°44'	-21'	62°	61°11'	-19'	64°	61°37'	-17'	65°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13						

**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**

Dec°	7			8			9			10			11			12			13			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	60°14'	+14'	102°	60°01'	+16'	104°	59°45'	+18'	106°	59°28'	+20'	107°	59°09'	+22'	109°	58°49'	+23'	111°	58°27'	+25'	112°	0			
1	60°28'	+12'	100°	60°16'	+14'	102°	60°03'	+16'	104°	59°48'	+18'	106°	59°31'	+20'	107°	59°12'	+22'	109°	58°52'	+24'	110°	1			
2	60°40'	+10'	98°	60°31'	+12'	100°	60°19'	+14'	102°	60°06'	+16'	104°	59°51'	+18'	105°	59°34'	+20'	107°	59°16'	+22'	109°	2			
3	60°51'	+08'	96°	60°43'	+11'	98°	60°33'	+13'	100°	60°22'	+15'	102°	60°09'	+17'	103°	59°54'	+19'	105°	59°38'	+21'	107°	3			
4	60°59'	+07'	94°	60°54'	+09'	96°	60°46'	+11'	98°	60°37'	+13'	100°	60°26'	+15'	101°	60°13'	+17'	103°	59°59'	+19'	105°	4			
5	61°06'	+05'	92°	61°02'	+07'	94°	60°57'	+09'	96°	60°50'	+11'	98°	60°41'	+13'	99°	60°30'	+15'	101°	60°18'	+17'	103°	5			
6	61°10'	+03'	90°	61°09'	+05'	92°	61°06'	+07'	94°	61°01'	+09'	96°	60°54'	+11'	97°	60°45'	+14'	99°	60°35'	+16'	101°	6			
7	61°13'	+01'	88°	61°14'	+03'	90°	61°13'	+05'	92°	61°10'	+07'	94°	61°06'	+10'	95°	60°59'	+12'	97°	60°50'	+14'	99°	7			
8	61°14'	-01'	86°	61°17'	+01'	88°	61°19'	+03'	90°	61°18'	+06'	92°	61°15'	+08'	93°	61°11'	+10'	95°	61°04'	+12'	97°	8			
9	61°13'	-03'	84°	61°19'	-01'	86°	61°22'	+01'	88°	61°23'	+04'	90°	61°23'	+06'	91°	61°21'	+08'	93°	61°16'	+10'	95°	9			
10	61°10'	-05'	82°	61°18'	-03'	84°	61°23'	00'	86°	61°27'	+02'	87°	61°29'	+04'	89°	61°29'	+06'	91°	61°26'	+08'	93°	10			
11	61°06'	-07'	80°	61°15'	-05'	82°	61°23'	-02'	84°	61°29'	00'	85°	61°33'	+02'	87°	61°35'	+04'	89°	61°35'	+06'	91°	11			
12	60°59'	-09'	78°	61°11'	-06'	80°	61°21'	-04'	81°	61°29'	-02'	83°	61°35'	+00'	85°	61°39'	+02'	87°	61°41'	+04'	89°	12			
13	60°50'	-10'	76°	61°04'	-08'	78°	61°16'	-06'	79°	61°26'	-04'	81°	61°35'	-02'	83°	61°41'	+00'	85°	61°46'	+03'	87°	13			
14	60°40'	-12'	74°	60°56'	-10'	76°	61°10'	-08'	77°	61°22'	-06'	79°	61°33'	-04'	81°	61°41'	-02'	83°	61°48'	+01'	85°	14			
15	60°28'	-14'	72°	60°46'	-12'	73°	61°02'	-10'	75°	61°16'	-08'	77°	61°29'	-06'	79°	61°40'	-04'	81°	61°49'	-01'	82°	15			
16	60°14'	-16'	70°	60°34'	-14'	71°	60°52'	-12'	73°	61°09'	-10'	75°	61°23'	-08'	77°	61°36'	-05'	78°	61°47'	-03'	80°	16			
17	59°58'	-17'	68°	60°20'	-15'	70°	60°40'	-13'	71°	60°59'	-12'	73°	61°16'	-09'	75°	61°31'	-07'	76°	61°44'	-05'	78°	17			
18	59°41'	-19'	66°	60°05'	-17'	68°	60°27'	-15'	69°	60°47'	-13'	71°	61°06'	-11'	73°	61°23'	-09'	74°	61°39'	-07'	76°	18			
19	59°22'	-20'	64°	59°48'	-19'	66°	60°12'	-17'	67°	60°34'	-15'	69°	60°55'	-13'	71°	61°14'	-11'	72°	61°31'	-09'	74°	19			
20	59°02'	-22'	62°	59°29'	-20'	64°	59°55'	-19'	65°	60°19'	-17'	67°	60°42'	-15'	69°	61°03'	-13'	70°	61°22'	-11'	72°	20			
21	58°40'	-23'	60°	59°09'	-22'	62°	59°36'	-20'	63°	60°02'	-18'	65°	60°27'	-17'	67°	60°50'	-15'	68°	61°11'	-13'	70°	21			
22	58°16'	-25'	59°	58°47'	-23'	60°	59°16'	-22'	62°	59°44'	-20'	63°	60°10'	-18'	65°	60°35'	-16'	66°	60°59'	-15'	68°	22			
23	57°51'	-26'	57°	58°23'	-25'	58°	58°54'	-23'	60°	59°24'	-22'	61°	59°52'	-20'	63°	60°19'	-18'	64°	60°44'	-16'	66°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13						

**29° 331° LHA**

**Latitude SAME as Declination**

**29° 331° LHA**

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

30° 330° LHA

Latitude SAME as Declination

30° 330° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	59°16'	+13'	102°	59°03'	+15'	104°	58°48'	+17'	105°	58°32'	+19'	107°	58°13'	+21'	108°	57°54'	+23'	110°	57°33'	+24'	111°	0
1	59°30'	+12'	100°	59°18'	+14'	102°	59°05'	+16'	103°	58°51'	+18'	105°	58°34'	+19'	107°	58°17'	+21'	108°	57°57'	+23'	110°	1
2	59°41'	+10'	98°	59°32'	+12'	100°	59°21'	+14'	101°	59°08'	+16'	103°	58°54'	+18'	105°	58°38'	+20'	106°	58°20'	+22'	108°	2
3	59°51'	+08'	96°	59°44'	+10'	98°	59°35'	+12'	100°	59°24'	+14'	101°	59°12'	+16'	103°	58°58'	+18'	104°	58°42'	+20'	106°	3
4	60°00'	+06'	94°	59°54'	+09'	96°	59°47'	+11'	98°	59°39'	+13'	99°	59°28'	+15'	101°	59°16'	+17'	103°	59°02'	+19'	104°	4
5	60°06'	+05'	92°	60°03'	+07'	94°	59°58'	+09'	96°	59°51'	+11'	97°	59°43'	+13'	99°	59°32'	+15'	101°	59°21'	+17'	102°	5
6	60°11'	+03'	90°	60°10'	+05'	92°	60°07'	+07'	94°	60°02'	+09'	95°	59°56'	+11'	97°	59°47'	+13'	99°	59°37'	+15'	100°	6
7	60°14'	+01'	88°	60°15'	+03'	90°	60°14'	+05'	92°	60°11'	+07'	93°	60°07'	+09'	95°	60°01'	+12'	97°	59°53'	+14'	99°	7
8	60°15'	-01'	86°	60°18'	+01'	88°	60°19'	+03'	90°	60°19'	+06'	91°	60°16'	+08'	93°	60°12'	+10'	95°	60°06'	+12'	97°	8
9	60°14'	-03'	84°	60°19'	-01'	86°	60°23'	+02'	88°	60°24'	+04'	89°	60°24'	+06'	91°	60°22'	+08'	93°	60°18'	+10'	95°	9
10	60°11'	-04'	82°	60°19'	-02'	84°	60°24'	00'	86°	60°28'	+02'	87°	60°30'	+04'	89°	60°30'	+06'	91°	60°28'	+08'	93°	10
11	60°07'	-06'	80°	60°16'	-04'	82°	60°24'	-02'	84°	60°30'	+00'	85°	60°34'	+02'	87°	60°36'	+04'	89°	60°36'	+06'	91°	11
12	60°01'	-08'	78°	60°12'	-06'	80°	60°22'	-04'	82°	60°30'	-02'	83°	60°36'	+00'	85°	60°40'	+02'	87°	60°43'	+05'	89°	12
13	59°53'	-10'	76°	60°06'	-08'	78°	60°18'	-06'	80°	60°28'	-04'	81°	60°36'	-02'	83°	60°43'	+01'	85°	60°47'	+03'	87°	13
14	59°43'	-12'	74°	59°58'	-10'	76°	60°12'	-08'	78°	60°24'	-06'	79°	60°35'	-03'	81°	60°43'	-01'	83°	60°50'	+01'	85°	14
15	59°31'	-13'	72°	59°49'	-11'	74°	60°05'	-09'	76°	60°19'	-07'	77°	60°31'	-05'	79°	60°42'	-03'	81°	60°51'	-01'	82°	15
16	59°18'	-15'	70°	59°38'	-13'	72°	59°55'	-11'	74°	60°12'	-09'	75°	60°26'	-07'	77°	60°39'	-05'	79°	60°50'	-03'	80°	16
17	59°03'	-17'	68°	59°24'	-15'	70°	59°44'	-13'	72°	60°02'	-11'	73°	60°19'	-09'	75°	60°34'	-07'	77°	60°47'	-05'	78°	17
18	58°47'	-18'	67°	59°10'	-16'	68°	59°31'	-15'	70°	59°51'	-13'	71°	60°10'	-11'	73°	60°27'	-09'	75°	60°42'	-07'	76°	18
19	58°29'	-20'	65°	58°53'	-18'	66°	59°17'	-16'	68°	59°39'	-14'	69°	59°59'	-12'	71°	60°18'	-10'	73°	60°35'	-08'	74°	19
20	58°09'	-21'	63°	58°36'	-19'	64°	59°01'	-18'	66°	59°25'	-16'	67°	59°47'	-14'	69°	60°08'	-12'	71°	60°27'	-10'	72°	20
21	57°48'	-23'	61°	58°16'	-21'	63°	58°43'	-19'	64°	59°09'	-18'	66°	59°33'	-16'	67°	59°55'	-14'	69°	60°16'	-12'	70°	21
22	57°25'	-24'	59°	57°55'	-22'	61°	58°24'	-21'	62°	58°51'	-19'	64°	59°17'	-17'	65°	59°41'	-16'	67°	60°04'	-14'	68°	22
23	57°01'	-25'	58°	57°33'	-24'	59°	58°03'	-22'	60°	58°32'	-21'	62°	58°59'	-19'	63°	59°26'	-17'	65°	59°51'	-15'	66°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

30° 330° LHA

Latitude SAME as Declination

30° 330° LHA

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

31° 329° LHA

Latitude SAME as Declination

31° 329° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	58°18'	+13'	101°	58°05'	+15'	103°	57°51'	+17'	105°	57°35'	+19'	106°	57°17'	+20'	108°	56°59'	+22'	109°	56°38'	+24'	111°	0
1	58°31'	+11'	100°	58°20'	+13'	101°	58°08'	+15'	103°	57°54'	+17'	104°	57°38'	+19'	106°	57°21'	+21'	107°	57°02'	+22'	109°	1
2	58°42'	+10'	98°	58°33'	+12'	99°	58°23'	+14'	101°	58°11'	+16'	103°	57°57'	+17'	104°	57°41'	+19'	106°	57°25'	+21'	107°	2
3	58°52'	+08'	96°	58°45'	+10'	97°	58°37'	+12'	99°	58°26'	+14'	101°	58°14'	+16'	102°	58°01'	+18'	104°	57°46'	+20'	105°	3
4	59°00'	+06'	94°	58°55'	+08'	96°	58°49'	+10'	97°	58°40'	+12'	99°	58°30'	+14'	100°	58°19'	+16'	102°	58°05'	+18'	104°	4
5	59°07'	+05'	92°	59°04'	+07'	94°	58°59'	+09'	95°	58°53'	+11'	97°	58°45'	+13'	99°	58°35'	+15'	100°	58°23'	+17'	102°	5
6	59°11'	+03'	90°	59°10'	+05'	92°	59°08'	+07'	93°	59°03'	+09'	95°	58°57'	+11'	97°	58°49'	+13'	98°	58°40'	+15'	100°	6
7	59°14'	+01'	88°	59°15'	+03'	90°	59°15'	+05'	91°	59°12'	+07'	93°	59°08'	+09'	95°	59°02'	+11'	96°	58°55'	+13'	98°	7
8	59°15'	-01'	86°	59°19'	+01'	88°	59°20'	+03'	89°	59°20'	+06'	91°	59°18'	+08'	93°	59°14'	+10'	95°	59°08'	+12'	96°	8
9	59°15'	-02'	84°	59°20'	00'	86°	59°23'	+02'	88°	59°25'	+04'	89°	59°25'	+06'	91°	59°23'	+08'	93°	59°20'	+10'	94°	9
10	59°12'	-04'	82°	59°20'	-02'	84°	59°25'	00'	86°	59°29'	+02'	87°	59°31'	+04'	89°	59°31'	+06'	91°	59°30'	+08'	92°	10
11	59°08'	-06'	80°	59°18'	-04'	82°	59°25'	-02'	84°	59°31'	+00'	85°	59°35'	+02'	87°	59°37'	+04'	89°	59°38'	+06'	90°	11
12	59°02'	-08'	78°	59°14'	-06'	80°	59°23'	-04'	82°	59°31'	-02'	83°	59°37'	+00'	85°	59°42'	+03'	87°	59°44'	+05'	88°	12
13	58°55'	-09'	76°	59°08'	-07'	78°	59°20'	-05'	80°	59°30'	-03'	81°	59°38'	-01'	83°	59°44'	+01'	85°	59°49'	+03'	86°	13
14	58°46'	-11'	74°	59°01'	-09'	76°	59°14'	-07'	78°	59°26'	-05'	79°	59°36'	-03'	81°	59°45'	-01'	83°	59°52'	+01'	84°	14
15	58°35'	-13'	73°	58°52'	-11'	74°	59°07'	-09'	76°	59°21'	-07'	77°	59°33'	-05'	79°	59°44'	-03'	81°	59°53'	-01'	82°	15
16	58°22'	-14'	71°	58°41'	-12'	72°	58°58'	-11'	74°	59°14'	-09'	75°	59°29'	-07'	77°	59°41'	-05'	79°	59°52'	-03'	80°	16
17	58°08'	-16'	69°	58°29'	-14'	70°	58°48'	-12'	72°	59°06'	-10'	74°	59°22'	-08'	75°	59°37'	-06'	77°	59°49'	-04'	78°	17
18	57°52'	-17'	67°	58°15'	-16'	69°	58°36'	-14'	70°	58°55'	-12'	72°	59°14'	-10'	73°	59°30'	-08'	75°	59°45'	-06'	76°	18
19	57°35'	-19'	65°	57°59'	-17'	67°	58°22'	-15'	68°	58°44'	-14'	70°	59°04'	-12'	71°	59°22'	-10'	73°	59°39'	-08'	75°	19
20	57°16'	-20'	63°	57°42'	-19'	65°	58°07'	-17'	66°	58°30'	-15'	68°	58°52'	-13'	69°	59°12'	-12'	71°	59°31'	-10'	73°	20
21	56°55'	-22'	62°	57°23'	-20'	63°	57°50'	-18'	65°	58°15'	-17'	66°	58°38'	-15'	68°	59°01'	-13'	69°	59°21'	-11'	71°	21
22	56°34'	-23'	60°	57°03'	-22'	61°	57°31'	-20'	63°	57°58'	-18'	64°	58°23'	-17'	66°	58°47'	-15'	67°	59°10'	-13'	69°	22
23	56°11'	-24'	58°	56°41'	-23'	60°	57°11'	-21'	61°	57°40'	-20'	62°	58°07'	-18'	64°	58°33'	-16'	65°	58°57'	-15'	67°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	57°19'	+13'	101°	57°07'	+15'	103°	56°53'	+16'	104°	56°38'	+18'	106°	56°21'	+20'	107°	56°03'	+22'	108°	55°43'	+23'	110°	0
1	57°32'	+11'	99°	57°22'	+13'	101°	57°10'	+15'	102°	56°56'	+17'	104°	56°41'	+19'	105°	56°25'	+20'	107°	56°07'	+22'	108°	1
2	57°43'	+10'	97°	57°35'	+11'	99°	57°25'	+13'	100°	57°13'	+15'	102°	57°00'	+17'	104°	56°45'	+19'	105°	56°29'	+21'	106°	2
3	57°53'	+08'	96°	57°46'	+10'	97°	57°38'	+12'	99°	57°28'	+14'	100°	57°17'	+16'	102°	57°04'	+17'	103°	56°49'	+19'	105°	3
4	58°01'	+06'	94°	57°56'	+08'	95°	57°50'	+10'	97°	57°42'	+12'	98°	57°32'	+14'	100°	57°21'	+16'	102°	57°08'	+18'	103°	4
5	58°07'	+05'	92°	58°04'	+07'	93°	58°00'	+09'	95°	57°54'	+11'	97°	57°46'	+12'	98°	57°37'	+14'	100°	57°26'	+16'	101°	5
6	58°12'	+03'	90°	58°11'	+05'	92°	58°09'	+07'	93°	58°04'	+09'	95°	57°59'	+11'	96°	57°51'	+13'	98°	57°42'	+15'	99°	6
7	58°15'	+01'	88°	58°16'	+03'	90°	58°15'	+05'	91°	58°13'	+07'	93°	58°10'	+09'	94°	58°04'	+11'	96°	57°57'	+13'	98°	7
8	58°16'	00'	86°	58°19'	+02'	88°	58°21'	+04'	89°	58°21'	+06'	91°	58°19'	+08'	93°	58°15'	+09'	94°	58°10'	+11'	96°	8
9	58°15'	-02'	84°	58°21'	00'	86°	58°24'	+02'	87°	58°26'	+04'	89°	58°26'	+06'	91°	58°25'	+08'	92°	58°21'	+10'	94°	9
10	58°13'	-04'	82°	58°21'	-02'	84°	58°26'	+00'	86°	58°30'	+02'	87°	58°32'	+04'	89°	58°32'	+06'	90°	58°31'	+08'	92°	10
11	58°10'	-05'	80°	58°19'	-04'	82°	58°26'	-02'	84°	58°32'	+00'	85°	58°36'	+02'	87°	58°39'	+04'	89°	58°39'	+06'	90°	11
12	58°04'	-07'	79°	58°15'	-05'	80°	58°25'	-03'	82°	58°32'	-01'	83°	58°39'	+01'	85°	58°43'	+03'	87°	58°46'	+05'	88°	12
13	57°57'	-09'	77°	58°10'	-07'	78°	58°21'	-05'	80°	58°31'	-03'	81°	58°39'	-01'	83°	58°46'	+01'	85°	58°50'	+03'	86°	13
14	57°48'	-10'	75°	58°03'	-09'	76°	58°16'	-07'	78°	58°28'	-05'	79°	58°38'	-03'	81°	58°47'	-01'	83°	58°53'	+01'	84°	14
15	57°38'	-12'	73°	57°55'	-10'	74°	58°10'	-08'	76°	58°23'	-06'	78°	58°36'	-04'	79°	58°46'	-02'	81°	58°55'	00'	82°	15
16	57°26'	-14'	71°	57°44'	-12'	73°	58°01'	-10'	74°	58°17'	-08'	76°	58°31'	-06'	77°	58°44'	-04'	79°	58°54'	-02'	81°	16
17	57°12'	-15'	69°	57°33'	-13'	71°	57°52'	-12'	72°	58°09'	-10'	74°	58°25'	-08'	75°	58°39'	-06'	77°	58°52'	-04'	79°	17
18	56°57'	-17'	68°	57°19'	-15'	69°	57°40'	-13'	70°	57°59'	-11'	72°	58°17'	-09'	73°	58°33'	-08'	75°	58°48'	-06'	77°	18
19	56°40'	-18'	66°	57°04'	-16'	67°	57°27'	-15'	69°	57°48'	-13'	70°	58°08'	-11'	72°	58°26'	-09'	73°	58°42'	-07'	75°	19
20	56°22'	-19'	64°	56°48'	-18'	65°	57°12'	-16'	67°	57°35'	-14'	68°	57°57'	-13'	70°	58°17'	-11'	71°	58°35'	-09'	73°	20
21	56°03'	-21'	62°	56°30'	-19'	64°	56°56'	-18'	65°	57°21'	-16'	66°	57°44'	-14'	68°	58°06'	-13'	69°	58°26'	-11'	71°	21
22	55°42'	-22'	61°	56°11'	-21'	62°	56°38'	-19'	63°	57°05'	-18'	65°	57°30'	-16'	66°	57°53'	-14'	68°	58°15'	-12'	69°	22
23	55°20'	-23'	59°	55°50'	-22'	60°	56°19'	-21'	62°	56°47'	-19'	63°	57°14'	-17'	64°	57°39'	-16'	66°	58°03'	-14'	67°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	56°21'	+12'	101°	56°09'	+14'	102°	55°56'	+16'	104°	55°41'	+18'	105°	55°25'	+19'	106°	55°07'	+21'	108°	54°48'	+23'	109°	0
1	56°33'	+11'	99°	56°23'	+13'	100°	56°12'	+15'	102°	55°59'	+16'	103°	55°44'	+18'	105°	55°28'	+20'	106°	55°11'	+21'	107°	1
2	56°44'	+09'	97°	56°36'	+11'	99°	56°26'	+13'	100°	56°15'	+15'	102°	56°02'	+17'	103°	55°48'	+18'	104°	55°32'	+20'	106°	2
3	56°54'	+08'	95°	56°47'	+10'	97°	56°39'	+12'	98°	56°30'	+13'	100°	56°19'	+15'	101°	56°07'	+17'	103°	55°53'	+19'	104°	3
4	57°01'	+06'	93°	56°57'	+08'	95°	56°51'	+10'	97°	56°43'	+12'	98°	56°34'	+14'	100°	56°24'	+16'	101°	56°11'	+17'	102°	4
5	57°08'	+05'	92°	57°05'	+07'	93°	57°01'	+08'	95°	56°55'	+10'	96°	56°48'	+12'	98°	56°39'	+14'	99°	56°29'	+16'	101°	5
6	57°12'	+03'	90°	57°12'	+05'	91°	57°09'	+07'	93°	57°06'	+09'	94°	57°00'	+11'	96°	56°53'	+13'	97°	56°45'	+14'	99°	6
7	57°15'	+01'	88°	57°17'	+03'	89°	57°16'	+05'	91°	57°14'	+07'	93°	57°11'	+09'	94°	57°06'	+11'	96°	56°59'	+13'	97°	7
8	57°17'	00'	86°	57°20'	+02'	88°	57°21'	+04'	89°	57°21'	+06'	91°	57°20'	+07'	92°	57°17'	+09'	94°	57°12'	+11'	95°	8
9	57°16'	-02'	84°	57°21'	+00'	86°	57°25'	+02'	87°	57°27'	+04'	89°	57°27'	+06'	90°	57°26'	+08'	92°	57°23'	+10'	94°	9
10	57°14'	-04'	82°	57°21'	-02'	84°	57°27'	+00'	85°	57°31'	+02'	87°	57°33'	+04'	89°	57°34'	+06'	90°	57°33'	+08'	92°	10
11	57°11'	-05'	81°	57°20'	-03'	82°	57°27'	-01'	84°	57°33'	+01'	85°	57°37'	+03'	87°	57°40'	+05'	88°	57°41'	+06'	90°	11
12	57°06'	-07'	79°	57°17'	-05'	80°	57°26'	-03'	82°	57°34'	-01'	83°	57°40'	+01'	85°	57°44'	+03'	86°	57°47'	+05'	88°	12
13	56°59'	-08'	77°	57°12'	-06'	78°	57°23'	-05'	80°	57°33'	-03'	81°	57°41'	-01'	83°	57°47'	+01'	85°	57°52'	+03'	86°	13
14	56°51'	-10'	75°	57°05'	-08'	77°	57°18'	-06'	78°	57°30'	-04'	80°	57°40'	-02'	81°	57°49'	00'	83°	57°55'	+01'	84°	14
15	56°41'	-11'	73°	56°57'	-10'	75°	57°12'	-08'	76°	57°26'	-06'	78°	57°38'	-04'	79°	57°48'	-02'	81°	57°57'	00'	82°	15
16	56°29'	-13'	71°	56°48'	-11'	73°	57°04'	-09'	74°	57°20'	-08'	76°	57°34'	-06'	77°	57°46'	-04'	79°	57°57'	-02'	81°	16
17	56°16'	-14'	70°	56°36'	-13'	71°	56°55'	-11'	73°	57°12'	-09'	74°	57°28'	-07'	76°	57°42'	-05'	77°	57°55'	-04'	79°	17
18	56°02'	-16'	68°	56°24'	-14'	69°	56°44'	-12'	71°	57°03'	-11'	72°	57°21'	-09'	74°	57°37'	-07'	75°	57°51'	-05'	77°	18
19	55°46'	-17'	66°	56°09'	-16'	68°	56°32'	-14'	69°	56°52'	-12'	70°	57°12'	-10'	72°	57°30'	-09'	73°	57°46'	-07'	75°	19
20	55°29'	-19'	65°	55°54'	-17'	66°	56°18'	-15'	67°	56°40'	-14'	69°	57°01'	-12'	70°	57°21'	-10'	72°	57°39'	-08'	73°	20
21	55°10'	-20'	63°	55°37'	-19'	64°	56°02'	-17'	66°	56°26'	-15'	67°	56°49'	-14'	68°	57°11'	-12'	70°	57°31'	-10'	71°	21
22	54°50'	-21'	61°	55°18'	-20'	63°	55°45'	-18'	64°	56°11'	-17'	65°	56°36'	-15'	67°	56°59'	-13'	68°	57°21'	-12'	69°	22
23	54°29'	-23'	60°	54°58'	-21'	61°	55°27'	-20'	62°	55°54'	-18'	63°	56°21'	-17'	65°	56°46'	-15'	66°	57°09'	-13'	68°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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

Table with 12 columns (7-13) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric around the center.

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

Table with 12 columns (7-13) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric around the center.

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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	53°25'	+12'	100°	53°14'	+13'	101°	53°02'	+15'	102°	52°49'	+17'	103°	52°35'	+18'	105°	52°19'	+20'	106°	52°02'	+21'	107°	0
1	53°37'	+10'	98°	53°28'	+12'	99°	53°17'	+14'	101°	53°06'	+15'	102°	52°53'	+17'	103°	52°38'	+19'	104°	52°23'	+20'	106°	1
2	53°47'	+09'	96°	53°40'	+11'	98°	53°31'	+12'	99°	53°21'	+14'	100°	53°10'	+16'	102°	52°57'	+17'	103°	52°43'	+19'	104°	2
3	53°56'	+07'	95°	53°50'	+09'	96°	53°43'	+11'	97°	53°35'	+13'	99°	53°25'	+14'	100°	53°14'	+16'	101°	53°02'	+18'	103°	3
4	54°03'	+06'	93°	53°59'	+08'	94°	53°54'	+10'	96°	53°48'	+11'	97°	53°40'	+13'	98°	53°30'	+15'	100°	53°20'	+16'	101°	4
5	54°09'	+05'	91°	54°07'	+06'	93°	54°04'	+08'	94°	53°59'	+10'	95°	53°53'	+12'	97°	53°45'	+13'	98°	53°36'	+15'	99°	5
6	54°14'	+03'	89°	54°13'	+05'	91°	54°12'	+07'	92°	54°09'	+08'	94°	54°04'	+10'	95°	53°58'	+12'	96°	53°51'	+14'	98°	6
7	54°17'	+02'	88°	54°18'	+03'	89°	54°18'	+05'	91°	54°17'	+07'	92°	54°14'	+09'	93°	54°10'	+11'	95°	54°05'	+12'	96°	7
8	54°18'	+00'	86°	54°22'	+02'	87°	54°24'	+04'	89°	54°24'	+06'	90°	54°23'	+07'	92°	54°21'	+09'	93°	54°17'	+11'	94°	8
9	54°18'	-01'	84°	54°24'	+01'	86°	54°27'	+02'	87°	54°30'	+04'	88°	54°31'	+06'	90°	54°30'	+08'	91°	54°28'	+09'	93°	9
10	54°17'	-03'	83°	54°24'	-01'	84°	54°30'	+01'	85°	54°34'	+03'	87°	54°37'	+04'	88°	54°38'	+06'	90°	54°37'	+08'	91°	10
11	54°14'	-04'	81°	54°23'	-02'	82°	54°31'	-01'	84°	54°37'	+01'	85°	54°41'	+03'	86°	54°44'	+05'	88°	54°45'	+07'	89°	11
12	54°10'	-06'	79°	54°21'	-04'	81°	54°30'	-02'	82°	54°38'	00'	83°	54°44'	+01'	85°	54°49'	+03'	86°	54°52'	+05'	88°	12
13	54°05'	-07'	77°	54°17'	-05'	79°	54°28'	-04'	80°	54°37'	-02'	82°	54°45'	+00'	83°	54°52'	+02'	84°	54°57'	+04'	86°	13
14	53°58'	-08'	76°	54°12'	-07'	77°	54°24'	-05'	78°	54°36'	-03'	80°	54°45'	-01'	81°	54°54'	+00'	83°	55°01'	+02'	84°	14
15	53°49'	-10'	74°	54°05'	-08'	75°	54°19'	-06'	77°	54°32'	-05'	78°	54°44'	-03'	80°	54°54'	-01'	81°	55°03'	+01'	82°	15
16	53°39'	-11'	72°	53°57'	-10'	74°	54°13'	-08'	75°	54°28'	-06'	76°	54°41'	-04'	78°	54°53'	-03'	79°	55°04'	-01'	81°	16
17	53°28'	-13'	71°	53°47'	-11'	72°	54°05'	-09'	73°	54°22'	-08'	75°	54°37'	-06'	76°	54°50'	-04'	77°	55°03'	-02'	79°	17
18	53°16'	-14'	69°	53°36'	-12'	70°	53°56'	-11'	72°	54°14'	-09'	73°	54°31'	-07'	74°	54°46'	-06'	76°	55°00'	-04'	77°	18
19	53°02'	-15'	68°	53°24'	-14'	69°	53°45'	-12'	70°	54°05'	-10'	71°	54°23'	-09'	73°	54°41'	-07'	74°	54°57'	-05'	75°	19
20	52°46'	-17'	66°	53°10'	-15'	67°	53°33'	-13'	68°	53°54'	-12'	70°	54°15'	-10'	71°	54°34'	-09'	72°	54°51'	-07'	74°	20
21	52°30'	-18'	64°	52°55'	-16'	66°	53°20'	-15'	67°	53°43'	-13'	68°	54°04'	-12'	69°	54°25'	-10'	71°	54°44'	-08'	72°	21
22	52°12'	-19'	63°	52°39'	-18'	64°	53°05'	-16'	65°	53°29'	-15'	66°	53°53'	-13'	68°	54°15'	-11'	69°	54°36'	-10'	70°	22
23	51°53'	-20'	61°	52°21'	-19'	62°	52°49'	-17'	64°	53°15'	-16'	65°	53°40'	-14'	66°	54°04'	-13'	67°	54°26'	-11'	68°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	52°26'	+11'	99°	52°16'	+13'	100°	52°04'	+15'	102°	51°52'	+16'	103°	51°37'	+18'	104°	51°22'	+19'	105°	51°06'	+21'	107°	0
1	52°38'	+10'	98°	52°29'	+12'	99°	52°19'	+13'	100°	52°08'	+15'	101°	51°55'	+17'	103°	51°42'	+18'	104°	51°26'	+20'	105°	1
2	52°48'	+09'	96°	52°41'	+10'	97°	52°32'	+12'	99°	52°23'	+14'	100°	52°12'	+15'	101°	52°00'	+17'	102°	51°46'	+19'	104°	2
3	52°56'	+07'	94°	52°51'	+09'	96°	52°44'	+11'	97°	52°37'	+12'	98°	52°27'	+14'	100°	52°17'	+16'	101°	52°05'	+17'	102°	3
4	53°04'	+06'	93°	53°00'	+08'	94°	52°55'	+09'	95°	52°49'	+11'	97°	52°41'	+13'	98°	52°32'	+14'	99°	52°22'	+16'	100°	4
5	53°09'	+05'	91°	53°08'	+06'	92°	53°05'	+08'	94°	53°00'	+10'	95°	52°54'	+11'	96°	52°47'	+13'	98°	52°38'	+15'	99°	5
6	53°14'	+03'	89°	53°14'	+05'	91°	53°13'	+07'	92°	53°10'	+08'	93°	53°06'	+10'	95°	53°00'	+12'	96°	52°53'	+13'	97°	6
7	53°17'	+02'	88°	53°19'	+03'	89°	53°19'	+05'	90°	53°18'	+07'	92°	53°16'	+09'	93°	53°12'	+10'	94°	53°07'	+12'	96°	7
8	53°19'	+00'	86°	53°22'	+02'	87°	53°24'	+04'	89°	53°25'	+06'	90°	53°24'	+07'	91°	53°22'	+09'	93°	53°19'	+11'	94°	8
9	53°19'	-01'	84°	53°24'	+01'	86°	53°28'	+02'	87°	53°31'	+04'	88°	53°32'	+06'	90°	53°31'	+08'	91°	53°30'	+09'	92°	9
10	53°18'	-02'	83°	53°25'	-01'	84°	53°31'	+01'	85°	53°35'	+03'	87°	53°38'	+05'	88°	53°39'	+06'	89°	53°39'	+08'	91°	10
11	53°16'	-04'	81°	53°24'	-02'	82°	53°32'	00'	84°	53°38'	+01'	85°	53°42'	+03'	86°	53°45'	+05'	88°	53°47'	+07'	89°	11
12	53°12'	-05'	79°	53°22'	-04'	81°	53°31'	-02'	82°	53°39'	00'	83°	53°45'	+02'	85°	53°50'	+03'	86°	53°54'	+05'	87°	12
13	53°07'	-07'	78°	53°19'	-05'	79°	53°30'	-03'	80°	53°39'	-01'	82°	53°47'	+00'	83°	53°54'	+02'	84°	53°59'	+04'	86°	13
14	53°00'	-08'	76°	53°14'	-06'	77°	53°26'	-05'	79°	53°37'	-03'	80°	53°47'	-01'	81°	53°56'	+01'	83°	54°03'	+02'	84°	14
15	52°52'	-09'	74°	53°07'	-08'	76°	53°22'	-06'	77°	53°35'	-04'	78°	53°46'	-03'	80°	53°56'	-01'	81°	54°05'	+01'	82°	15
16	52°43'	-11'	73°	53°00'	-09'	74°	53°16'	-07'	75°	53°30'	-06'	77°	53°44'	-04'	78°	53°55'	-02'	79°	54°06'	-01'	81°	16
17	52°32'	-12'	71°	52°51'	-10'	72°	53°08'	-09'	74°	53°25'	-07'	75°	53°39'	-05'	76°	53°53'	-04'	78°	54°05'	-02'	79°	17
18	52°20'	-13'	69°	52°40'	-12'	71°	52°59'	-10'	72°	53°17'	-09'	73°	53°34'	-07'	75°	53°49'	-05'	76°	54°03'	-03'	77°	18
19	52°06'	-15'	68°	52°28'	-13'	69°	52°49'	-11'	70°	53°09'	-10'	72°	53°27'	-08'	73°	53°44'	-07'	74°	54°00'	-05'	75°	19
20	51°52'	-16'	66°	52°15'	-14'	68°	52°38'	-13'	69°	52°59'	-11'	70°	53°19'	-10'	71°	53°38'	-08'	72°	53°55'	-06'	74°	20
21	51°36'	-17'	65°	52°01'	-16'	66°	52°25'	-14'	67°	52°48'	-13'	68°	53°09'	-11'	70°	53°30'	-09'	71°	53°49'	-08'	72°	21
22	51°19'	-18'	63°	51°46'	-17'	64°	52°11'	-15'	66°	52°35'	-14'	67°	52°58'	-12'	68°	53°20'	-11'	69°	53°41'	-09'	70°	22
23	51°01'	-19'	62°	51°29'	-18'	63°	51°56'	-17'	64°	52°21'	-15'	65°	52°46'	-14'	66°	53°10'	-12'	68°	53°32'	-10'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	51°27'	+11'	99°	51°18'	+13'	100°	51°06'	+14'	101°	50°54'	+16'	103°	50°40'	+17'	104°	50°25'	+19'	105°	50°09'	+21'	106°	0
1	51°38'	+10'	97°	51°30'	+11'	99°	51°21'	+13'	100°	51°10'	+15'	101°	50°58'	+16'	102°	50°45'	+18'	103°	50°30'	+19'	105°	1
2	51°48'	+09'	96°	51°42'	+10'	97°	51°34'	+12'	98°	51°25'	+13'	99°	51°14'	+15'	101°	51°02'	+17'	102°	50°49'	+18'	103°	2
3	51°57'	+07'	94°	51°52'	+09'	95°	51°46'	+11'	97°	51°38'	+12'	98°	51°29'	+14'	99°	51°19'	+15'	100°	51°08'	+17'	102°	3
4	52°04'	+06'	92°	52°01'	+08'	94°	51°56'	+09'	95°	51°50'	+11'	96°	51°43'	+13'	98°	51°34'	+14'	99°	51°25'	+16'	100°	4
5	52°10'	+05'	91°	52°08'	+06'	92°	52°05'	+08'	93°	52°01'	+10'	95°	51°56'	+11'	96°	51°49'	+13'	97°	51°40'	+15'	99°	5
6	52°14'	+03'	89°	52°15'	+05'	91°	52°13'	+07'	92°	52°11'	+08'	93°	52°07'	+10'	94°	52°02'	+12'	96°	51°55'	+13'	97°	6
7	52°18'	+02'	88°	52°19'	+04'	89°	52°20'	+05'	90°	52°19'	+07'	91°	52°17'	+09'	93°	52°13'	+10'	94°	52°08'	+12'	95°	7
8	52°19'	+00'	86°	52°23'	+02'	87°	52°25'	+04'	89°	52°26'	+06'	90°	52°26'	+07'	91°	52°24'	+09'	92°	52°20'	+11'	94°	8
9	52°20'	-01'	84°	52°25'	+01'	86°	52°29'	+03'	87°	52°32'	+04'	88°	52°33'	+06'	90°	52°33'	+08'	91°	52°31'	+09'	92°	9
10	52°19'	-02'	83°	52°26'	-01'	84°	52°32'	+01'	85°	52°36'	+03'	87°	52°39'	+05'	88°	52°40'	+06'	89°	52°41'	+08'	91°	10
11	52°17'	-04'	81°	52°26'	-02'	82°	52°33'	00'	84°	52°39'	+02'	85°	52°43'	+03'	86°	52°47'	+05'	88°	52°49'	+07'	89°	11
12	52°13'	-05'	79°	52°24'	-03'	81°	52°33'	-02'	82°	52°40'	+00'	83°	52°47'	+02'	85°	52°52'	+04'	86°	52°55'	+05'	87°	12
13	52°08'	-06'	78°	52°20'	-05'	79°	52°31'	-03'	80°	52°41'	-01'	82°	52°49'	+00'	83°	52°55'	+02'	84°	53°01'	+04'	86°	13
14	52°02'	-08'	76°	52°16'	-06'	77°	52°28'	-04'	79°	52°39'	-03'	80°	52°49'	-01'	81°	52°57'	+01'	83°	53°05'	+03'	84°	14
15	51°55'	-09'	75°	52°10'	-07'	76°	52°24'	-06'	77°	52°37'	-04'	78°	52°48'	-02'	80°	52°58'	-01'	81°	53°07'	+01'	82°	15
16	51°46'	-10'	73°	52°03'	-09'	74°	52°18'	-07'	75°	52°33'	-05'	77°	52°46'	-04'	78°	52°58'	-02'	79°	53°08'	00'	81°	16
17	51°35'	-11'	71°	51°54'	-10'	73°	52°11'	-08'	74°	52°27'	-07'	75°	52°42'	-05'	76°	52°56'	-03'	78°	53°08'	-02'	79°	17
18	51°24'	-13'	70°	51°44'	-11'	71°	52°03'	-10'	72°	52°21'	-08'	73°	52°37'	-06'	75°	52°52'	-05'	76°	53°06'	-03'	77°	18
19	51°11'	-14'	68°	51°33'	-12'	69°	51°53'	-11'	71°	52°13'	-09'	72°	52°31'	-08'	73°	52°48'	-06'	74°	53°03'	-04'	76°	19
20	50°57'	-15'	67°	51°20'	-14'	68°	51°43'	-12'	69°	52°03'	-11'	70°	52°23'	-09'	71°	52°42'	-07'	73°	52°59'	-06'	74°	20
21	50°42'	-16'	65°	51°07'	-15'	66°	51°30'	-13'	67°	51°53'	-12'	69°	52°14'	-10'	70°	52°34'	-09'	71°	52°53'	-07'	72°	21
22	50°26'	-18'	64°	50°52'	-16'	65°	51°17'	-15'	66°	51°41'	-13'	67°	52°04'	-12'	68°	52°25'	-10'	69°	52°46'	-09'	71°	22
23	50°08'	-19'	62°	50°36'	-17'	63°	51°02'	-16'	64°	51°28'	-14'	65°	51°52'	-13'	67°	52°15'	-11'	68°	52°37'	-10'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	50°29'	+11'	99°	50°19'	+12'	100°	50°08'	+14'	101°	49°56'	+16'	102°	49°43'	+17'	103°	49°29'	+19'	104°	49°13'	+20'	106°	0
1	50°39'	+10'	97°	50°31'	+11'	98°	50°22'	+13'	99°	50°12'	+14'	101°	50°00'	+16'	102°	49°47'	+18'	103°	49°33'	+19'	104°	1
2	50°49'	+08'	95°	50°43'	+10'	97°	50°35'	+12'	98°	50°26'	+13'	99°	50°16'	+15'	100°	50°05'	+16'	101°	49°52'	+18'	103°	2
3	50°57'	+07'	94°	50°53'	+09'	95°	50°47'	+10'	96°	50°39'	+12'	98°	50°31'	+14'	99°	50°21'	+15'	100°	50°10'	+17'	101°	3
4	51°05'	+06'	92°	51°01'	+07'	94°	50°57'	+09'	95°	50°52'	+11'	96°	50°45'	+12'	97°	50°36'	+14'	98°	50°27'	+16'	100°	4
5	51°10'	+05'	91°	51°09'	+06'	92°	51°06'	+08'	93°	51°02'	+10'	94°	50°57'	+11'	96°	50°50'	+13'	97°	50°43'	+14'	98°	5
6	51°15'	+03'	89°	51°15'	+05'	90°	51°14'	+07'	92°	51°12'	+08'	93°	51°08'	+10'	94°	51°03'	+12'	95°	50°57'	+13'	97°	6
7	51°18'	+02'	88°	51°20'	+04'	89°	51°21'	+05'	90°	51°20'	+07'	91°	51°18'	+09'	93°	51°15'	+10'	94°	51°10'	+12'	95°	7
8	51°20'	+01'	86°	51°24'	+02'	87°	51°26'	+04'	88°	51°27'	+06'	90°	51°27'	+07'	91°	51°25'	+09'	92°	51°22'	+11'	93°	8
9	51°21'	-01'	84°	51°26'	+01'	86°	51°30'	+03'	87°	51°33'	+04'	88°	51°34'	+06'	89°	51°34'	+08'	91°	51°33'	+09'	92°	9
10	51°20'	-02'	83°	51°27'	00'	84°	51°33'	+01'	85°	51°37'	+03'	86°	51°40'	+05'	88°	51°42'	+06'	89°	51°42'	+08'	90°	10
11	51°18'	-03'	81°	51°27'	-02'	82°	51°34'	+00'	84°	51°40'	+02'	85°	51°45'	+03'	86°	51°48'	+05'	87°	51°50'	+07'	89°	11
12	51°15'	-05'	80°	51°25'	-03'	81°	51°34'	-01'	82°	51°42'	+00'	83°	51°48'	+02'	85°	51°53'	+04'	86°	51°57'	+05'	87°	12
13	51°10'	-06'	78°	51°22'	-04'	79°	51°33'	-03'	80°	51°42'	-01'	82°	51°50'	+01'	83°	51°57'	+02'	84°	52°02'	+04'	85°	13
14	51°04'	-07'	76°	51°18'	-06'	78°	51°30'	-04'	79°	51°41'	-02'	80°	51°51'	-01'	81°	51°59'	+01'	83°	52°06'	+03'	84°	14
15	50°57'	-08'	75°	51°12'	-07'	76°	51°26'	-05'	77°	51°39'	-04'	78°	51°50'	-02'	80°	52°00'	00'	81°	52°09'	+01'	82°	15
16	50°49'	-10'	73°	51°05'	-08'	74°	51°21'	-07'	76°	51°35'	-05'	77°	51°48'	-03'	78°	52°00'	-02'	79°	52°11'	+00'	81°	16
17	50°39'	-11'	72°	50°57'	-09'	73°	51°14'	-08'	74°	51°30'	-06'	75°	51°45'	-05'	76°	51°58'	-03'	78°	52°11'	-01'	79°	17
18	50°28'	-12'	70°	50°48'	-11'	71°	51°07'	-09'	72°	51°24'	-08'	74°	51°40'	-06'	75°	51°56'	-04'	76°	52°09'	-03'	77°	18
19	50°16'	-13'	69°	50°37'	-12'	70°	50°58'	-10'	71°	51°17'	-09'	72°	51°35'	-07'	73°	51°51'	-06'	74°	52°07'	-04'	76°	19
20	50°03'	-15'	67°	50°25'	-13'	68°	50°47'	-12'	69°	51°08'	-10'	70°	51°27'	-09'	72°	51°46'	-07'	73°	52°03'	-05'	74°	20
21	49°48'	-16'	66°	50°12'	-14'	67°	50°36'	-13'	68°	50°58'	-11'	69°	51°19'	-10'	70°	51°39'	-08'	71°	51°57'	-07'	72°	21
22	49°32'	-17'	64°	49°58'	-15'	65°	50°23'	-14'	66°	50°46'	-13'	67°	51°09'	-11'	68°	51°30'	-10'	70°	51°51'	-08'	71°	22
23	49°15'	-18'	63°	49°43'	-17'	64°	50°09'	-15'	65°	50°34'	-14'	66°	50°58'	-12'	67°	51°21'	-11'	68°	51°43'	-09'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	49°30'	+11'	98°	49°20'	+12'	99°	49°10'	+14'	101°	48°58'	+15'	102°	48°46'	+17'	103°	48°32'	+18'	104°	48°17'	+20'	105°	0
1	49°40'	+09'	97°	49°33'	+11'	98°	49°24'	+13'	99°	49°14'	+14'	100°	49°02'	+16'	101°	48°50'	+17'	102°	48°37'	+19'	104°	1
2	49°50'	+08'	95°	49°44'	+10'	96°	49°36'	+11'	98°	49°28'	+13'	99°	49°18'	+15'	100°	49°07'	+16'	101°	48°55'	+18'	102°	2
3	49°58'	+07'	94°	49°54'	+09'	95°	49°48'	+10'	96°	49°41'	+12'	97°	49°33'	+13'	98°	49°23'	+15'	100°	49°13'	+16'	101°	3
4	50°05'	+06'	92°	50°02'	+07'	93°	49°58'	+09'	95°	49°53'	+11'	96°	49°46'	+12'	97°	49°38'	+14'	98°	49°29'	+15'	99°	4
5	50°11'	+05'	91°	50°10'	+06'	92°	50°07'	+08'	93°	50°03'	+09'	94°	49°58'	+11'	95°	49°52'	+13'	97°	49°45'	+14'	98°	5
6	50°15'	+03'	89°	50°16'	+05'	90°	50°15'	+07'	91°	50°13'	+08'	93°	50°09'	+10'	94°	50°05'	+11'	95°	49°59'	+13'	96°	6
7	50°19'	+02'	87°	50°21'	+04'	89°	50°21'	+05'	90°	50°21'	+07'	91°	50°19'	+09'	92°	50°16'	+10'	93°	50°12'	+12'	95°	7
8	50°21'	+01'	86°	50°24'	+02'	87°	50°27'	+04'	88°	50°28'	+06'	90°	50°28'	+07'	91°	50°26'	+09'	92°	50°24'	+11'	93°	8
9	50°21'	00'	84°	50°27'	+01'	86°	50°31'	+03'	87°	50°34'	+04'	88°	50°35'	+06'	89°	50°35'	+08'	90°	50°34'	+09'	92°	9
10	50°21'	-02'	83°	50°28'	00'	84°	50°34'	+02'	85°	50°38'	+03'	86°	50°41'	+05'	88°	50°43'	+06'	89°	50°44'	+08'	90°	10
11	50°19'	-03'	81°	50°28'	-01'	82°	50°35'	+00'	84°	50°41'	+02'	85°	50°46'	+04'	86°	50°49'	+05'	87°	50°52'	+07'	88°	11
12	50°16'	-04'	80°	50°26'	-03'	81°	50°35'	-01'	82°	50°43'	+01'	83°	50°49'	+02'	84°	50°55'	+04'	86°	50°58'	+06'	87°	12
13	50°12'	-06'	78°	50°24'	-04'	79°	50°34'	-02'	80°	50°44'	-01'	82°	50°52'	+01'	83°	50°58'	+03'	84°	51°04'	+04'	85°	13
14	50°06'	-07'	77°	50°20'	-05'	78°	50°32'	-04'	79°	50°43'	-02'	80°	50°53'	00'	81°	51°01'	+01'	83°	51°08'	+03'	84°	14
15	50°00'	-08'	75°	50°15'	-06'	76°	50°28'	-05'	77°	50°41'	-03'	78°	50°52'	-02'	80°	51°02'	+00'	81°	51°11'	+02'	82°	15
16	49°52'	-09'	73°	50°08'	-08'	75°	50°24'	-06'	76°	50°38'	-05'	77°	50°51'	-03'	78°	51°02'	-01'	79°	51°13'	+00'	81°	16
17	49°42'	-10'	72°	50°00'	-09'	73°	50°17'	-07'	74°	50°33'	-06'	75°	50°48'	-04'	77°	51°01'	-03'	78°	51°13'	-01'	79°	17
18	49°32'	-12'	70°	49°52'	-10'	71°	50°10'	-09'	73°	50°27'	-07'	74°	50°44'	-05'	75°	50°59'	-04'	76°	51°12'	-02'	77°	18
19	49°20'	-13'	69°	49°41'	-11'	70°	50°01'	-10'	71°	50°20'	-08'	72°	50°38'	-07'	73°	50°55'	-05'	75°	51°10'	-04'	76°	19
20	49°08'	-14'	67°	49°30'	-12'	68°	49°52'	-11'	70°	50°12'	-10'	71°	50°31'	-08'	72°	50°50'	-06'	73°	51°07'	-05'	74°	20
21	48°54'	-15'	66°	49°18'	-14'	67°	49°41'	-12'	68°	50°03'	-11'	69°	50°23'	-09'	70°	50°43'	-08'	71°	51°02'	-06'	73°	21
22	48°39'	-16'	64°	49°04'	-15'	65°	49°28'	-13'	67°	49°52'	-12'	68°	50°14'	-10'	69°	50°35'	-09'	70°	50°56'	-07'	71°	22
23	48°23'	-17'	63°	48°49'	-16'	64°	49°15'	-15'	65°	49°40'	-13'	66°	50°04'	-12'	67°	50°26'	-10'	68°	50°48'	-09'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	48°31'	+10'	98°	48°22'	+12'	99°	48°12'	+14'	100°	48°01'	+15'	101°	47°48'	+17'	102°	47°35'	+18'	103°	47°20'	+19'	105°	0
1	48°41'	+09'	96°	48°34'	+11'	98°	48°25'	+12'	99°	48°16'	+14'	100°	48°05'	+15'	101°	47°53'	+17'	102°	47°40'	+18'	103°	1
2	48°50'	+08'	95°	48°45'	+10'	96°	48°38'	+11'	97°	48°29'	+13'	98°	48°20'	+14'	99°	48°10'	+16'	101°	47°58'	+17'	102°	2
3	48°59'	+07'	93°	48°54'	+09'	95°	48°49'	+10'	96°	48°42'	+12'	97°	48°34'	+13'	98°	48°25'	+15'	99°	48°15'	+16'	100°	3
4	49°06'	+06'	92°	49°03'	+07'	93°	48°59'	+09'	94°	48°54'	+10'	95°	48°48'	+12'	97°	48°40'	+14'	98°	48°32'	+15'	99°	4
5	49°11'	+05'	90°	49°10'	+06'	92°	49°08'	+08'	93°	49°04'	+09'	94°	49°00'	+11'	95°	48°54'	+12'	96°	48°47'	+14'	97°	5
6	49°16'	+03'	89°	49°16'	+05'	90°	49°16'	+07'	91°	49°14'	+08'	92°	49°11'	+10'	94°	49°06'	+11'	95°	49°01'	+13'	96°	6
7	49°19'	+02'	87°	49°21'	+04'	89°	49°22'	+05'	90°	49°22'	+07'	91°	49°20'	+09'	92°	49°18'	+10'	93°	49°14'	+12'	94°	7
8	49°21'	+01'	86°	49°25'	+03'	87°	49°28'	+04'	88°	49°29'	+06'	89°	49°29'	+07'	91°	49°28'	+09'	92°	49°25'	+11'	93°	8
9	49°22'	00'	84°	49°28'	+01'	85°	49°32'	+03'	87°	49°35'	+04'	88°	49°36'	+06'	89°	49°37'	+08'	90°	49°36'	+09'	91°	9
10	49°22'	-02'	83°	49°29'	+00'	84°	49°35'	+02'	85°	49°39'	+03'	86°	49°42'	+05'	87°	49°44'	+06'	89°	49°45'	+08'	90°	10
11	49°20'	-03'	81°	49°29'	-01'	82°	49°36'	+00'	84°	49°42'	+02'	85°	49°47'	+04'	86°	49°51'	+05'	87°	49°53'	+07'	88°	11
12	49°18'	-04'	80°	49°28'	-02'	81°	49°37'	-01'	82°	49°44'	+01'	83°	49°51'	+02'	84°	49°56'	+04'	86°	50°00'	+06'	87°	12
13	49°14'	-05'	78°	49°25'	-04'	79°	49°36'	-02'	80°	49°45'	00'	82°	49°53'	+01'	83°	50°00'	+03'	84°	50°06'	+04'	85°	13
14	49°08'	-06'	77°	49°22'	-05'	78°	49°34'	-03'	79°	49°45'	-02'	80°	49°54'	00'	81°	50°03'	+02'	82°	50°10'	+03'	84°	14
15	49°02'	-08'	75°	49°17'	-06'	76°	49°31'	-04'	77°	49°43'	-03'	79°	49°54'	-01'	80°	50°04'	+00'	81°	50°13'	+02'	82°	15
16	48°54'	-09'	74°	49°11'	-07'	75°	49°26'	-06'	76°	49°40'	-04'	77°	49°53'	-03'	78°	50°05'	-01'	79°	50°15'	+01'	81°	16
17	48°46'	-10'	72°	49°04'	-08'	73°	49°20'	-07'	74°	49°36'	-05'	75°	49°50'	-04'	77°	50°04'	-02'	78°	50°16'	-01'	79°	17
18	48°36'	-11'	71°	48°55'	-10'	72°	49°13'	-08'	73°	49°31'	-07'	74°	49°47'	-05'	75°	50°02'	-03'	76°	50°15'	-02'	77°	18
19	48°25'	-12'	69°	48°46'	-11'	70°	49°05'	-09'	71°	49°24'	-08'	72°	49°42'	-06'	74°	49°58'	-05'	75°	50°13'	-03'	76°	19
20	48°13'	-13'	68°	48°35'	-12'	69°	48°56'	-10'	70°	49°16'	-09'	71°	49°35'	-07'	72°	49°53'	-06'	73°	50°10'	-04'	74°	20
21	47°59'	-14'	66°	48°23'	-13'	67°	48°46'	-12'	68°	49°07'	-10'	69°	49°28'	-09'	70°	49°47'	-07'	72°	50°06'	-06'	73°	21
22	47°45'	-15'	65°	48°10'	-14'	66°	48°34'	-13'	67°	48°57'	-11'	68°	49°19'	-10'	69°	49°40'	-08'	70°	50°00'	-07'	71°	22
23	47°29'	-17'	63°	47°56'	-15'	64°	48°21'	-14'	65°	48°46'	-12'	66°	49°09'	-11'	67°	49°32'	-10'	69°	49°53'	-08'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	47°32'	+10'	98°	47°23'	+12'	99°	47°13'	+13'	100°	47°03'	+15'	101°	46°51'	+16'	102°	46°38'	+18'	103°	46°24'	+19'	104°	0
1	47°42'	+09'	96°	47°35'	+11'	97°	47°27'	+12'	98°	47°17'	+14'	99°	47°07'	+15'	101°	46°55'	+17'	102°	46°43'	+18'	103°	1
2	47°51'	+08'	95°	47°46'	+10'	96°	47°39'	+11'	97°	47°31'	+13'	98°	47°22'	+14'	99°	47°12'	+16'	100°	47°01'	+17'	101°	2
3	47°59'	+07'	93°	47°55'	+08'	94°	47°50'	+10'	96°	47°44'	+11'	97°	47°36'	+13'	98°	47°28'	+15'	99°	47°18'	+16'	100°	3
4	48°06'	+06'	92°	48°04'	+07'	93°	48°00'	+09'	94°	47°55'	+10'	95°	47°49'	+12'	96°	47°42'	+13'	97°	47°34'	+15'	98°	4
5	48°12'	+05'	90°	48°11'	+06'	91°	48°09'	+08'	93°	48°05'	+09'	94°	48°01'	+11'	95°	47°55'	+12'	96°	47°49'	+14'	97°	5
6	48°16'	+03'	89°	48°17'	+05'	90°	48°16'	+07'	91°	48°15'	+08'	92°	48°12'	+10'	93°	48°08'	+11'	94°	48°03'	+13'	96°	6
7	48°20'	+02'	87°	48°22'	+04'	88°	48°23'	+05'	90°	48°23'	+07'	91°	48°21'	+08'	92°	48°19'	+10'	93°	48°15'	+12'	94°	7
8	48°22'	+01'	86°	48°26'	+03'	87°	48°28'	+04'	88°	48°30'	+06'	89°	48°30'	+07'	90°	48°29'	+09'	91°	48°27'	+10'	93°	8
9	48°23'	00'	84°	48°28'	+01'	85°	48°32'	+03'	87°	48°35'	+05'	88°	48°37'	+06'	89°	48°38'	+08'	90°	48°37'	+09'	91°	9
10	48°23'	-01'	83°	48°30'	+00'	84°	48°35'	+02'	85°	48°40'	+03'	86°	48°43'	+05'	87°	48°46'	+07'	88°	48°47'	+08'	90°	10
11	48°21'	-02'	81°	48°30'	-01'	82°	48°37'	+01'	84°	48°43'	+02'	85°	48°48'	+04'	86°	48°52'	+05'	87°	48°55'	+07'	88°	11
12	48°19'	-04'	80°	48°29'	-02'	81°	48°38'	-01'	82°	48°46'	+01'	83°	48°52'	+03'	84°	48°58'	+04'	85°	49°02'	+06'	87°	12
13	48°15'	-05'	78°	48°27'	-03'	79°	48°37'	-02'	81°	48°47'	00'	82°	48°55'	+01'	83°	49°02'	+03'	84°	49°08'	+05'	85°	13
14	48°10'	-06'	77°	48°24'	-04'	78°	48°36'	-03'	79°	48°46'	-01'	80°	48°56'	+00'	81°	49°05'	+02'	82°	49°12'	+03'	84°	14
15	48°04'	-07'	75°	48°19'	-06'	76°	48°33'	-04'	77°	48°45'	-03'	79°	48°56'	-01'	80°	49°06'	+01'	81°	49°15'	+02'	82°	15
16	47°57'	-08'	74°	48°13'	-07'	75°	48°29'	-05'	76°	48°43'	-04'	77°	48°55'	-02'	78°	49°07'	-01'	79°	49°18'	+01'	80°	16
17	47°49'	-09'	72°	48°07'	-08'	73°	48°23'	-06'	74°	48°39'	-05'	76°	48°53'	-03'	77°	49°06'	-02'	78°	49°18'	00'	79°	17
18	47°40'	-11'	71°	47°59'	-09'	72°	48°17'	-08'	73°	48°34'	-06'	74°	48°50'	-05'	75°	49°05'	-03'	76°	49°18'	-02'	77°	18
19	47°29'	-12'	69°	47°50'	-10'	70°	48°09'	-09'	72°	48°28'	-07'	73°	48°45'	-06'	74°	49°01'	-04'	75°	49°17'	-03'	76°	19
20	47°17'	-13'	68°	47°39'	-11'	69°	48°00'	-10'	70°	48°20'	-08'	71°	48°39'	-07'	72°	48°57'	-05'	73°	49°14'	-04'	74°	20
21	47°05'	-14'	67°	47°28'	-12'	68°	47°51'	-11'	69°	48°12'	-10'	70°	48°32'	-08'	71°	48°52'	-07'	72°	49°10'	-05'	73°	21
22	46°51'	-15'	65°	47°16'	-14'	66°	47°40'	-12'	67°	48°02'	-11'	68°	48°24'	-09'	69°	48°45'	-08'	70°	49°05'	-06'	71°	22
23	46°36'	-16'	64°	47°02'	-15'	65°	47°27'	-13'	66°	47°52'	-12'	67°	48°15'	-10'	68°	48°37'	-09'	69°	48°59'	-08'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	46°33'	+10'	97°	46°24'	+12'	98°	46°15'	+13'	100°	46°04'	+15'	101°	45°53'	+16'	102°	45°40'	+17'	103°	45°27'	+19'	104°	0
1	46°43'	+09'	96°	46°36'	+11'	97°	46°28'	+12'	98°	46°19'	+13'	99°	46°09'	+15'	100°	45°58'	+16'	101°	45°46'	+18'	102°	1
2	46°52'	+08'	95°	46°46'	+09'	96°	46°40'	+11'	97°	46°32'	+12'	98°	46°24'	+14'	99°	46°14'	+15'	100°	46°03'	+17'	101°	2
3	47°00'	+07'	93°	46°56'	+08'	94°	46°51'	+10'	95°	46°45'	+11'	96°	46°38'	+13'	97°	46°29'	+14'	98°	46°20'	+16'	99°	3
4	47°06'	+06'	92°	47°04'	+07'	93°	47°01'	+09'	94°	46°56'	+10'	95°	46°51'	+12'	96°	46°44'	+13'	97°	46°36'	+15'	98°	4
5	47°12'	+05'	90°	47°11'	+06'	91°	47°09'	+08'	92°	47°06'	+09'	93°	47°02'	+11'	94°	46°57'	+12'	96°	46°51'	+14'	97°	5
6	47°17'	+03'	89°	47°18'	+05'	90°	47°17'	+07'	91°	47°16'	+08'	92°	47°13'	+10'	93°	47°09'	+11'	94°	47°04'	+13'	95°	6
7	47°20'	+02'	87°	47°22'	+04'	88°	47°24'	+05'	89°	47°24'	+07'	91°	47°23'	+08'	92°	47°20'	+10'	93°	47°17'	+12'	94°	7
8	47°22'	+01'	86°	47°26'	+03'	87°	47°29'	+04'	88°	47°31'	+06'	89°	47°31'	+07'	90°	47°30'	+09'	91°	47°28'	+10'	92°	8
9	47°24'	+00'	84°	47°29'	+02'	85°	47°33'	+03'	86°	47°36'	+05'	88°	47°38'	+06'	89°	47°39'	+08'	90°	47°39'	+09'	91°	9
10	47°24'	-01'	83°	47°31'	+00'	84°	47°36'	+02'	85°	47°41'	+04'	86°	47°45'	+05'	87°	47°47'	+07'	88°	47°48'	+08'	89°	10
11	47°23'	-02'	81°	47°31'	-01'	82°	47°38'	+01'	84°	47°45'	+02'	85°	47°50'	+04'	86°	47°54'	+05'	87°	47°56'	+07'	88°	11
12	47°20'	-03'	80°	47°30'	-02'	81°	47°39'	00'	82°	47°47'	+01'	83°	47°54'	+03'	84°	47°59'	+04'	85°	48°03'	+06'	86°	12
13	47°17'	-05'	78°	47°28'	-03'	79°	47°39'	-01'	81°	47°48'	+00'	82°	47°56'	+02'	83°	48°03'	+03'	84°	48°09'	+05'	85°	13
14	47°12'	-06'	77°	47°25'	-04'	78°	47°37'	-03'	79°	47°48'	-01'	80°	47°58'	+00'	81°	48°07'	+02'	82°	48°14'	+04'	83°	14
15	47°07'	-07'	75°	47°21'	-05'	77°	47°35'	-04'	78°	47°47'	-02'	79°	47°58'	-01'	80°	48°09'	+01'	81°	48°18'	+02'	82°	15
16	47°00'	-08'	74°	47°16'	-06'	75°	47°31'	-05'	76°	47°45'	-03'	77°	47°58'	-02'	78°	48°09'	00'	79°	48°20'	+01'	80°	16
17	46°52'	-09'	73°	47°10'	-07'	74°	47°26'	-06'	75°	47°42'	-05'	76°	47°56'	-03'	77°	48°09'	-02'	78°	48°21'	+00'	79°	17
18	46°43'	-10'	71°	47°02'	-09'	72°	47°20'	-07'	73°	47°37'	-06'	74°	47°53'	-04'	75°	48°08'	-03'	76°	48°21'	-01'	77°	18
19	46°33'	-11'	70°	46°54'	-10'	71°	47°13'	-08'	72°	47°31'	-07'	73°	47°49'	-05'	74°	48°05'	-04'	75°	48°20'	-02'	76°	19
20	46°22'	-12'	68°	46°44'	-11'	69°	47°05'	-09'	70°	47°25'	-08'	71°	47°43'	-06'	72°	48°01'	-05'	73°	48°18'	-04'	74°	20
21	46°10'	-13'	67°	46°33'	-12'	68°	46°55'	-10'	69°	47°17'	-09'	70°	47°37'	-08'	71°	47°56'	-06'	72°	48°14'	-05'	73°	21
22	45°57'	-14'	65°	46°21'	-13'	66°	46°45'	-12'	67°	47°08'	-10'	68°	47°29'	-09'	69°	47°50'	-07'	70°	48°09'	-06'	71°	22
23	45°43'	-15'	64°	46°08'	-14'	65°	46°33'	-13'	66°	46°57'	-11'	67°	47°20'	-10'	68°	47°43'	-08'	69°	48°04'	-07'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**43° 317° LHA**

**Latitude SAME as Declination**

**43° 317° LHA**

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



44° 316° LHA

Latitude SAME as Declination

44° 316° LHA

Table with 24 rows (Dec 0-23) and columns for LHA 7, 8, 9, 10, 11, 12, 13. Each cell contains three coordinate values (Hc, d, Z).

44° 316° LHA

Latitude SAME as Declination

44° 316° LHA

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

45° 315° LHA

Latitude SAME as Declination

45° 315° LHA

Table with 24 rows (Dec 0-23) and columns for LHA 7, 8, 9, 10, 11, 12, 13. Each cell contains three coordinate values (Hc, d, Z).

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

Table with 13 columns (Dec°, 7, 8, 9, 10, 11, 12, 13, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°.

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

Table with 13 columns (Dec°, 7, 8, 9, 10, 11, 12, 13, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°.

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

Table with columns Dec, 7, 8, 9, 10, 11, 12, 13, Dec. Sub-headers include Hc°, d', Z° for each column.

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

Table with columns Dec, 7, 8, 9, 10, 11, 12, 13, Dec. Sub-headers include Hc°, d', Z° for each column.

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

58° 302° LHA

Latitude SAME as Declination

58° 302° LHA

Table with columns for Dec°, Hc°, d', Z° and rows for 0-23. It contains astronomical data for 58° 302° LHA.

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

Table with columns for Dec°, Hc°, d', Z° and rows for 0-23. It contains astronomical data for 59° 301° LHA.

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	29°45'	+08'	94°	29°41'	+09'	95°	29°36'	+11'	95°	29°30'	+12'	96°	29°24'	+13'	96°	29°17'	+14'	97°	29°09'	+15'	97°	0
1	29°53'	+08'	93°	29°50'	+09'	93°	29°46'	+10'	94°	29°42'	+11'	95°	29°37'	+12'	95°	29°31'	+13'	96°	29°25'	+15'	96°	1
2	30°01'	+07'	92°	29°59'	+08'	92°	29°56'	+09'	93°	29°53'	+11'	93°	29°49'	+12'	94°	29°44'	+13'	95°	29°39'	+14'	95°	2
3	30°08'	+06'	91°	30°07'	+08'	91°	30°05'	+09'	92°	30°03'	+10'	92°	30°01'	+11'	93°	29°57'	+12'	93°	29°53'	+13'	94°	3
4	30°14'	+06'	89°	30°14'	+07'	90°	30°14'	+08'	91°	30°13'	+09'	91°	30°12'	+11'	92°	30°09'	+12'	92°	30°07'	+13'	93°	4
5	30°20'	+05'	88°	30°21'	+06'	89°	30°22'	+08'	89°	30°23'	+09'	90°	30°22'	+10'	91°	30°21'	+11'	91°	30°20'	+12'	92°	5
6	30°25'	+05'	87°	30°28'	+06'	88°	30°30'	+07'	88°	30°31'	+08'	89°	30°32'	+09'	89°	30°32'	+11'	90°	30°32'	+12'	91°	6
7	30°30'	+04'	86°	30°33'	+05'	87°	30°37'	+06'	87°	30°39'	+08'	88°	30°41'	+09'	88°	30°43'	+10'	89°	30°44'	+11'	90°	7
8	30°33'	+03'	85°	30°39'	+04'	85°	30°43'	+06'	86°	30°47'	+07'	87°	30°50'	+08'	87°	30°53'	+09'	88°	30°55'	+11'	88°	8
9	30°37'	+03'	84°	30°43'	+04'	84°	30°49'	+05'	85°	30°54'	+06'	85°	30°58'	+08'	86°	31°02'	+09'	87°	31°05'	+10'	87°	9
10	30°39'	+02'	82°	30°47'	+03'	83°	30°54'	+04'	84°	31°00'	+06'	84°	31°06'	+07'	85°	31°11'	+08'	85°	31°15'	+09'	86°	10
11	30°41'	+01'	81°	30°50'	+03'	82°	30°58'	+04'	83°	31°06'	+05'	83°	31°13'	+06'	84°	31°19'	+07'	84°	31°25'	+09'	85°	11
12	30°43'	+01'	80°	30°53'	+02'	81°	31°02'	+03'	81°	31°11'	+04'	82°	31°19'	+06'	83°	31°26'	+07'	83°	31°33'	+08'	84°	12
13	30°44'	+00'	79°	30°55'	+01'	80°	31°05'	+03'	80°	31°15'	+04'	81°	31°25'	+05'	81°	31°33'	+06'	82°	31°41'	+07'	83°	13
14	30°44'	00'	78°	30°56'	+01'	78°	31°08'	+02'	79°	31°19'	+03'	80°	31°30'	+04'	80°	31°39'	+06'	81°	31°49'	+07'	81°	14
15	30°43'	-01'	77°	30°57'	+00'	77°	31°10'	+01'	78°	31°22'	+03'	78°	31°34'	+04'	79°	31°45'	+05'	80°	31°55'	+06'	80°	15
16	30°42'	-02'	76°	30°57'	-01'	76°	31°11'	+01'	77°	31°25'	+02'	77°	31°38'	+03'	78°	31°50'	+04'	78°	32°02'	+05'	79°	16
17	30°41'	-02'	74°	30°57'	-01'	75°	31°12'	+00'	76°	31°27'	+01'	76°	31°41'	+02'	77°	31°54'	+04'	77°	32°07'	+05'	78°	17
18	30°38'	-03'	73°	30°55'	-02'	74°	31°12'	-01'	74°	31°28'	+01'	75°	31°43'	+02'	76°	31°58'	+03'	76°	32°12'	+04'	77°	18
19	30°35'	-04'	72°	30°54'	-02'	73°	31°11'	-01'	73°	31°28'	00'	74°	31°45'	+01'	74°	32°01'	+02'	75°	32°16'	+04'	76°	19
20	30°32'	-04'	71°	30°51'	-03'	71°	31°10'	-02'	72°	31°28'	-01'	73°	31°46'	+00'	73°	32°03'	+02'	74°	32°20'	+03'	74°	20
21	30°28'	-05'	70°	30°48'	-04'	70°	31°08'	-02'	71°	31°28'	-01'	71°	31°47'	00'	72°	32°05'	+01'	73°	32°22'	+02'	73°	21
22	30°23'	-05'	69°	30°45'	-04'	69°	31°06'	-03'	70°	31°26'	-02'	70°	31°46'	-01'	71°	32°06'	+00'	71°	32°25'	+02'	72°	22
23	30°18'	-06'	67°	30°40'	-05'	68°	31°03'	-04'	69°	31°24'	-03'	69°	31°46'	-01'	70°	32°06'	00'	70°	32°26'	+01'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	28°46'	+08'	94°	28°41'	+09'	94°	28°37'	+10'	95°	28°31'	+12'	95°	28°25'	+13'	96°	28°18'	+14'	97°	28°11'	+15'	97°	0
1	28°54'	+07'	93°	28°51'	+09'	93°	28°47'	+10'	94°	28°43'	+11'	94°	28°38'	+12'	95°	28°32'	+13'	95°	28°26'	+15'	96°	1
2	29°01'	+07'	92°	28°59'	+08'	92°	28°57'	+09'	93°	28°54'	+10'	93°	28°50'	+12'	94°	28°46'	+13'	94°	28°41'	+14'	95°	2
3	29°08'	+06'	90°	29°08'	+08'	91°	29°06'	+09'	92°	29°04'	+10'	92°	29°02'	+11'	93°	28°59'	+12'	93°	28°55'	+13'	94°	3
4	29°15'	+06'	89°	29°15'	+07'	90°	29°15'	+08'	90°	29°14'	+09'	91°	29°13'	+11'	92°	29°11'	+12'	92°	29°08'	+13'	93°	4
5	29°20'	+05'	88°	29°22'	+06'	89°	29°23'	+08'	89°	29°23'	+09'	90°	29°23'	+10'	90°	29°23'	+11'	91°	29°21'	+12'	92°	5
6	29°26'	+05'	87°	29°28'	+06'	88°	29°31'	+07'	88°	29°32'	+08'	89°	29°33'	+09'	89°	29°34'	+11'	90°	29°34'	+12'	90°	6
7	29°30'	+04'	86°	29°34'	+05'	86°	29°38'	+06'	87°	29°40'	+08'	88°	29°43'	+09'	88°	29°44'	+10'	89°	29°45'	+11'	89°	7
8	29°34'	+03'	85°	29°39'	+05'	85°	29°44'	+06'	86°	29°48'	+07'	86°	29°51'	+08'	87°	29°54'	+09'	88°	29°56'	+11'	88°	8
9	29°38'	+03'	84°	29°44'	+04'	84°	29°50'	+05'	85°	29°55'	+06'	85°	30°00'	+08'	86°	30°04'	+09'	86°	30°07'	+10'	87°	9
10	29°40'	+02'	82°	29°48'	+03'	83°	29°55'	+05'	84°	30°01'	+06'	84°	30°07'	+07'	85°	30°12'	+08'	85°	30°17'	+09'	86°	10
11	29°43'	+02'	81°	29°51'	+03'	82°	30°00'	+04'	82°	30°07'	+05'	83°	30°14'	+06'	84°	30°21'	+08'	84°	30°26'	+09'	85°	11
12	29°44'	+01'	80°	29°54'	+02'	81°	30°04'	+03'	81°	30°12'	+05'	82°	30°21'	+06'	82°	30°28'	+07'	83°	30°35'	+08'	84°	12
13	29°45'	+00'	79°	29°56'	+02'	80°	30°07'	+03'	80°	30°17'	+04'	81°	30°26'	+05'	81°	30°35'	+06'	82°	30°43'	+08'	82°	13
14	29°46'	00'	78°	29°58'	+01'	78°	30°10'	+02'	79°	30°21'	+03'	80°	30°32'	+05'	80°	30°42'	+06'	81°	30°51'	+07'	81°	14
15	29°45'	-01'	77°	29°59'	+00'	77°	30°12'	+02'	78°	30°24'	+03'	78°	30°36'	+04'	79°	30°47'	+05'	80°	30°58'	+06'	80°	15
16	29°45'	-01'	76°	29°59'	00'	76°	30°14'	+01'	77°	30°27'	+02'	77°	30°40'	+03'	78°	30°52'	+05'	78°	31°04'	+06'	79°	16
17	29°43'	-02'	74°	29°59'	-01'	75°	30°15'	+00'	76°	30°29'	+02'	76°	30°43'	+03'	77°	30°57'	+04'	77°	31°10'	+05'	78°	17
18	29°41'	-03'	73°	29°58'	-01'	74°	30°15'	00'	74°	30°31'	+01'	75°	30°46'	+02'	75°	31°01'	+03'	76°	31°15'	+04'	77°	18
19	29°39'	-03'	72°	29°57'	-02'	73°	30°15'	-01'	73°	30°32'	+00'	74°	30°48'	+01'	74°	31°04'	+03'	75°	31°19'	+04'	75°	19
20	29°36'	-04'	71°	29°55'	-03'	71°	30°14'	-01'	72°	30°32'	00'	73°	30°50'	+01'	73°	31°07'	+02'	74°	31°23'	+03'	74°	20
21	29°32'	-04'	70°	29°52'	-03'	70°	30°12'	-02'	71°	30°32'	-01'	71°	30°51'	+00'	72°	31°09'	+01'	73°	31°26'	+03'	73°	21
22	29°28'	-05'	69°	29°49'	-04'	69°	30°10'	-03'	70°	30°31'	-02'	70°	30°51'	00'	71°	31°10'	+01'	71°	31°29'	+02'	72°	22
23	29°23'	-06'	68°	29°45'	-04'	68°	30°08'	-03'	69°	30°29'	-02'	69°	30°50'	-01'	70°	31°11'	+00'	70°	31°31'	+01'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	27°46'	+08'	94°	27°42'	+09'	94°	27°38'	+10'	95°	27°32'	+11'	95°	27°27'	+13'	96°	27°20'	+14'	96°	27°13'	+15'	97°	0
1	27°54'	+07'	93°	27°51'	+09'	93°	27°48'	+10'	94°	27°44'	+11'	94°	27°39'	+12'	95°	27°34'	+13'	95°	27°28'	+14'	96°	1
2	28°02'	+07'	91°	28°00'	+08'	92°	27°58'	+09'	93°	27°55'	+10'	93°	27°51'	+12'	94°	27°47'	+13'	94°	27°43'	+14'	95°	2
3	28°09'	+06'	90°	28°08'	+08'	91°	28°07'	+09'	91°	28°05'	+10'	92°	28°03'	+11'	92°	28°00'	+12'	93°	27°57'	+13'	94°	3
4	28°15'	+06'	89°	28°16'	+07'	90°	28°16'	+08'	90°	28°15'	+09'	91°	28°14'	+11'	91°	28°12'	+12'	92°	28°10'	+13'	92°	4
5	28°21'	+05'	88°	28°23'	+06'	89°	28°24'	+08'	89°	28°24'	+09'	90°	28°24'	+10'	90°	28°24'	+11'	91°	28°23'	+12'	91°	5
6	28°26'	+05'	87°	28°29'	+06'	87°	28°31'	+07'	88°	28°33'	+08'	89°	28°34'	+09'	89°	28°35'	+11'	90°	28°35'	+12'	90°	6
7	28°31'	+04'	86°	28°35'	+05'	86°	28°38'	+06'	87°	28°41'	+08'	87°	28°44'	+09'	88°	28°46'	+10'	89°	28°47'	+11'	89°	7
8	28°35'	+04'	85°	28°40'	+05'	85°	28°45'	+06'	86°	28°49'	+07'	86°	28°53'	+08'	87°	28°56'	+09'	87°	28°58'	+11'	88°	8
9	28°38'	+03'	84°	28°45'	+04'	84°	28°51'	+05'	85°	28°56'	+07'	85°	29°01'	+08'	86°	29°05'	+09'	86°	29°09'	+10'	87°	9
10	28°41'	+02'	82°	28°49'	+04'	83°	28°56'	+05'	83°	29°03'	+06'	84°	29°09'	+07'	85°	29°14'	+08'	85°	29°19'	+09'	86°	10
11	28°44'	+02'	81°	28°53'	+03'	82°	29°01'	+04'	82°	29°09'	+05'	83°	29°16'	+07'	83°	29°22'	+08'	84°	29°28'	+09'	85°	11
12	28°46'	+01'	80°	28°56'	+02'	81°	29°05'	+04'	81°	29°14'	+05'	82°	29°22'	+06'	82°	29°30'	+07'	83°	29°37'	+08'	83°	12
13	28°47'	+01'	79°	28°58'	+02'	80°	29°09'	+03'	80°	29°19'	+04'	81°	29°28'	+05'	81°	29°37'	+07'	82°	29°45'	+08'	82°	13
14	28°47'	+00'	78°	29°00'	+01'	78°	29°12'	+02'	79°	29°23'	+04'	79°	29°34'	+05'	80°	29°44'	+06'	81°	29°53'	+07'	81°	14
15	28°48'	00'	77°	29°01'	+01'	77°	29°14'	+02'	78°	29°26'	+03'	78°	29°38'	+04'	79°	29°50'	+05'	79°	30°00'	+07'	80°	15
16	28°47'	-01'	76°	29°02'	+00'	76°	29°16'	+01'	77°	29°29'	+02'	77°	29°43'	+04'	78°	29°55'	+05'	78°	30°07'	+06'	79°	16
17	28°46'	-02'	74°	29°02'	00'	75°	29°17'	+01'	75°	29°32'	+02'	76°	29°46'	+03'	77°	30°00'	+04'	77°	30°13'	+05'	78°	17
18	28°44'	-02'	73°	29°01'	-01'	74°	29°18'	+00'	74°	29°34'	+01'	75°	29°49'	+02'	75°	30°04'	+04'	76°	30°18'	+05'	77°	18
19	28°42'	-03'	72°	29°00'	-02'	73°	29°18'	-01'	73°	29°35'	+01'	74°	29°52'	+02'	74°	30°07'	+03'	75°	30°23'	+04'	75°	19
20	28°39'	-03'	71°	28°59'	-02'	72°	29°17'	-01'	72°	29°36'	+00'	73°	29°53'	+01'	73°	30°10'	+02'	74°	30°27'	+04'	74°	20
21	28°36'	-04'	70°	28°56'	-03'	70°	29°16'	-02'	71°	29°36'	-01'	71°	29°55'	+01'	72°	30°13'	+02'	73°	30°31'	+03'	73°	21
22	28°32'	-04'	69°	28°54'	-03'	69°	29°15'	-02'	70°	29°35'	-01'	70°	29°55'	00'	71°	30°15'	+01'	71°	30°33'	+02'	72°	22
23	28°28'	-05'	68°	28°50'	-04'	68°	29°12'	-03'	69°	29°34'	-02'	69°	29°55'	-01'	70°	30°16'	+01'	70°	30°36'	+02'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°47'	+08'	94°	26°43'	+09'	94°	26°38'	+10'	95°	26°33'	+11'	95°	26°28'	+13'	96°	26°22'	+14'	96°	26°15'	+15'	97°	0
1	26°55'	+07'	92°	26°52'	+09'	93°	26°49'	+10'	93°	26°45'	+11'	94°	26°40'	+12'	94°	26°36'	+13'	95°	26°30'	+14'	95°	1
2	27°02'	+07'	91°	27°01'	+08'	92°	26°58'	+09'	92°	26°56'	+10'	93°	26°52'	+12'	93°	26°49'	+13'	94°	26°44'	+14'	94°	2
3	27°09'	+06'	90°	27°09'	+08'	91°	27°08'	+09'	91°	27°06'	+10'	92°	27°04'	+11'	92°	27°01'	+12'	93°	26°58'	+13'	93°	3
4	27°16'	+06'	89°	27°16'	+07'	90°	27°16'	+08'	90°	27°16'	+09'	91°	27°15'	+10'	91°	27°14'	+12'	92°	27°12'	+13'	92°	4
5	27°21'	+05'	88°	27°23'	+06'	88°	27°25'	+08'	89°	27°25'	+09'	90°	27°25'	+10'	90°	27°25'	+11'	91°	27°24'	+12'	91°	5
6	27°27'	+05'	87°	27°30'	+06'	87°	27°32'	+07'	88°	27°34'	+08'	88°	27°35'	+09'	89°	27°36'	+11'	89°	27°37'	+12'	90°	6
7	27°31'	+04'	86°	27°36'	+05'	86°	27°39'	+07'	87°	27°42'	+08'	87°	27°45'	+09'	88°	27°47'	+10'	88°	27°48'	+11'	89°	7
8	27°36'	+04'	85°	27°41'	+05'	85°	27°46'	+06'	86°	27°50'	+07'	86°	27°54'	+08'	87°	27°57'	+10'	87°	28°00'	+11'	88°	8
9	27°39'	+03'	83°	27°46'	+04'	84°	27°52'	+05'	85°	27°57'	+07'	85°	28°02'	+08'	86°	28°06'	+09'	86°	28°10'	+10'	87°	9
10	27°42'	+03'	82°	27°50'	+04'	83°	27°57'	+05'	83°	28°04'	+06'	84°	28°10'	+07'	84°	28°15'	+08'	85°	28°20'	+10'	86°	10
11	27°45'	+02'	81°	27°54'	+03'	82°	28°02'	+04'	82°	28°10'	+06'	83°	28°17'	+07'	83°	28°24'	+08'	84°	28°30'	+09'	84°	11
12	27°47'	+01'	80°	27°57'	+03'	81°	28°06'	+04'	81°	28°15'	+05'	82°	28°24'	+06'	82°	28°32'	+07'	83°	28°39'	+08'	83°	12
13	27°48'	+01'	79°	28°00'	+02'	79°	28°10'	+03'	80°	28°20'	+04'	81°	28°30'	+06'	81°	28°39'	+07'	82°	28°47'	+08'	82°	13
14	27°49'	+00'	78°	28°02'	+02'	78°	28°13'	+03'	79°	28°25'	+04'	79°	28°36'	+05'	80°	28°46'	+06'	80°	28°55'	+07'	81°	14
15	27°50'	00'	77°	28°03'	+01'	77°	28°16'	+02'	78°	28°29'	+03'	78°	28°41'	+04'	79°	28°52'	+06'	79°	29°03'	+07'	80°	15
16	27°49'	-01'	76°	28°04'	+00'	76°	28°18'	+02'	77°	28°32'	+03'	77°	28°45'	+04'	78°	28°58'	+05'	78°	29°09'	+06'	79°	16
17	27°49'	-01'	74°	28°04'	00'	75°	28°20'	+01'	75°	28°35'	+02'	76°	28°49'	+03'	77°	29°03'	+04'	77°	29°16'	+06'	78°	17
18	27°47'	-02'	73°	28°04'	-01'	74°	28°21'	+00'	74°	28°37'	+02'	75°	28°52'	+03'	75°	29°07'	+04'	76°	29°21'	+05'	76°	18
19	27°45'	-02'	72°	28°04'	-01'	73°	28°21'	00'	73°	28°38'	+01'	74°	28°55'	+02'	74°	29°11'	+03'	75°	29°26'	+04'	75°	19
20	27°43'	-03'	71°	28°02'	-02'	72°	28°21'	-01'	72°	28°39'	+00'	73°	28°57'	+02'	73°	29°14'	+03'	74°	29°31'	+04'	74°	20
21	27°40'	-04'	70°	28°00'	-02'	70°	28°20'	-01'	71°	28°40'	00'	71°	28°59'	+01'	72°	29°17'	+02'	72°	29°35'	+03'	73°	21
22	27°37'	-04'	69°	27°58'	-03'	69°	28°19'	-02'	70°	28°40'	-01'	70°	28°59'	+00'	71°	29°19'	+02'	71°	29°38'	+03'	72°	22
23	27°33'	-05'	68°	27°55'	-04'	68°	28°17'	-02'	69°	28°39'	-01'	69°	29°00'	00'	70°	29°20'	+01'	70°	29°41'	+02'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°48'	+08'	93°	25°44'	+09'	94°	25°39'	+10'	94°	25°35'	+11'	95°	25°29'	+12'	95°	25°23'	+14'	96°	25°17'	+15'	96°	0
1	25°55'	+07'	92°	25°53'	+09'	93°	25°50'	+10'	93°	25°46'	+11'	94°	25°42'	+12'	94°	25°37'	+13'	95°	25°32'	+14'	95°	1
2	26°03'	+07'	91°	26°01'	+08'	92°	25°59'	+09'	92°	25°57'	+10'	93°	25°54'	+11'	93°	25°50'	+13'	94°	25°46'	+14'	94°	2
3	26°10'	+06'	90°	26°09'	+08'	91°	26°08'	+09'	91°	26°07'	+10'	92°	26°05'	+11'	92°	26°03'	+12'	93°	26°00'	+13'	93°	3
4	26°16'	+06'	89°	26°17'	+07'	89°	26°17'	+08'	90°	26°17'	+09'	90°	26°16'	+10'	91°	26°15'	+12'	91°	26°13'	+13'	92°	4
5	26°22'	+05'	88°	26°24'	+06'	88°	26°25'	+08'	89°	26°26'	+09'	89°	26°27'	+10'	90°	26°26'	+11'	90°	26°26'	+12'	91°	5
6	26°27'	+05'	87°	26°30'	+06'	87°	26°33'	+07'	88°	26°35'	+08'	88°	26°37'	+09'	89°	26°38'	+11'	89°	26°38'	+12'	90°	6
7	26°32'	+04'	86°	26°36'	+05'	86°	26°40'	+07'	87°	26°43'	+08'	87°	26°46'	+09'	88°	26°48'	+10'	88°	26°50'	+11'	89°	7
8	26°36'	+04'	85°	26°42'	+05'	85°	26°47'	+06'	86°	26°51'	+07'	86°	26°55'	+08'	87°	26°58'	+10'	87°	27°01'	+11'	88°	8
9	26°40'	+03'	83°	26°47'	+04'	84°	26°53'	+06'	84°	26°58'	+07'	85°	27°03'	+08'	85°	27°08'	+09'	86°	27°12'	+10'	86°	9
10	26°43'	+03'	82°	26°51'	+04'	83°	26°58'	+05'	83°	27°05'	+06'	84°	27°11'	+07'	84°	27°17'	+09'	85°	27°22'	+10'	85°	10
11	26°46'	+02'	81°	26°55'	+03'	82°	27°03'	+05'	82°	27°11'	+06'	83°	27°19'	+07'	83°	27°25'	+08'	84°	27°32'	+09'	84°	11
12	26°48'	+02'	80°	26°58'	+03'	81°	27°08'	+04'	81°	27°17'	+05'	82°	27°25'	+06'	82°	27°33'	+07'	83°	27°41'	+09'	83°	12
13	26°50'	+01'	79°	27°01'	+02'	79°	27°12'	+03'	80°	27°22'	+05'	80°	27°32'	+06'	81°	27°41'	+07'	81°	27°50'	+08'	82°	13
14	26°51'	+01'	78°	27°03'	+02'	78°	27°15'	+03'	79°	27°27'	+04'	79°	27°38'	+05'	80°	27°48'	+06'	80°	27°58'	+08'	81°	14
15	26°52'	+00'	77°	27°05'	+01'	77°	27°18'	+02'	78°	27°31'	+04'	78°	27°43'	+05'	79°	27°54'	+06'	79°	28°05'	+07'	80°	15
16	26°52'	00'	76°	27°06'	+01'	76°	27°21'	+02'	77°	27°34'	+03'	77°	27°47'	+04'	78°	28°00'	+05'	78°	28°12'	+06'	79°	16
17	26°51'	-01'	74°	27°07'	+00'	75°	27°22'	+01'	75°	27°37'	+02'	76°	27°52'	+04'	76°	28°05'	+05'	77°	28°19'	+06'	77°	17
18	26°50'	-02'	73°	27°07'	00'	74°	27°24'	+01'	74°	27°40'	+02'	75°	27°55'	+03'	75°	28°10'	+04'	76°	28°24'	+05'	76°	18
19	26°49'	-02'	72°	27°07'	-01'	73°	27°24'	+00'	73°	27°42'	+01'	74°	27°58'	+02'	74°	28°14'	+04'	75°	28°30'	+05'	75°	19
20	26°47'	-03'	71°	27°06'	-01'	72°	27°25'	00'	72°	27°43'	+01'	73°	28°01'	+02'	73°	28°18'	+03'	74°	28°35'	+04'	74°	20
21	26°44'	-03'	70°	27°04'	-02'	70°	27°24'	-01'	71°	27°44'	+00'	71°	28°03'	+01'	72°	28°21'	+02'	72°	28°39'	+04'	73°	21
22	26°41'	-04'	69°	27°02'	-03'	69°	27°23'	-01'	70°	27°44'	00'	70°	28°04'	+01'	71°	28°23'	+02'	71°	28°42'	+03'	72°	22
23	26°37'	-04'	68°	27°00'	-03'	68°	27°22'	-02'	69°	27°44'	-01'	69°	28°05'	+00'	70°	28°25'	+01'	70°	28°45'	+02'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°48'	+08'	93°	24°44'	+09'	94°	24°40'	+10'	94°	24°36'	+11'	95°	24°31'	+12'	95°	24°25'	+13'	96°	24°19'	+15'	96°	0
1	24°56'	+07'	92°	24°53'	+08'	93°	24°50'	+10'	93°	24°47'	+11'	94°	24°43'	+12'	94°	24°39'	+13'	94°	24°34'	+14'	95°	1
2	25°03'	+07'	91°	25°02'	+08'	92°	25°00'	+09'	92°	24°58'	+10'	92°	24°55'	+11'	93°	24°52'	+13'	93°	24°48'	+14'	94°	2
3	25°10'	+06'	90°	25°10'	+08'	90°	25°09'	+09'	91°	25°08'	+10'	91°	25°06'	+11'	92°	25°04'	+12'	92°	25°01'	+13'	93°	3
4	25°16'	+06'	89°	25°17'	+07'	89°	25°18'	+08'	90°	25°18'	+09'	90°	25°17'	+10'	91°	25°16'	+12'	91°	25°15'	+13'	92°	4
5	25°22'	+05'	88°	25°24'	+07'	88°	25°26'	+08'	89°	25°27'	+09'	89°	25°28'	+10'	90°	25°28'	+11'	90°	25°27'	+12'	91°	5
6	25°28'	+05'	87°	25°31'	+06'	87°	25°34'	+07'	88°	25°36'	+08'	88°	25°38'	+09'	89°	25°39'	+11'	89°	25°40'	+12'	90°	6
7	25°33'	+04'	86°	25°37'	+06'	86°	25°41'	+07'	87°	25°44'	+08'	87°	25°47'	+09'	87°	25°50'	+10'	88°	25°51'	+11'	88°	7
8	25°37'	+04'	84°	25°43'	+05'	85°	25°48'	+06'	85°	25°52'	+07'	86°	25°56'	+09'	86°	26°00'	+10'	87°	26°03'	+11'	87°	8
9	25°41'	+03'	83°	25°48'	+05'	84°	25°54'	+06'	84°	25°59'	+07'	85°	26°05'	+08'	85°	26°09'	+09'	86°	26°14'	+10'	86°	9
10	25°44'	+03'	82°	25°52'	+04'	83°	25°59'	+05'	83°	26°06'	+06'	84°	26°13'	+07'	84°	26°19'	+09'	85°	26°24'	+10'	85°	10
11	25°47'	+02'	81°	25°56'	+04'	82°	26°05'	+05'	82°	26°13'	+06'	83°	26°20'	+07'	83°	26°27'	+08'	84°	26°34'	+09'	84°	11
12	25°50'	+02'	80°	26°00'	+03'	80°	26°09'	+04'	81°	26°19'	+05'	81°	26°27'	+06'	82°	26°35'	+08'	82°	26°43'	+09'	83°	12
13	25°51'	+01'	79°	26°03'	+03'	79°	26°14'	+04'	80°	26°24'	+05'	80°	26°34'	+06'	81°	26°43'	+07'	81°	26°52'	+08'	82°	13
14	25°53'	+01'	78°	26°05'	+02'	78°	26°17'	+03'	79°	26°29'	+04'	79°	26°40'	+05'	80°	26°50'	+07'	80°	27°00'	+08'	81°	14
15	25°54'	+00'	77°	26°07'	+01'	77°	26°20'	+03'	78°	26°33'	+04'	78°	26°45'	+05'	79°	26°57'	+06'	79°	27°08'	+07'	80°	15
16	25°54'	00'	76°	26°09'	+01'	76°	26°23'	+02'	77°	26°37'	+03'	77°	26°50'	+04'	78°	27°03'	+06'	78°	27°15'	+07'	79°	16
17	25°54'	-01'	74°	26°10'	+00'	75°	26°25'	+02'	75°	26°40'	+03'	76°	26°54'	+04'	76°	27°08'	+05'	77°	27°22'	+06'	77°	17
18	25°53'	-01'	73°	26°10'	00'	74°	26°27'	+01'	74°	26°43'	+02'	75°	26°58'	+03'	75°	27°13'	+04'	76°	27°28'	+06'	76°	18
19	25°52'	-02'	72°	26°10'	-01'	73°	26°28'	+01'	73°	26°45'	+02'	74°	27°01'	+03'	74°	27°18'	+04'	75°	27°33'	+05'	75°	19
20	25°50'	-02'	71°	26°10'	-01'	72°	26°28'	+00'	72°	26°47'	+01'	73°	27°04'	+02'	73°	27°22'	+03'	74°	27°38'	+05'	74°	20
21	25°48'	-03'	70°	26°08'	-02'	70°	26°28'	00'	71°	26°48'	+01'	71°	27°07'	+02'	72°	27°25'	+03'	72°	27°43'	+04'	73°	21
22	25°46'	-03'	69°	26°07'	-02'	69°	26°28'	-01'	70°	26°48'	+00'	70°	27°08'	+01'	71°	27°28'	+02'	71°	27°47'	+03'	72°	22
23	25°42'	-04'	68°	26°05'	-03'	68°	26°27'	-02'	69°	26°48'	00'	69°	27°09'	+01'	70°	27°30'	+02'	70°	27°50'	+03'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	23°49'	+08'	93°	23°45'	+09'	94°	23°41'	+10'	94°	23°37'	+11'	94°	23°32'	+12'	95°	23°27'	+13'	95°	23°21'	+14'	96°	0
1	23°56'	+07'	92°	23°54'	+08'	92°	23°51'	+10'	93°	23°48'	+11'	93°	23°44'	+12'	94°	23°40'	+13'	94°	23°35'	+14'	95°	1
2	24°04'	+07'	91°	24°02'	+08'	91°	24°01'	+09'	92°	23°59'	+10'	92°	23°56'	+11'	93°	23°53'	+13'	93°	23°49'	+14'	94°	2
3	24°11'	+06'	90°	24°10'	+08'	90°	24°10'	+09'	91°	24°09'	+10'	91°	24°07'	+11'	92°	24°05'	+12'	92°	24°03'	+13'	93°	3
4	24°17'	+06'	89°	24°18'	+07'	89°	24°19'	+08'	90°	24°19'	+09'	90°	24°18'	+10'	91°	24°18'	+12'	91°	24°16'	+13'	91°	4
5	24°23'	+05'	88°	24°25'	+07'	88°	24°27'	+08'	89°	24°28'	+09'	89°	24°29'	+10'	89°	24°29'	+11'	90°	24°29'	+12'	90°	5
6	24°28'	+05'	87°	24°32'	+06'	87°	24°34'	+07'	87°	24°37'	+08'	88°	24°39'	+10'	88°	24°40'	+11'	89°	24°41'	+12'	89°	6
7	24°33'	+04'	85°	24°38'	+06'	86°	24°42'	+07'	86°	24°45'	+08'	87°	24°48'	+09'	87°	24°51'	+10'	88°	24°53'	+11'	88°	7
8	24°38'	+04'	84°	24°43'	+05'	85°	24°49'	+06'	85°	24°53'	+07'	86°	24°57'	+09'	86°	25°01'	+10'	87°	25°04'	+11'	87°	8
9	24°42'	+04'	83°	24°49'	+05'	84°	24°55'	+06'	84°	25°01'	+07'	85°	25°06'	+08'	85°	25°11'	+09'	86°	25°15'	+10'	86°	9
10	24°45'	+03'	82°	24°53'	+04'	83°	25°01'	+05'	83°	25°08'	+06'	84°	25°14'	+08'	84°	25°20'	+09'	85°	25°26'	+10'	85°	10
11	24°48'	+03'	81°	24°57'	+04'	82°	25°06'	+05'	82°	25°14'	+06'	82°	25°22'	+07'	83°	25°29'	+08'	83°	25°35'	+09'	84°	11
12	24°51'	+02'	80°	25°01'	+03'	80°	25°11'	+04'	81°	25°20'	+06'	81°	25°29'	+07'	82°	25°37'	+08'	82°	25°45'	+09'	83°	12
13	24°53'	+02'	79°	25°04'	+03'	79°	25°15'	+04'	80°	25°26'	+05'	80°	25°35'	+06'	81°	25°45'	+07'	81°	25°54'	+08'	82°	13
14	24°55'	+01'	78°	25°07'	+02'	78°	25°19'	+03'	79°	25°31'	+05'	79°	25°42'	+06'	80°	25°52'	+07'	80°	26°02'	+08'	81°	14
15	24°56'	+01'	77°	25°09'	+02'	77°	25°22'	+03'	78°	25°35'	+04'	78°	25°47'	+05'	79°	25°59'	+06'	79°	26°10'	+07'	79°	15
16	24°56'	+00'	76°	25°11'	+01'	76°	25°25'	+02'	76°	25°39'	+04'	77°	25°52'	+05'	77°	26°05'	+06'	78°	26°18'	+07'	78°	16
17	24°57'	00'	74°	25°12'	+01'	75°	25°28'	+02'	75°	25°43'	+03'	76°	25°57'	+04'	76°	26°11'	+05'	77°	26°24'	+06'	77°	17
18	24°56'	-01'	73°	25°13'	+00'	74°	25°30'	+01'	74°	25°46'	+03'	75°	26°01'	+04'	75°	26°16'	+05'	76°	26°31'	+06'	76°	18
19	24°55'	-01'	72°	25°13'	00'	73°	25°31'	+01'	73°	25°48'	+02'	74°	26°05'	+03'	74°	26°21'	+04'	75°	26°37'	+05'	75°	19
20	24°54'	-02'	71°	25°13'	-01'	72°	25°32'	+00'	72°	25°50'	+01'	73°	26°08'	+03'	73°	26°25'	+04'	73°	26°42'	+05'	74°	20
21	24°52'	-02'	70°	25°12'	-01'	70°	25°32'	00'	71°	25°52'	+01'	71°	26°11'	+02'	72°	26°29'	+03'	72°	26°47'	+04'	73°	21
22	24°50'	-03'	69°	25°11'	-02'	69°	25°32'	-01'	70°	25°53'	+00'	70°	26°13'	+02'	71°	26°32'	+03'	71°	26°51'	+04'	72°	22
23	24°47'	-03'	68°	25°10'	-02'	68°	25°32'	-01'	69°	25°53'	00'	69°	26°14'	+01'	70°	26°35'	+02'	70°	26°55'	+03'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	22°49'	+08'	93°	22°46'	+09'	93°	22°42'	+10'	94°	22°38'	+11'	94°	22°33'	+12'	95°	22°28'	+13'	95°	22°23'	+14'	95°	0
1	22°57'	+07'	92°	22°55'	+08'	92°	22°52'	+10'	93°	22°49'	+11'	93°	22°45'	+12'	94°	22°41'	+13'	94°	22°37'	+14'	94°	1
2	23°04'	+07'	91°	23°03'	+08'	91°	23°02'	+09'	92°	23°00'	+10'	92°	22°57'	+11'	93°	22°54'	+12'	93°	22°51'	+14'	93°	2
3	23°11'	+06'	90°	23°11'	+08'	90°	23°11'	+09'	91°	23°10'	+10'	91°	23°09'	+11'	91°	23°07'	+12'	92°	23°05'	+13'	92°	3
4	23°17'	+06'	89°	23°19'	+07'	89°	23°19'	+08'	90°	23°20'	+09'	90°	23°19'	+10'	90°	23°19'	+12'	91°	23°18'	+13'	91°	4
5	23°23'	+06'	88°	23°26'	+07'	88°	23°28'	+08'	88°	23°29'	+09'	89°	23°30'	+10'	89°	23°30'	+11'	90°	23°30'	+12'	90°	5
6	23°29'	+05'	86°	23°32'	+06'	87°	23°35'	+07'	87°	23°38'	+08'	88°	23°40'	+10'	88°	23°42'	+11'	89°	23°43'	+12'	89°	6
7	23°34'	+05'	85°	23°38'	+06'	86°	23°43'	+07'	86°	23°46'	+08'	87°	23°50'	+09'	87°	23°52'	+10'	88°	23°55'	+11'	88°	7
8	23°38'	+04'	84°	23°44'	+05'	85°	23°49'	+06'	85°	23°54'	+08'	86°	23°59'	+09'	86°	24°03'	+10'	87°	24°06'	+11'	87°	8
9	23°43'	+04'	83°	23°49'	+05'	84°	23°56'	+06'	84°	24°02'	+07'	85°	24°07'	+08'	85°	24°12'	+09'	85°	24°17'	+10'	86°	9
10	23°46'	+03'	82°	23°54'	+04'	83°	24°02'	+05'	83°	24°09'	+07'	83°	24°16'	+08'	84°	24°22'	+09'	84°	24°27'	+10'	85°	10
11	23°50'	+03'	81°	23°59'	+04'	81°	24°07'	+05'	82°	24°16'	+06'	82°	24°23'	+07'	83°	24°31'	+08'	83°	24°37'	+10'	84°	11
12	23°52'	+02'	80°	24°03'	+03'	80°	24°12'	+05'	81°	24°22'	+06'	81°	24°31'	+07'	82°	24°39'	+08'	82°	24°47'	+09'	83°	12
13	23°55'	+02'	79°	24°06'	+03'	79°	24°17'	+04'	80°	24°27'	+05'	80°	24°37'	+06'	81°	24°47'	+07'	81°	24°56'	+09'	82°	13
14	23°56'	+01'	78°	24°09'	+02'	78°	24°21'	+04'	79°	24°33'	+05'	79°	24°44'	+06'	80°	24°54'	+07'	80°	25°05'	+08'	80°	14
15	23°58'	+01'	77°	24°11'	+02'	77°	24°25'	+03'	78°	24°37'	+04'	78°	24°50'	+05'	78°	25°01'	+07'	79°	25°13'	+08'	79°	15
16	23°59'	+00'	76°	24°13'	+02'	76°	24°28'	+03'	76°	24°42'	+04'	77°	24°55'	+05'	77°	25°08'	+06'	78°	25°20'	+07'	78°	16
17	23°59'	00'	74°	24°15'	+01'	75°	24°30'	+02'	75°	24°45'	+03'	76°	25°00'	+04'	76°	25°14'	+06'	77°	25°27'	+07'	77°	17
18	23°59'	00'	73°	24°16'	+01'	74°	24°33'	+02'	74°	24°49'	+03'	75°	25°04'	+04'	75°	25°19'	+05'	76°	25°34'	+06'	76°	18
19	23°59'	-01'	72°	24°17'	+00'	73°	24°34'	+01'	73°	24°51'	+02'	74°	25°08'	+03'	74°	25°24'	+05'	74°	25°40'	+06'	75°	19
20	23°58'	-01'	71°	24°17'	00'	72°	24°36'	+01'	72°	24°54'	+02'	72°	25°12'	+03'	73°	25°29'	+04'	73°	25°46'	+05'	74°	20
21	23°56'	-02'	70°	24°16'	-01'	71°	24°36'	+00'	71°	24°56'	+01'	71°	25°15'	+02'	72°	25°33'	+04'	72°	25°51'	+05'	73°	21
22	23°54'	-02'	69°	24°16'	-01'	69°	24°37'	00'	70°	24°57'	+01'	70°	25°17'	+02'	71°	25°37'	+03'	71°	25°56'	+04'	72°	22
23	23°52'	-03'	68°	24°14'	-02'	68°	24°36'	-01'	69°	24°58'	+00'	69°	25°19'	+01'	70°	25°40'	+03'	70°	26°00'	+04'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°50'	+08'	93°	21°46'	+09'	93°	21°43'	+10'	94°	21°39'	+11'	94°	21°35'	+12'	94°	21°30'	+13'	95°	21°24'	+14'	95°	0
1	21°57'	+07'	92°	21°55'	+08'	92°	21°53'	+09'	93°	21°50'	+11'	93°	21°47'	+12'	93°	21°43'	+13'	94°	21°39'	+14'	94°	1
2	22°05'	+07'	91°	22°04'	+08'	91°	22°02'	+09'	91°	22°01'	+10'	92°	21°58'	+11'	92°	21°56'	+12'	93°	21°53'	+14'	93°	2
3	22°11'	+06'	90°	22°12'	+08'	90°	22°11'	+09'	90°	22°11'	+10'	91°	22°10'	+11'	91°	22°08'	+12'	92°	22°06'	+13'	92°	3
4	22°18'	+06'	89°	22°19'	+07'	89°	22°20'	+08'	89°	22°21'	+09'	90°	22°21'	+10'	90°	22°20'	+12'	91°	22°19'	+13'	91°	4
5	22°24'	+06'	87°	22°26'	+07'	88°	22°28'	+08'	88°	22°30'	+09'	89°	22°31'	+10'	89°	22°32'	+11'	90°	22°32'	+12'	90°	5
6	22°29'	+05'	86°	22°33'	+06'	87°	22°36'	+07'	87°	22°39'	+09'	88°	22°41'	+10'	88°	22°43'	+11'	88°	22°44'	+12'	89°	6
7	22°35'	+05'	85°	22°39'	+06'	86°	22°43'	+07'	86°	22°47'	+08'	87°	22°51'	+09'	87°	22°54'	+10'	87°	22°56'	+11'	88°	7
8	22°39'	+04'	84°	22°45'	+05'	85°	22°50'	+07'	85°	22°55'	+08'	85°	23°00'	+09'	86°	23°04'	+10'	86°	23°08'	+11'	87°	8
9	22°43'	+04'	83°	22°50'	+05'	84°	22°57'	+06'	84°	23°03'	+07'	84°	23°09'	+08'	85°	23°14'	+09'	85°	23°19'	+11'	86°	9
10	22°47'	+03'	82°	22°55'	+05'	82°	23°03'	+06'	83°	23°10'	+07'	83°	23°17'	+08'	84°	23°23'	+09'	84°	23°29'	+10'	85°	10
11	22°51'	+03'	81°	23°00'	+04'	81°	23°09'	+05'	82°	23°17'	+06'	82°	23°25'	+07'	83°	23°32'	+09'	83°	23°39'	+10'	84°	11
12	22°54'	+03'	80°	23°04'	+04'	80°	23°14'	+05'	81°	23°23'	+06'	81°	23°32'	+07'	82°	23°41'	+08'	82°	23°49'	+09'	82°	12
13	22°56'	+02'	79°	23°08'	+03'	79°	23°19'	+04'	80°	23°29'	+05'	80°	23°39'	+07'	81°	23°49'	+08'	81°	23°58'	+09'	81°	13
14	22°58'	+02'	78°	23°11'	+03'	78°	23°23'	+04'	79°	23°35'	+05'	79°	23°46'	+06'	79°	23°57'	+07'	80°	24°07'	+08'	80°	14
15	23°00'	+01'	77°	23°13'	+02'	77°	23°27'	+03'	77°	23°40'	+05'	78°	23°52'	+06'	78°	24°04'	+07'	79°	24°15'	+08'	79°	15
16	23°01'	+01'	76°	23°16'	+02'	76°	23°30'	+03'	76°	23°44'	+04'	77°	23°58'	+05'	77°	24°11'	+06'	78°	24°23'	+07'	78°	16
17	23°02'	+00'	74°	23°18'	+01'	75°	23°33'	+02'	75°	23°48'	+04'	76°	24°03'	+05'	76°	24°17'	+06'	77°	24°31'	+07'	77°	17
18	23°02'	00'	73°	23°19'	+01'	74°	23°36'	+02'	74°	23°52'	+03'	75°	24°07'	+04'	75°	24°23'	+05'	75°	24°37'	+06'	76°	18
19	23°02'	-01'	72°	23°20'	+00'	73°	23°38'	+02'	73°	23°55'	+03'	74°	24°12'	+04'	74°	24°28'	+05'	74°	24°44'	+06'	75°	19
20	23°01'	-01'	71°	23°20'	+00'	72°	23°39'	+01'	72°	23°57'	+02'	72°	24°15'	+03'	73°	24°33'	+04'	73°	24°50'	+05'	74°	20
21	23°00'	-01'	70°	23°20'	00'	71°	23°40'	+01'	71°	24°00'	+02'	71°	24°19'	+03'	72°	24°37'	+04'	72°	24°55'	+05'	73°	21
22	22°59'	-02'	69°	23°20'	-01'	69°	23°41'	+00'	70°	24°01'	+01'	70°	24°21'	+02'	71°	24°41'	+03'	71°	25°00'	+05'	72°	22
23	22°57'	-02'	68°	23°19'	-01'	68°	23°41'	00'	69°	24°03'	+01'	69°	24°24'	+02'	70°	24°45'	+03'	70°	25°05'	+04'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	20°50'	+08'	93°	20°47'	+09'	93°	20°44'	+10'	93°	20°40'	+11'	94°	20°36'	+12'	94°	20°31'	+13'	95°	20°26'	+14'	95°	0
1	20°58'	+07'	92°	20°56'	+08'	92°	20°54'	+09'	92°	20°51'	+11'	93°	20°48'	+12'	93°	20°44'	+13'	94°	20°40'	+14'	94°	1
2	21°05'	+07'	91°	21°04'	+08'	91°	21°03'	+09'	91°	21°01'	+10'	92°	20°59'	+11'	92°	20°57'	+12'	92°	20°54'	+13'	93°	2
3	21°12'	+06'	89°	21°12'	+08'	90°	21°12'	+09'	90°	21°12'	+10'	91°	21°11'	+11'	91°	21°09'	+12'	91°	21°08'	+13'	92°	3
4	21°18'	+06'	88°	21°20'	+07'	89°	21°21'	+08'	89°	21°21'	+09'	90°	21°22'	+10'	90°	21°21'	+12'	90°	21°21'	+13'	91°	4
5	21°24'	+06'	87°	21°27'	+07'	88°	21°29'	+08'	88°	21°31'	+09'	89°	21°32'	+10'	89°	21°33'	+11'	89°	21°34'	+12'	90°	5
6	21°30'	+05'	86°	21°34'	+06'	87°	21°37'	+07'	87°	21°40'	+09'	87°	21°42'	+10'	88°	21°44'	+11'	88°	21°46'	+12'	89°	6
7	21°35'	+05'	85°	21°40'	+06'	86°	21°44'	+07'	86°	21°48'	+08'	86°	21°52'	+09'	87°	21°55'	+10'	87°	21°58'	+11'	88°	7
8	21°40'	+04'	84°	21°46'	+06'	85°	21°51'	+07'	85°	21°56'	+08'	85°	22°01'	+09'	86°	22°05'	+10'	86°	22°09'	+11'	87°	8
9	21°44'	+04'	83°	21°51'	+05'	83°	21°58'	+06'	84°	22°04'	+07'	84°	22°10'	+08'	85°	22°15'	+10'	85°	22°20'	+11'	85°	9
10	21°48'	+04'	82°	21°56'	+05'	82°	22°04'	+06'	83°	22°12'	+07'	83°	22°18'	+08'	84°	22°25'	+09'	84°	22°31'	+10'	84°	10
11	21°52'	+03'	81°	22°01'	+04'	81°	22°10'	+05'	82°	22°18'	+06'	82°	22°26'	+08'	83°	22°34'	+09'	83°	22°41'	+10'	83°	11
12	21°55'	+03'	80°	22°05'	+04'	80°	22°15'	+05'	81°	22°25'	+06'	81°	22°34'	+07'	81°	22°43'	+08'	82°	22°51'	+09'	82°	12
13	21°58'	+02'	79°	22°09'	+03'	79°	22°20'	+05'	80°	22°31'	+06'	80°	22°41'	+07'	80°	22°51'	+08'	81°	23°00'	+09'	81°	13
14	22°00'	+02'	78°	22°13'	+03'	78°	22°25'	+04'	78°	22°37'	+05'	79°	22°48'	+06'	79°	22°59'	+07'	80°	23°09'	+09'	80°	14
15	22°02'	+01'	77°	22°16'	+03'	77°	22°29'	+04'	77°	22°42'	+05'	78°	22°54'	+06'	78°	23°06'	+07'	79°	23°18'	+08'	79°	15
16	22°03'	+01'	76°	22°18'	+02'	76°	22°33'	+03'	76°	22°47'	+04'	77°	23°00'	+05'	77°	23°13'	+07'	78°	23°26'	+08'	78°	16
17	22°04'	+01'	74°	22°20'	+02'	75°	22°36'	+03'	75°	22°51'	+04'	76°	23°05'	+05'	76°	23°20'	+06'	76°	23°34'	+07'	77°	17
18	22°05'	+00'	73°	22°22'	+01'	74°	22°39'	+02'	74°	22°55'	+03'	75°	23°10'	+05'	75°	23°26'	+06'	75°	23°41'	+07'	76°	18
19	22°05'	00'	72°	22°23'	+01'	73°	22°41'	+02'	73°	22°58'	+03'	73°	23°15'	+04'	74°	23°31'	+05'	74°	23°47'	+06'	75°	19
20	22°05'	-01'	71°	22°24'	+00'	72°	22°43'	+01'	72°	23°01'	+03'	72°	23°19'	+04'	73°	23°37'	+05'	73°	23°54'	+06'	74°	20
21	22°04'	-01'	70°	22°24'	00'	71°	22°44'	+01'	71°	23°04'	+02'	71°	23°23'	+03'	72°	23°41'	+04'	72°	24°00'	+05'	73°	21
22	22°03'	-02'	69°	22°24'	00'	69°	22°45'	+01'	70°	23°06'	+02'	70°	23°26'	+03'	71°	23°46'	+04'	71°	24°05'	+05'	71°	22
23	22°02'	-02'	68°	22°24'	-01'	68°	22°46'	+00'	69°	23°07'	+01'	69°	23°29'	+02'	70°	23°49'	+03'	70°	24°10'	+04'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	19°51'	+08'	93°	19°48'	+09'	93°	19°45'	+10'	93°	19°41'	+11'	94°	19°37'	+12'	94°	19°33'	+13'	94°	19°28'	+14'	95°	0
1	19°58'	+07'	91°	19°57'	+08'	92°	19°54'	+09'	92°	19°52'	+11'	93°	19°49'	+12'	93°	19°46'	+13'	93°	19°42'	+14'	94°	1
2	20°05'	+07'	90°	20°05'	+08'	91°	20°04'	+09'	91°	20°02'	+10'	92°	20°01'	+11'	92°	19°58'	+12'	92°	19°56'	+13'	93°	2
3	20°12'	+06'	89°	20°13'	+08'	90°	20°13'	+09'	90°	20°13'	+10'	90°	20°12'	+11'	91°	20°11'	+12'	91°	20°09'	+13'	92°	3
4	20°19'	+06'	88°	20°20'	+07'	89°	20°22'	+08'	89°	20°22'	+09'	89°	20°23'	+10'	90°	20°23'	+12'	90°	20°22'	+13'	91°	4
5	20°25'	+06'	87°	20°28'	+07'	88°	20°30'	+08'	88°	20°32'	+09'	88°	20°33'	+10'	89°	20°34'	+11'	89°	20°35'	+12'	89°	5
6	20°31'	+05'	86°	20°34'	+06'	87°	20°38'	+08'	87°	20°41'	+09'	87°	20°43'	+10'	88°	20°46'	+11'	88°	20°47'	+12'	88°	6
7	20°36'	+05'	85°	20°41'	+06'	85°	20°45'	+07'	86°	20°49'	+08'	86°	20°53'	+09'	87°	20°56'	+10'	87°	20°59'	+12'	87°	7
8	20°41'	+05'	84°	20°47'	+06'	84°	20°52'	+07'	85°	20°58'	+08'	85°	21°02'	+09'	86°	21°07'	+10'	86°	21°11'	+11'	86°	8
9	20°45'	+04'	83°	20°52'	+05'	83°	20°59'	+06'	84°	21°05'	+07'	84°	21°11'	+09'	85°	21°17'	+10'	85°	21°22'	+11'	85°	9
10	20°49'	+04'	82°	20°58'	+05'	82°	21°05'	+06'	83°	21°13'	+07'	83°	21°20'	+08'	83°	21°27'	+09'	84°	21°33'	+10'	84°	10
11	20°53'	+03'	81°	21°02'	+04'	81°	21°11'	+06'	82°	21°20'	+07'	82°	21°28'	+08'	82°	21°36'	+09'	83°	21°43'	+10'	83°	11
12	20°56'	+03'	80°	21°07'	+04'	80°	21°17'	+05'	81°	21°27'	+06'	81°	21°36'	+07'	81°	21°45'	+08'	82°	21°53'	+10'	82°	12
13	20°59'	+03'	79°	21°11'	+04'	79°	21°22'	+05'	79°	21°33'	+06'	80°	21°43'	+07'	80°	21°53'	+08'	81°	22°03'	+09'	81°	13
14	21°02'	+02'	78°	21°14'	+03'	78°	21°27'	+04'	78°	21°39'	+05'	79°	21°50'	+07'	79°	22°01'	+08'	80°	22°12'	+09'	80°	14
15	21°04'	+02'	77°	21°18'	+03'	77°	21°31'	+04'	77°	21°44'	+05'	78°	21°57'	+06'	78°	22°09'	+07'	79°	22°20'	+08'	79°	15
16	21°06'	+01'	76°	21°21'	+02'	76°	21°35'	+03'	76°	21°49'	+05'	77°	22°03'	+06'	77°	22°16'	+07'	77°	22°29'	+08'	78°	16
17	21°07'	+01'	74°	21°23'	+02'	75°	21°38'	+03'	75°	21°54'	+04'	76°	22°08'	+05'	76°	22°23'	+06'	76°	22°37'	+07'	77°	17
18	21°08'	+01'	73°	21°25'	+02'	74°	21°42'	+03'	74°	21°58'	+04'	75°	22°14'	+05'	75°	22°29'	+06'	75°	22°44'	+07'	76°	18
19	21°08'	+00'	72°	21°26'	+01'	73°	21°44'	+02'	73°	22°01'	+03'	73°	22°18'	+04'	74°	22°35'	+05'	74°	22°51'	+07'	75°	19
20	21°09'	00'	71°	21°28'	+01'	72°	21°46'	+02'	72°	22°05'	+03'	72°	22°23'	+04'	73°	22°40'	+05'	73°	22°58'	+06'	74°	20
21	21°08'	-01'	70°	21°28'	+00'	71°	21°48'	+01'	71°	22°08'	+02'	71°	22°27'	+04'	72°	22°45'	+05'	72°	23°04'	+06'	72°	21
22	21°08'	-01'	69°	21°29'	00'	69°	21°50'	+01'	70°	22°10'	+02'	70°	22°30'	+03'	71°	22°50'	+04'	71°	23°09'	+05'	71°	22
23	21°06'	-02'	68°	21°29'	00'	68°	21°51'	+01'	69°	22°12'	+02'	69°	22°33'	+03'	69°	22°54'	+04'	70°	23°15'	+05'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	18°51'	+08'	92°	18°48'	+09'	93°	18°45'	+10'	93°	18°42'	+11'	93°	18°38'	+12'	94°	18°34'	+13'	94°	18°30'	+14'	94°	0
1	18°59'	+07'	91°	18°57'	+08'	92°	18°55'	+09'	92°	18°53'	+10'	92°	18°50'	+12'	93°	18°47'	+13'	93°	18°44'	+14'	93°	1
2	19°06'	+07'	90°	19°05'	+08'	91°	19°05'	+09'	91°	19°03'	+10'	91°	19°02'	+11'	92°	19°00'	+12'	92°	18°58'	+13'	92°	2
3	19°13'	+06'	89°	19°13'	+08'	90°	19°14'	+09'	90°	19°13'	+10'	90°	19°13'	+11'	91°	19°12'	+12'	91°	19°11'	+13'	91°	3
4	19°19'	+06'	88°	19°21'	+07'	89°	19°22'	+08'	89°	19°23'	+09'	89°	19°24'	+11'	90°	19°24'	+12'	90°	19°24'	+13'	90°	4
5	19°25'	+06'	87°	19°28'	+07'	87°	19°31'	+08'	88°	19°33'	+09'	88°	19°34'	+10'	89°	19°36'	+11'	89°	19°37'	+12'	89°	5
6	19°31'	+05'	86°	19°35'	+06'	86°	19°39'	+08'	87°	19°42'	+09'	87°	19°45'	+10'	88°	19°47'	+11'	88°	19°49'	+12'	88°	6
7	19°36'	+05'	85°	19°41'	+06'	85°	19°46'	+07'	86°	19°50'	+08'	86°	19°54'	+09'	86°	19°58'	+11'	87°	20°01'	+12'	87°	7
8	19°41'	+05'	84°	19°48'	+06'	84°	19°53'	+07'	85°	19°59'	+08'	85°	20°04'	+09'	85°	20°08'	+10'	86°	20°13'	+11'	86°	8
9	19°46'	+04'	83°	19°53'	+05'	83°	20°00'	+06'	84°	20°07'	+08'	84°	20°13'	+09'	84°	20°18'	+10'	85°	20°24'	+11'	85°	9
10	19°50'	+04'	82°	19°59'	+05'	82°	20°07'	+06'	83°	20°14'	+07'	83°	20°21'	+08'	83°	20°28'	+09'	84°	20°35'	+10'	84°	10
11	19°54'	+04'	81°	20°04'	+05'	81°	20°13'	+06'	82°	20°21'	+07'	82°	20°30'	+08'	82°	20°38'	+09'	83°	20°45'	+10'	83°	11
12	19°58'	+03'	80°	20°08'	+04'	80°	20°18'	+05'	80°	20°28'	+06'	81°	20°38'	+08'	81°	20°47'	+09'	82°	20°55'	+10'	82°	12
13	20°01'	+03'	79°	20°13'	+04'	79°	20°24'	+05'	79°	20°35'	+06'	80°	20°45'	+07'	80°	20°55'	+08'	81°	21°05'	+09'	81°	13
14	20°04'	+02'	78°	20°16'	+03'	78°	20°29'	+05'	78°	20°41'	+06'	79°	20°52'	+07'	79°	21°03'	+08'	79°	21°14'	+09'	80°	14
15	20°06'	+02'	77°	20°20'	+03'	77°	20°33'	+04'	77°	20°46'	+05'	78°	20°59'	+06'	78°	21°11'	+07'	78°	21°23'	+09'	79°	15
16	20°08'	+02'	75°	20°23'	+03'	76°	20°37'	+04'	76°	20°52'	+05'	77°	21°05'	+06'	77°	21°19'	+07'	77°	21°32'	+08'	78°	16
17	20°10'	+01'	74°	20°26'	+02'	75°	20°41'	+03'	75°	20°56'	+04'	75°	21°11'	+06'	76°	21°26'	+07'	76°	21°40'	+08'	77°	17
18	20°11'	+01'	73°	20°28'	+02'	74°	20°45'	+03'	74°	21°01'	+04'	74°	21°17'	+05'	75°	21°32'	+06'	75°	21°47'	+07'	76°	18
19	20°12'	+00'	72°	20°30'	+02'	73°	20°47'	+03'	73°	21°05'	+04'	73°	21°22'	+05'	74°	21°38'	+06'	74°	21°55'	+07'	74°	19
20	20°12'	+00'	71°	20°31'	+01'	72°	20°50'	+02'	72°	21°09'	+03'	72°	21°27'	+04'	73°	21°44'	+05'	73°	22°02'	+06'	73°	20
21	20°12'	00'	70°	20°32'	+01'	71°	20°52'	+02'	71°	21°12'	+03'	71°	21°31'	+04'	72°	21°50'	+05'	72°	22°08'	+06'	72°	21
22	20°12'	-01'	69°	20°33'	+00'	69°	20°54'	+01'	70°	21°15'	+02'	70°	21°35'	+03'	71°	21°55'	+05'	71°	22°14'	+06'	71°	22
23	20°11'	-01'	68°	20°33'	00'	68°	20°55'	+01'	69°	21°17'	+02'	69°	21°38'	+03'	69°	21°59'	+04'	70°	22°20'	+05'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	17°52'	+08'	92°	17°49'	+09'	93°	17°46'	+10'	93°	17°43'	+11'	93°	17°39'	+12'	94°	17°36'	+13'	94°	17°31'	+14'	94°	0
1	17°59'	+07'	91°	17°58'	+08'	92°	17°56'	+09'	92°	17°54'	+10'	92°	17°51'	+12'	93°	17°49'	+13'	93°	17°45'	+14'	93°	1
2	18°06'	+07'	90°	18°06'	+08'	91°	18°05'	+09'	91°	18°04'	+10'	91°	18°03'	+11'	91°	18°01'	+12'	92°	17°59'	+13'	92°	2
3	18°13'	+07'	89°	18°14'	+08'	89°	18°14'	+09'	90°	18°14'	+10'	90°	18°14'	+11'	90°	18°13'	+12'	91°	18°12'	+13'	91°	3
4	18°20'	+06'	88°	18°22'	+07'	88°	18°23'	+08'	89°	18°24'	+09'	89°	18°25'	+11'	89°	18°25'	+12'	90°	18°25'	+13'	90°	4
5	18°26'	+06'	87°	18°29'	+07'	87°	18°31'	+08'	88°	18°34'	+09'	88°	18°35'	+10'	88°	18°37'	+11'	89°	18°38'	+12'	89°	5
6	18°32'	+05'	86°	18°36'	+07'	86°	18°39'	+08'	87°	18°43'	+09'	87°	18°46'	+10'	87°	18°48'	+11'	88°	18°51'	+12'	88°	6
7	18°37'	+05'	85°	18°42'	+06'	85°	18°47'	+07'	86°	18°51'	+08'	86°	18°56'	+09'	86°	18°59'	+11'	87°	19°03'	+12'	87°	7
8	18°42'	+05'	84°	18°48'	+06'	84°	18°54'	+07'	85°	19°00'	+08'	85°	19°05'	+09'	85°	19°10'	+10'	86°	19°14'	+11'	86°	8
9	18°47'	+04'	83°	18°54'	+06'	83°	19°01'	+07'	84°	19°08'	+08'	84°	19°14'	+09'	84°	19°20'	+10'	85°	19°26'	+11'	85°	9
10	18°51'	+04'	82°	19°00'	+05'	82°	19°08'	+06'	82°	19°16'	+07'	83°	19°23'	+08'	83°	19°30'	+10'	84°	19°36'	+11'	84°	10
11	18°56'	+04'	81°	19°05'	+05'	81°	19°14'	+06'	81°	19°23'	+07'	82°	19°31'	+08'	82°	19°39'	+09'	82°	19°47'	+10'	83°	11
12	18°59'	+03'	80°	19°10'	+04'	80°	19°20'	+06'	80°	19°30'	+07'	81°	19°39'	+08'	81°	19°49'	+09'	81°	19°57'	+10'	82°	12
13	19°03'	+03'	79°	19°14'	+04'	79°	19°26'	+05'	79°	19°36'	+06'	80°	19°47'	+07'	80°	19°57'	+08'	80°	20°07'	+09'	81°	13
14	19°06'	+03'	78°	19°18'	+04'	78°	19°31'	+05'	78°	19°43'	+06'	79°	19°54'	+07'	79°	20°06'	+08'	79°	20°17'	+09'	80°	14
15	19°08'	+02'	77°	19°22'	+03'	77°	19°35'	+04'	77°	19°49'	+05'	78°	20°01'	+07'	78°	20°14'	+08'	78°	20°26'	+09'	79°	15
16	19°10'	+02'	75°	19°25'	+03'	76°	19°40'	+04'	76°	19°54'	+05'	76°	20°08'	+06'	77°	20°21'	+07'	77°	20°35'	+08'	78°	16
17	19°12'	+02'	74°	19°28'	+03'	75°	19°44'	+04'	75°	19°59'	+05'	75°	20°14'	+06'	76°	20°29'	+07'	76°	20°43'	+08'	76°	17
18	19°14'	+01'	73°	19°31'	+02'	74°	19°48'	+03'	74°	20°04'	+04'	74°	20°20'	+05'	75°	20°36'	+06'	75°	20°51'	+08'	75°	18
19	19°15'	+01'	72°	19°33'	+02'	73°	19°51'	+03'	73°	20°08'	+04'	73°	20°25'	+05'	74°	20°42'	+06'	74°	20°58'	+07'	74°	19
20	19°16'	+00'	71°	19°35'	+01'	72°	19°54'	+03'	72°	20°12'	+04'	72°	20°30'	+05'	73°	20°48'	+06'	73°	21°06'	+07'	73°	20
21	19°16'	+00'	70°	19°36'	+01'	70°	19°56'	+02'	71°	20°16'	+03'	71°	20°35'	+04'	72°	20°54'	+05'	72°	21°12'	+06'	72°	21
22	19°16'	00'	69°	19°37'	+01'	69°	19°58'	+02'	70°	20°19'	+03'	70°	20°39'	+04'	70°	20°59'	+05'	71°	21°19'	+06'	71°	22
23	19°16'	-01'	68°	19°38'	+00'	68°	20°00'	+01'	69°	20°22'	+02'	69°	20°43'	+03'	69°	21°04'	+05'	70°	21°25'	+06'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	16°52'	+07'	92°	16°50'	+09'	92°	16°47'	+10'	93°	16°44'	+11'	93°	16°41'	+12'	93°	16°37'	+13'	94°	16°33'	+14'	94°	0
1	17°00'	+07'	91°	16°58'	+08'	91°	16°57'	+09'	92°	16°55'	+10'	92°	16°53'	+11'	92°	16°50'	+13'	93°	16°47'	+14'	93°	1
2	17°07'	+07'	90°	17°07'	+08'	90°	17°06'	+09'	91°	17°05'	+10'	91°	17°04'	+11'	91°	17°02'	+12'	92°	17°01'	+13'	92°	2
3	17°14'	+07'	89°	17°15'	+08'	89°	17°15'	+09'	90°	17°15'	+10'	90°	17°15'	+11'	90°	17°15'	+12'	91°	17°14'	+13'	91°	3
4	17°20'	+06'	88°	17°22'	+07'	88°	17°24'	+08'	89°	17°25'	+09'	89°	17°26'	+11'	89°	17°27'	+12'	90°	17°27'	+13'	90°	4
5	17°26'	+06'	87°	17°29'	+07'	87°	17°32'	+08'	88°	17°35'	+09'	88°	17°37'	+10'	88°	17°38'	+11'	89°	17°40'	+12'	89°	5
6	17°32'	+06'	86°	17°36'	+07'	86°	17°40'	+08'	87°	17°44'	+09'	87°	17°47'	+10'	87°	17°50'	+11'	87°	17°52'	+12'	88°	6
7	17°38'	+05'	85°	17°43'	+06'	85°	17°48'	+07'	85°	17°53'	+08'	86°	17°57'	+10'	86°	18°01'	+11'	86°	18°04'	+12'	87°	7
8	17°43'	+05'	84°	17°49'	+06'	84°	17°55'	+07'	84°	18°01'	+08'	85°	18°06'	+09'	85°	18°11'	+10'	85°	18°16'	+11'	86°	8
9	17°48'	+05'	83°	17°55'	+06'	83°	18°02'	+07'	83°	18°09'	+08'	84°	18°16'	+09'	84°	18°22'	+10'	84°	18°27'	+11'	85°	9
10	17°53'	+04'	82°	18°01'	+05'	82°	18°09'	+06'	82°	18°17'	+07'	83°	18°24'	+09'	83°	18°32'	+10'	83°	18°38'	+11'	84°	10
11	17°57'	+04'	81°	18°06'	+05'	81°	18°16'	+06'	81°	18°24'	+07'	82°	18°33'	+08'	82°	18°41'	+09'	82°	18°49'	+10'	83°	11
12	18°01'	+04'	80°	18°11'	+05'	80°	18°22'	+06'	80°	18°32'	+07'	81°	18°41'	+08'	81°	18°51'	+09'	81°	18°59'	+10'	82°	12
13	18°04'	+03'	79°	18°16'	+04'	79°	18°27'	+05'	79°	18°38'	+06'	80°	18°49'	+08'	80°	18°59'	+09'	80°	19°10'	+10'	81°	13
14	18°07'	+03'	78°	18°20'	+04'	78°	18°33'	+05'	78°	18°45'	+06'	78°	18°57'	+07'	79°	19°08'	+08'	79°	19°19'	+09'	80°	14
15	18°10'	+03'	76°	18°24'	+04'	77°	18°38'	+05'	77°	18°51'	+06'	77°	19°04'	+07'	78°	19°16'	+08'	78°	19°28'	+09'	78°	15
16	18°13'	+02'	75°	18°28'	+03'	76°	18°42'	+04'	76°	18°57'	+05'	76°	19°11'	+06'	77°	19°24'	+08'	77°	19°37'	+09'	77°	16
17	18°15'	+02'	74°	18°31'	+03'	75°	18°47'	+04'	75°	19°02'	+05'	75°	19°17'	+06'	76°	19°32'	+07'	76°	19°46'	+08'	76°	17
18	18°17'	+01'	73°	18°34'	+03'	74°	18°51'	+04'	74°	19°07'	+05'	74°	19°23'	+06'	75°	19°39'	+07'	75°	19°54'	+08'	75°	18
19	18°18'	+01'	72°	18°36'	+02'	73°	18°54'	+03'	73°	19°12'	+04'	73°	19°29'	+05'	74°	19°46'	+06'	74°	20°02'	+07'	74°	19
20	18°19'	+01'	71°	18°39'	+02'	72°	18°57'	+03'	72°	19°16'	+04'	72°	19°34'	+05'	73°	19°52'	+06'	73°	20°10'	+07'	73°	20
21	18°20'	+00'	70°	18°40'	+01'	70°	19°00'	+03'	71°	19°20'	+04'	71°	19°39'	+05'	71°	19°58'	+06'	72°	20°17'	+07'	72°	21
22	18°21'	+00'	69°	18°42'	+01'	69°	19°03'	+02'	70°	19°23'	+03'	70°	19°44'	+04'	70°	20°04'	+05'	71°	20°23'	+06'	71°	22
23	18°21'	00'	68°	18°43'	+01'	68°	19°05'	+02'	69°	19°27'	+03'	69°	19°48'	+04'	69°	20°09'	+05'	70°	20°30'	+06'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	15°53'	+07'	92°	15°50'	+09'	92°	15°48'	+10'	93°	15°45'	+11'	93°	15°42'	+12'	93°	15°38'	+13'	93°	15°35'	+14'	94°	0
1	16°00'	+07'	91°	15°59'	+08'	91°	15°57'	+09'	92°	15°56'	+10'	92°	15°54'	+11'	92°	15°51'	+13'	92°	15°49'	+14'	93°	1
2	16°07'	+07'	90°	16°07'	+08'	90°	16°07'	+09'	91°	16°06'	+10'	91°	16°05'	+11'	91°	16°04'	+12'	91°	16°02'	+13'	92°	2
3	16°14'	+07'	89°	16°15'	+08'	89°	16°16'	+09'	89°	16°16'	+10'	90°	16°16'	+11'	90°	16°16'	+12'	90°	16°16'	+13'	91°	3
4	16°21'	+06'	88°	16°23'	+07'	88°	16°25'	+08'	88°	16°26'	+10'	89°	16°27'	+11'	89°	16°28'	+12'	89°	16°29'	+13'	90°	4
5	16°27'	+06'	87°	16°30'	+07'	87°	16°33'	+08'	87°	16°36'	+09'	88°	16°38'	+10'	88°	16°40'	+11'	88°	16°41'	+12'	89°	5
6	16°33'	+06'	86°	16°37'	+07'	86°	16°41'	+08'	86°	16°45'	+09'	87°	16°48'	+10'	87°	16°51'	+11'	87°	16°54'	+12'	88°	6
7	16°39'	+05'	85°	16°44'	+06'	85°	16°49'	+07'	85°	16°54'	+09'	86°	16°58'	+10'	86°	17°02'	+11'	86°	17°06'	+12'	87°	7
8	16°44'	+05'	84°	16°50'	+06'	84°	16°56'	+07'	84°	17°02'	+08'	85°	17°08'	+09'	85°	17°13'	+10'	85°	17°18'	+11'	86°	8
9	16°49'	+05'	83°	16°56'	+06'	83°	17°04'	+07'	83°	17°10'	+08'	84°	17°17'	+09'	84°	17°23'	+10'	84°	17°29'	+11'	85°	9
10	16°54'	+04'	82°	17°02'	+05'	82°	17°10'	+07'	82°	17°18'	+08'	83°	17°26'	+09'	83°	17°33'	+10'	83°	17°40'	+11'	83°	10
11	16°58'	+04'	81°	17°08'	+05'	81°	17°17'	+06'	81°	17°26'	+07'	82°	17°35'	+08'	82°	17°43'	+09'	82°	17°51'	+11'	82°	11
12	17°02'	+04'	80°	17°13'	+05'	80°	17°23'	+06'	80°	17°33'	+07'	80°	17°43'	+08'	81°	17°53'	+09'	81°	18°02'	+10'	81°	12
13	17°06'	+03'	79°	17°18'	+05'	79°	17°29'	+06'	79°	17°40'	+07'	79°	17°51'	+08'	80°	18°02'	+09'	80°	18°12'	+10'	80°	13
14	17°09'	+03'	77°	17°22'	+04'	78°	17°35'	+05'	78°	17°47'	+06'	78°	17°59'	+07'	79°	18°10'	+08'	79°	18°22'	+10'	79°	14
15	17°12'	+03'	76°	17°26'	+04'	77°	17°40'	+05'	77°	17°53'	+06'	77°	18°06'	+07'	78°	18°19'	+08'	78°	18°31'	+09'	78°	15
16	17°15'	+02'	75°	17°30'	+04'	76°	17°45'	+05'	76°	17°59'	+06'	76°	18°13'	+07'	77°	18°27'	+08'	77°	18°40'	+09'	77°	16
17	17°18'	+02'	74°	17°34'	+03'	75°	17°49'	+04'	75°	18°05'	+05'	75°	18°20'	+06'	76°	18°35'	+07'	76°	18°49'	+08'	76°	17
18	17°20'	+02'	73°	17°37'	+03'	74°	17°54'	+04'	74°	18°10'	+05'	74°	18°26'	+06'	75°	18°42'	+07'	75°	18°58'	+08'	75°	18
19	17°22'	+01'	72°	17°40'	+03'	73°	17°58'	+04'	73°	18°15'	+05'	73°	18°32'	+06'	73°	18°49'	+07'	74°	19°06'	+08'	74°	19
20	17°23'	+01'	71°	17°42'	+02'	71°	18°01'	+03'	72°	18°20'	+04'	72°	18°38'	+05'	72°	18°56'	+06'	73°	19°14'	+07'	73°	20
21	17°24'	+01'	70°	17°44'	+02'	70°	18°04'	+03'	71°	18°24'	+04'	71°	18°43'	+05'	71°	19°02'	+06'	72°	19°21'	+07'	72°	21
22	17°25'	+00'	69°	17°46'	+02'	69°	18°07'	+03'	70°	18°28'	+04'	70°	18°48'	+05'	70°	19°08'	+06'	71°	19°28'	+07'	71°	22
23	17°25'	+00'	68°	17°48'	+01'	68°	18°10'	+02'	69°	18°32'	+03'	69°	18°53'	+04'	69°	19°14'	+05'	70°	19°35'	+06'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	14°53'	+07'	92°	14°51'	+09'	92°	14°49'	+10'	92°	14°46'	+11'	93°	14°43'	+12'	93°	14°40'	+13'	93°	14°36'	+14'	93°	0
1	15°01'	+07'	91°	15°00'	+08'	91°	14°58'	+09'	91°	14°57'	+10'	92°	14°55'	+11'	92°	14°53'	+12'	92°	14°50'	+14'	92°	1
2	15°08'	+07'	90°	15°08'	+08'	90°	15°08'	+09'	90°	15°07'	+10'	91°	15°06'	+11'	91°	15°05'	+12'	91°	15°04'	+13'	91°	2
3	15°15'	+07'	89°	15°16'	+08'	89°	15°17'	+09'	89°	15°17'	+10'	90°	15°17'	+11'	90°	15°17'	+12'	90°	15°17'	+13'	90°	3
4	15°21'	+06'	88°	15°23'	+07'	88°	15°25'	+08'	88°	15°27'	+10'	89°	15°28'	+11'	89°	15°29'	+12'	89°	15°30'	+13'	89°	4
5	15°27'	+06'	87°	15°31'	+07'	87°	15°34'	+08'	87°	15°36'	+09'	88°	15°39'	+10'	88°	15°41'	+11'	88°	15°43'	+12'	88°	5
6	15°34'	+06'	86°	15°38'	+07'	86°	15°42'	+08'	86°	15°46'	+09'	87°	15°49'	+10'	87°	15°52'	+11'	87°	15°55'	+12'	87°	6
7	15°39'	+05'	85°	15°45'	+07'	85°	15°50'	+08'	85°	15°55'	+09'	86°	15°59'	+10'	86°	16°03'	+11'	86°	16°07'	+12'	86°	7
8	15°45'	+05'	84°	15°51'	+06'	84°	15°57'	+07'	84°	16°03'	+08'	84°	16°09'	+09'	85°	16°14'	+11'	85°	16°19'	+12'	85°	8
9	15°50'	+05'	83°	15°57'	+06'	83°	16°05'	+07'	83°	16°12'	+08'	83°	16°18'	+09'	84°	16°25'	+10'	84°	16°31'	+11'	84°	9
10	15°55'	+05'	82°	16°03'	+06'	82°	16°12'	+07'	82°	16°20'	+08'	82°	16°28'	+09'	83°	16°35'	+10'	83°	16°42'	+11'	83°	10
11	15°59'	+04'	81°	16°09'	+05'	81°	16°18'	+06'	81°	16°28'	+07'	81°	16°36'	+09'	82°	16°45'	+10'	82°	16°53'	+11'	82°	11
12	16°03'	+04'	79°	16°14'	+05'	80°	16°25'	+06'	80°	16°35'	+07'	80°	16°45'	+08'	81°	16°55'	+09'	81°	17°04'	+10'	81°	12
13	16°07'	+04'	78°	16°19'	+05'	79°	16°31'	+06'	79°	16°42'	+07'	79°	16°53'	+08'	80°	17°04'	+09'	80°	17°14'	+10'	80°	13
14	16°11'	+03'	77°	16°24'	+04'	78°	16°37'	+05'	78°	16°49'	+07'	78°	17°01'	+08'	79°	17°13'	+09'	79°	17°24'	+10'	79°	14
15	16°14'	+03'	76°	16°28'	+04'	77°	16°42'	+05'	77°	16°56'	+06'	77°	17°09'	+07'	78°	17°22'	+08'	78°	17°34'	+09'	78°	15
16	16°18'	+03'	75°	16°33'	+04'	76°	16°47'	+05'	76°	17°02'	+06'	76°	17°16'	+07'	76°	17°30'	+08'	77°	17°43'	+09'	77°	16
17	16°20'	+02'	74°	16°36'	+03'	75°	16°52'	+05'	75°	17°08'	+06'	75°	17°23'	+07'	75°	17°38'	+08'	76°	17°52'	+09'	76°	17
18	16°23'	+02'	73°	16°40'	+03'	74°	16°57'	+04'	74°	17°13'	+05'	74°	17°30'	+06'	74°	17°46'	+07'	75°	18°01'	+08'	75°	18
19	16°25'	+02'	72°	16°43'	+03'	72°	17°01'	+04'	73°	17°19'	+05'	73°	17°36'	+06'	73°	17°53'	+07'	74°	18°10'	+08'	74°	19
20	16°27'	+02'	71°	16°46'	+03'	71°	17°05'	+04'	72°	17°24'	+05'	72°	17°42'	+06'	72°	18°00'	+07'	73°	18°18'	+08'	73°	20
21	16°28'	+01'	70°	16°48'	+02'	70°	17°08'	+03'	71°	17°28'	+04'	71°	17°48'	+05'	71°	18°07'	+06'	72°	18°25'	+07'	72°	21
22	16°29'	+01'	69°	16°51'	+02'	69°	17°12'	+03'	70°	17°32'	+04'	70°	17°53'	+05'	70°	18°13'	+06'	71°	18°33'	+07'	71°	22
23	16°30'	+01'	68°	16°53'	+02'	68°	17°15'	+03'	69°	17°36'	+04'	69°	17°58'	+05'	69°	18°19'	+06'	69°	18°40'	+07'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°54'	+07'	92°	13°52'	+08'	92°	13°49'	+10'	92°	13°47'	+11'	92°	13°44'	+12'	93°	13°41'	+13'	93°	13°38'	+14'	93°	0
1	14°01'	+07'	91°	14°00'	+08'	91°	13°59'	+09'	91°	13°58'	+10'	91°	13°56'	+11'	92°	13°54'	+12'	92°	13°52'	+14'	92°	1
2	14°08'	+07'	90°	14°08'	+08'	90°	14°08'	+09'	90°	14°08'	+10'	90°	14°07'	+11'	91°	14°06'	+12'	91°	14°05'	+13'	91°	2
3	14°15'	+07'	89°	14°16'	+08'	89°	14°17'	+09'	89°	14°18'	+10'	89°	14°18'	+11'	90°	14°19'	+12'	90°	14°19'	+13'	90°	3
4	14°22'	+06'	88°	14°24'	+07'	88°	14°26'	+09'	88°	14°28'	+10'	88°	14°29'	+11'	89°	14°31'	+12'	89°	14°32'	+13'	89°	4
5	14°28'	+06'	87°	14°31'	+07'	87°	14°35'	+08'	87°	14°37'	+09'	87°	14°40'	+10'	88°	14°42'	+11'	88°	14°44'	+12'	88°	5
6	14°34'	+06'	86°	14°39'	+07'	86°	14°43'	+08'	86°	14°47'	+09'	86°	14°50'	+10'	87°	14°54'	+11'	87°	14°57'	+12'	87°	6
7	14°40'	+06'	85°	14°46'	+07'	85°	14°51'	+08'	85°	14°56'	+09'	85°	15°01'	+10'	86°	15°05'	+11'	86°	15°09'	+12'	86°	7
8	14°46'	+05'	84°	14°52'	+06'	84°	14°58'	+07'	84°	15°05'	+08'	84°	15°10'	+10'	85°	15°16'	+11'	85°	15°21'	+12'	85°	8
9	14°51'	+05'	83°	14°58'	+06'	83°	15°06'	+07'	83°	15°13'	+08'	83°	15°20'	+09'	84°	15°26'	+10'	84°	15°33'	+11'	84°	9
10	14°56'	+05'	81°	15°05'	+06'	82°	15°13'	+07'	82°	15°21'	+08'	82°	15°29'	+09'	83°	15°37'	+10'	83°	15°44'	+11'	83°	10
11	15°01'	+04'	80°	15°10'	+06'	81°	15°20'	+07'	81°	15°29'	+08'	81°	15°38'	+09'	82°	15°47'	+10'	82°	15°55'	+11'	82°	11
12	15°05'	+04'	79°	15°16'	+05'	80°	15°26'	+06'	80°	15°37'	+07'	80°	15°47'	+08'	80°	15°57'	+09'	81°	16°06'	+11'	81°	12
13	15°09'	+04'	78°	15°21'	+05'	79°	15°33'	+06'	79°	15°44'	+07'	79°	15°55'	+08'	79°	16°06'	+09'	80°	16°17'	+10'	80°	13
14	15°13'	+04'	77°	15°26'	+05'	78°	15°39'	+06'	78°	15°51'	+07'	78°	16°03'	+08'	78°	16°15'	+09'	79°	16°27'	+10'	79°	14
15	15°17'	+03'	76°	15°31'	+04'	77°	15°44'	+05'	77°	15°58'	+06'	77°	16°11'	+08'	77°	16°24'	+09'	78°	16°37'	+10'	78°	15
16	15°20'	+03'	75°	15°35'	+04'	76°	15°50'	+05'	76°	16°04'	+06'	76°	16°19'	+07'	76°	16°33'	+08'	77°	16°46'	+09'	77°	16
17	15°23'	+03'	74°	15°39'	+04'	75°	15°55'	+05'	75°	16°11'	+06'	75°	16°26'	+07'	75°	16°41'	+08'	76°	16°56'	+09'	76°	17
18	15°26'	+02'	73°	15°43'	+03'	73°	16°00'	+05'	74°	16°16'	+06'	74°	16°33'	+07'	74°	16°49'	+08'	75°	17°05'	+09'	75°	18
19	15°28'	+02'	72°	15°46'	+03'	72°	16°04'	+04'	73°	16°22'	+05'	73°	16°39'	+06'	73°	16°57'	+07'	74°	17°13'	+08'	74°	19
20	15°30'	+02'	71°	15°50'	+03'	71°	16°09'	+04'	72°	16°27'	+05'	72°	16°46'	+06'	72°	17°04'	+07'	73°	17°22'	+08'	73°	20
21	15°32'	+02'	70°	15°52'	+03'	70°	16°13'	+04'	71°	16°32'	+05'	71°	16°52'	+06'	71°	17°11'	+07'	71°	17°30'	+08'	72°	21
22	15°34'	+01'	69°	15°55'	+02'	69°	16°16'	+03'	70°	16°37'	+04'	70°	16°57'	+05'	70°	17°18'	+06'	70°	17°38'	+07'	71°	22
23	15°35'	+01'	68°	15°57'	+02'	68°	16°19'	+03'	69°	16°41'	+04'	69°	17°03'	+05'	69°	17°24'	+06'	69°	17°45'	+07'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	12°54'	+07'	92°	12°52'	+08'	92°	12°50'	+10'	92°	12°48'	+11'	92°	12°45'	+12'	93°	12°43'	+13'	93°	12°40'	+14'	93°	0
1	13°01'	+07'	91°	13°01'	+08'	91°	13°00'	+09'	91°	12°59'	+10'	91°	12°57'	+11'	92°	12°55'	+12'	92°	12°53'	+13'	92°	1
2	13°09'	+07'	90°	13°09'	+08'	90°	13°09'	+09'	90°	13°09'	+10'	90°	13°08'	+11'	91°	13°08'	+12'	91°	13°07'	+13'	91°	2
3	13°16'	+07'	89°	13°17'	+08'	89°	13°18'	+09'	89°	13°19'	+10'	89°	13°20'	+11'	89°	13°20'	+12'	90°	13°20'	+13'	90°	3
4	13°22'	+06'	88°	13°25'	+07'	88°	13°27'	+09'	88°	13°29'	+10'	88°	13°31'	+11'	88°	13°32'	+12'	89°	13°33'	+13'	89°	4
5	13°29'	+06'	87°	13°32'	+07'	87°	13°35'	+08'	87°	13°38'	+09'	87°	13°41'	+10'	87°	13°44'	+11'	88°	13°46'	+13'	88°	5
6	13°35'	+06'	85°	13°39'	+07'	86°	13°44'	+08'	86°	13°48'	+09'	86°	13°52'	+10'	86°	13°55'	+11'	87°	13°59'	+12'	87°	6
7	13°41'	+06'	84°	13°46'	+07'	85°	13°52'	+08'	85°	13°57'	+09'	85°	14°02'	+10'	85°	14°06'	+11'	86°	14°11'	+12'	86°	7
8	13°46'	+05'	83°	13°53'	+06'	84°	14°00'	+08'	84°	14°06'	+09'	84°	14°12'	+10'	84°	14°17'	+11'	85°	14°23'	+12'	85°	8
9	13°52'	+05'	82°	14°00'	+06'	83°	14°07'	+07'	83°	14°14'	+08'	83°	14°21'	+09'	83°	14°28'	+10'	84°	14°35'	+12'	84°	9
10	13°57'	+05'	81°	14°06'	+06'	82°	14°14'	+07'	82°	14°23'	+08'	82°	14°31'	+09'	82°	14°39'	+10'	83°	14°46'	+11'	83°	10
11	14°02'	+05'	80°	14°12'	+06'	81°	14°21'	+07'	81°	14°31'	+08'	81°	14°40'	+09'	81°	14°49'	+10'	82°	14°57'	+11'	82°	11
12	14°06'	+04'	79°	14°17'	+05'	80°	14°28'	+06'	80°	14°39'	+08'	80°	14°49'	+09'	80°	14°59'	+10'	81°	15°08'	+11'	81°	12
13	14°11'	+04'	78°	14°23'	+05'	79°	14°35'	+06'	79°	14°46'	+07'	79°	14°57'	+08'	79°	15°08'	+09'	80°	15°19'	+10'	80°	13
14	14°15'	+04'	77°	14°28'	+05'	78°	14°41'	+06'	78°	14°53'	+07'	78°	15°06'	+08'	78°	15°18'	+09'	79°	15°29'	+10'	79°	14
15	14°19'	+04'	76°	14°33'	+05'	76°	14°47'	+06'	77°	15°00'	+07'	77°	15°14'	+08'	77°	15°27'	+09'	78°	15°40'	+10'	78°	15
16	14°22'	+03'	75°	14°38'	+04'	75°	14°52'	+05'	76°	15°07'	+06'	76°	15°22'	+07'	76°	15°36'	+09'	77°	15°49'	+10'	77°	16
17	14°26'	+03'	74°	14°42'	+04'	74°	14°58'	+05'	75°	15°14'	+06'	75°	15°29'	+07'	75°	15°44'	+08'	75°	15°59'	+09'	76°	17
18	14°29'	+03'	73°	14°46'	+04'	73°	15°03'	+05'	74°	15°20'	+06'	74°	15°36'	+07'	74°	15°52'	+08'	74°	16°08'	+09'	75°	18
19	14°31'	+03'	72°	14°50'	+04'	72°	15°08'	+05'	73°	15°26'	+06'	73°	15°43'	+07'	73°	16°00'	+08'	73°	16°17'	+09'	74°	19
20	14°34'	+02'	71°	14°53'	+03'	71°	15°12'	+04'	72°	15°31'	+05'	72°	15°50'	+06'	72°	16°08'	+07'	72°	16°26'	+08'	73°	20
21	14°36'	+02'	70°	14°57'	+03'	70°	15°17'	+04'	71°	15°36'	+05'	71°	15°56'	+06'	71°	16°15'	+07'	71°	16°34'	+08'	72°	21
22	14°38'	+02'	69°	14°59'	+03'	69°	15°21'	+04'	70°	15°41'	+05'	70°	16°02'	+06'	70°	16°22'	+07'	70°	16°42'	+08'	71°	22
23	14°40'	+01'	68°	15°02'	+02'	68°	15°24'	+03'	68°	15°46'	+04'	69°	16°08'	+05'	69°	16°29'	+06'	69°	16°50'	+07'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°55'	+07'	91°	11°53'	+08'	92°	11°51'	+09'	92°	11°49'	+11'	92°	11°47'	+12'	92°	11°44'	+13'	93°	11°41'	+14'	93°	0
1	12°02'	+07'	90°	12°01'	+08'	91°	12°00'	+09'	91°	11°59'	+10'	91°	11°58'	+11'	91°	11°57'	+12'	92°	11°55'	+13'	92°	1
2	12°09'	+07'	89°	12°10'	+08'	90°	12°10'	+09'	90°	12°10'	+10'	90°	12°10'	+11'	90°	12°09'	+12'	91°	12°08'	+13'	91°	2
3	12°16'	+07'	88°	12°18'	+08'	89°	12°19'	+09'	89°	12°20'	+10'	89°	12°21'	+11'	89°	12°21'	+12'	90°	12°22'	+13'	90°	3
4	12°23'	+06'	87°	12°25'	+08'	88°	12°28'	+09'	88°	12°30'	+10'	88°	12°32'	+11'	88°	12°33'	+12'	89°	12°35'	+13'	89°	4
5	12°29'	+06'	86°	12°33'	+07'	87°	12°36'	+08'	87°	12°39'	+09'	87°	12°42'	+10'	87°	12°45'	+12'	88°	12°48'	+13'	88°	5
6	12°35'	+06'	85°	12°40'	+07'	86°	12°45'	+08'	86°	12°49'	+09'	86°	12°53'	+10'	86°	12°57'	+11'	87°	13°00'	+12'	87°	6
7	12°41'	+06'	84°	12°47'	+07'	85°	12°53'	+08'	85°	12°58'	+09'	85°	13°03'	+10'	85°	13°08'	+11'	86°	13°12'	+12'	86°	7
8	12°47'	+06'	83°	12°54'	+07'	84°	13°01'	+08'	84°	13°07'	+09'	84°	13°13'	+10'	84°	13°19'	+11'	84°	13°25'	+12'	85°	8
9	12°53'	+05'	82°	13°01'	+06'	83°	13°08'	+07'	83°	13°16'	+08'	83°	13°23'	+10'	83°	13°30'	+11'	83°	13°36'	+12'	84°	9
10	12°58'	+05'	81°	13°07'	+06'	82°	13°16'	+07'	82°	13°24'	+08'	82°	13°32'	+09'	82°	13°40'	+10'	82°	13°48'	+11'	83°	10
11	13°03'	+05'	80°	13°13'	+06'	81°	13°23'	+07'	81°	13°32'	+08'	81°	13°42'	+09'	81°	13°51'	+10'	81°	14°00'	+11'	82°	11
12	13°08'	+05'	79°	13°19'	+06'	79°	13°30'	+07'	80°	13°40'	+08'	80°	13°51'	+09'	80°	14°01'	+10'	80°	14°11'	+11'	81°	12
13	13°12'	+04'	78°	13°25'	+05'	78°	13°36'	+06'	79°	13°48'	+07'	79°	14°00'	+09'	79°	14°11'	+10'	79°	14°22'	+11'	80°	13
14	13°17'	+04'	77°	13°30'	+05'	77°	13°43'	+06'	78°	13°56'	+07'	78°	14°08'	+08'	78°	14°20'	+09'	78°	14°32'	+10'	79°	14
15	13°21'	+04'	76°	13°35'	+05'	76°	13°49'	+06'	77°	14°03'	+07'	77°	14°16'	+08'	77°	14°30'	+09'	77°	14°43'	+10'	78°	15
16	13°25'	+04'	75°	13°40'	+05'	75°	13°55'	+06'	76°	14°10'	+07'	76°	14°24'	+08'	76°	14°39'	+09'	76°	14°53'	+10'	77°	16
17	13°28'	+03'	74°	13°45'	+04'	74°	14°01'	+05'	75°	14°16'	+06'	75°	14°32'	+07'	75°	14°47'	+09'	75°	15°02'	+10'	76°	17
18	13°32'	+03'	73°	13°49'	+04'	73°	14°06'	+05'	74°	14°23'	+06'	74°	14°40'	+07'	74°	14°56'	+08'	74°	15°12'	+09'	75°	18
19	13°35'	+03'	72°	13°53'	+04'	72°	14°11'	+05'	73°	14°29'	+06'	73°	14°47'	+07'	73°	15°04'	+08'	73°	15°21'	+09'	74°	19
20	13°38'	+03'	71°	13°57'	+04'	71°	14°16'	+05'	72°	14°35'	+06'	72°	14°54'	+07'	72°	15°12'	+08'	72°	15°30'	+09'	73°	20
21	13°40'	+02'	70°	14°01'	+03'	70°	14°21'	+04'	70°	14°41'	+05'	71°	15°00'	+06'	71°	15°20'	+07'	71°	15°39'	+08'	72°	21
22	13°43'	+02'	69°	14°04'	+03'	69°	14°25'	+04'	69°	14°46'	+05'	70°	15°07'	+06'	70°	15°27'	+07'	70°	15°47'	+08'	70°	22
23	13°45'	+02'	68°	14°07'	+03'	68°	14°29'	+04'	68°	14°51'	+05'	69°	15°13'	+06'	69°	15°34'	+07'	69°	15°55'	+08'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°55'	+07'	91°	10°53'	+08'	92°	10°52'	+09'	92°	10°50'	+11'	92°	10°48'	+12'	92°	10°45'	+13'	92°	10°43'	+14'	93°	0
1	11°02'	+07'	90°	11°02'	+08'	91°	11°01'	+09'	91°	11°00'	+10'	91°	10°59'	+11'	91°	10°58'	+12'	91°	10°57'	+13'	92°	1
2	11°10'	+07'	89°	11°10'	+08'	90°	11°10'	+09'	90°	11°11'	+10'	90°	11°11'	+11'	90°	11°10'	+12'	90°	11°10'	+13'	91°	2
3	11°16'	+07'	88°	11°18'	+08'	89°	11°20'	+09'	89°	11°21'	+10'	89°	11°22'	+11'	89°	11°23'	+12'	89°	11°23'	+13'	90°	3
4	11°23'	+07'	87°	11°26'	+08'	88°	11°28'	+09'	88°	11°31'	+10'	88°	11°33'	+11'	88°	11°35'	+12'	88°	11°36'	+13'	89°	4
5	11°30'	+06'	86°	11°33'	+07'	86°	11°37'	+08'	87°	11°40'	+09'	87°	11°44'	+11'	87°	11°46'	+12'	87°	11°49'	+13'	88°	5
6	11°36'	+06'	85°	11°41'	+07'	85°	11°45'	+08'	86°	11°50'	+09'	86°	11°54'	+10'	86°	11°58'	+11'	86°	12°02'	+12'	87°	6
7	11°42'	+06'	84°	11°48'	+07'	84°	11°54'	+08'	85°	11°59'	+09'	85°	12°04'	+10'	85°	12°09'	+11'	85°	12°14'	+12'	86°	7
8	11°48'	+06'	83°	11°55'	+07'	83°	12°02'	+08'	84°	12°08'	+09'	84°	12°15'	+10'	84°	12°21'	+11'	84°	12°26'	+12'	85°	8
9	11°54'	+05'	82°	12°02'	+07'	82°	12°09'	+08'	83°	12°17'	+09'	83°	12°24'	+10'	83°	12°32'	+11'	83°	12°38'	+12'	84°	9
10	11°59'	+05'	81°	12°08'	+06'	81°	12°17'	+07'	82°	12°26'	+08'	82°	12°34'	+09'	82°	12°42'	+10'	82°	12°50'	+12'	83°	10
11	12°04'	+05'	80°	12°15'	+06'	80°	12°24'	+07'	81°	12°34'	+08'	81°	12°43'	+09'	81°	12°53'	+10'	81°	13°02'	+11'	82°	11
12	12°09'	+05'	79°	12°21'	+06'	79°	12°32'	+07'	80°	12°42'	+08'	80°	12°53'	+09'	80°	13°03'	+10'	80°	13°13'	+11'	81°	12
13	12°14'	+05'	78°	12°26'	+06'	78°	12°38'	+07'	79°	12°50'	+08'	79°	13°02'	+09'	79°	13°13'	+10'	79°	13°24'	+11'	79°	13
14	12°19'	+04'	77°	12°32'	+05'	77°	12°45'	+06'	78°	12°58'	+07'	78°	13°10'	+08'	78°	13°23'	+10'	78°	13°35'	+11'	78°	14
15	12°23'	+04'	76°	12°37'	+05'	76°	12°51'	+06'	77°	13°05'	+07'	77°	13°19'	+08'	77°	13°32'	+09'	77°	13°45'	+10'	77°	15
16	12°27'	+04'	75°	12°43'	+05'	75°	12°58'	+06'	76°	13°13'	+07'	76°	13°27'	+08'	76°	13°42'	+09'	76°	13°56'	+10'	76°	16
17	12°31'	+04'	74°	12°47'	+05'	74°	13°04'	+06'	75°	13°19'	+07'	75°	13°35'	+08'	75°	13°51'	+09'	75°	14°06'	+10'	75°	17
18	12°35'	+03'	73°	12°52'	+04'	73°	13°09'	+05'	73°	13°26'	+06'	74°	13°43'	+08'	74°	13°59'	+09'	74°	14°16'	+10'	74°	18
19	12°38'	+03'	72°	12°57'	+04'	72°	13°15'	+05'	72°	13°33'	+06'	73°	13°50'	+07'	73°	14°08'	+08'	73°	14°25'	+09'	73°	19
20	12°41'	+03'	71°	13°01'	+04'	71°	13°20'	+05'	71°	13°39'	+06'	72°	13°58'	+07'	72°	14°16'	+08'	72°	14°34'	+09'	72°	20
21	12°44'	+03'	70°	13°05'	+04'	70°	13°25'	+05'	70°	13°45'	+06'	71°	14°05'	+07'	71°	14°24'	+08'	71°	14°44'	+09'	71°	21
22	12°47'	+02'	69°	13°08'	+03'	69°	13°30'	+04'	69°	13°51'	+05'	70°	14°11'	+06'	70°	14°32'	+07'	70°	14°52'	+08'	70°	22
23	12°49'	+02'	68°	13°12'	+03'	68°	13°34'	+04'	68°	13°56'	+05'	69°	14°18'	+06'	69°	14°39'	+07'	69°	15°01'	+08'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	9°55'	+07'	91°	9°54'	+08'	91°	9°53'	+09'	92°	9°51'	+10'	92°	9°49'	+12'	92°	9°47'	+13'	92°	9°44'	+14'	92°	0
1	10°03'	+07'	90°	10°02'	+08'	90°	10°02'	+09'	91°	10°01'	+10'	91°	10°00'	+11'	91°	9°59'	+12'	91°	9°58'	+13'	91°	1
2	10°10'	+07'	89°	10°11'	+08'	89°	10°11'	+09'	90°	10°12'	+10'	90°	10°12'	+11'	90°	10°12'	+12'	90°	10°12'	+13'	90°	2
3	10°17'	+07'	88°	10°19'	+08'	88°	10°20'	+09'	89°	10°22'	+10'	89°	10°23'	+11'	89°	10°24'	+12'	89°	10°25'	+13'	89°	3
4	10°24'	+07'	87°	10°27'	+08'	87°	10°29'	+09'	88°	10°32'	+10'	88°	10°34'	+11'	88°	10°36'	+12'	88°	10°38'	+13'	88°	4
5	10°30'	+06'	86°	10°34'	+07'	86°	10°38'	+09'	87°	10°41'	+10'	87°	10°45'	+11'	87°	10°48'	+12'	87°	10°51'	+13'	87°	5
6	10°37'	+06'	85°	10°42'	+07'	85°	10°46'	+08'	86°	10°51'	+09'	86°	10°55'	+10'	86°	10°59'	+11'	86°	11°03'	+12'	86°	6
7	10°43'	+06'	84°	10°49'	+07'	84°	10°55'	+08'	85°	11°00'	+09'	85°	11°06'	+10'	85°	11°11'	+11'	85°	11°16'	+12'	85°	7
8	10°49'	+06'	83°	10°56'	+07'	83°	11°03'	+08'	84°	11°09'	+09'	84°	11°16'	+10'	84°	11°22'	+11'	84°	11°28'	+12'	84°	8
9	10°55'	+06'	82°	11°03'	+07'	82°	11°11'	+08'	83°	11°18'	+09'	83°	11°26'	+10'	83°	11°33'	+11'	83°	11°40'	+12'	83°	9
10	11°00'	+05'	81°	11°09'	+06'	81°	11°18'	+08'	82°	11°27'	+09'	82°	11°36'	+10'	82°	11°44'	+11'	82°	11°52'	+12'	82°	10
11	11°06'	+05'	80°	11°16'	+06'	80°	11°26'	+07'	80°	11°36'	+08'	81°	11°45'	+09'	81°	11°55'	+10'	81°	12°04'	+11'	81°	11
12	11°11'	+05'	79°	11°22'	+06'	79°	11°33'	+07'	79°	11°44'	+08'	80°	11°55'	+09'	80°	12°05'	+10'	80°	12°15'	+11'	80°	12
13	11°16'	+05'	78°	11°28'	+06'	78°	11°40'	+07'	78°	11°52'	+08'	79°	12°04'	+09'	79°	12°15'	+10'	79°	12°27'	+11'	79°	13
14	11°21'	+05'	77°	11°34'	+06'	77°	11°47'	+07'	77°	12°00'	+08'	78°	12°13'	+09'	78°	12°25'	+10'	78°	12°38'	+11'	78°	14
15	11°25'	+04'	76°	11°40'	+05'	76°	11°54'	+06'	76°	12°08'	+07'	77°	12°22'	+08'	77°	12°35'	+10'	77°	12°48'	+11'	77°	15
16	11°30'	+04'	75°	11°45'	+05'	75°	12°00'	+06'	75°	12°15'	+07'	76°	12°30'	+08'	76°	12°45'	+09'	76°	12°59'	+10'	76°	16
17	11°34'	+04'	74°	11°50'	+05'	74°	12°06'	+06'	74°	12°22'	+07'	75°	12°38'	+08'	75°	12°54'	+09'	75°	13°09'	+10'	75°	17
18	11°38'	+04'	73°	11°55'	+05'	73°	12°12'	+06'	73°	12°30'	+07'	74°	12°46'	+08'	74°	13°03'	+09'	74°	13°19'	+10'	74°	18
19	11°41'	+04'	72°	12°00'	+05'	72°	12°18'	+06'	72°	12°36'	+07'	73°	12°54'	+08'	73°	13°12'	+09'	73°	13°29'	+10'	73°	19
20	11°45'	+03'	71°	12°04'	+04'	71°	12°24'	+05'	71°	12°43'	+06'	72°	13°02'	+07'	72°	13°20'	+08'	72°	13°39'	+09'	72°	20
21	11°48'	+03'	70°	12°09'	+04'	70°	12°29'	+05'	70°	12°49'	+06'	71°	13°09'	+07'	71°	13°29'	+08'	71°	13°48'	+09'	71°	21
22	11°51'	+03'	69°	12°13'	+04'	69°	12°34'	+05'	69°	12°55'	+06'	70°	13°16'	+07'	70°	13°37'	+08'	70°	13°57'	+09'	70°	22
23	11°54'	+03'	68°	12°17'	+04'	68°	12°39'	+05'	68°	13°01'	+06'	69°	13°23'	+07'	69°	13°45'	+08'	69°	14°06'	+09'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	8°56'	+07'	91°	8°55'	+08'	91°	8°53'	+09'	91°	8°52'	+10'	92°	8°50'	+12'	92°	8°48'	+13'	92°	8°46'	+14'	92°	0
1	9°03'	+07'	90°	9°03'	+08'	90°	9°03'	+09'	90°	9°02'	+10'	91°	9°02'	+11'	91°	9°01'	+12'	91°	9°00'	+13'	91°	1
2	9°10'	+07'	89°	9°11'	+08'	89°	9°12'	+09'	89°	9°12'	+10'	90°	9°13'	+11'	90°	9°13'	+12'	90°	9°13'	+13'	90°	2
3	9°17'	+07'	88°	9°19'	+08'	88°	9°21'	+09'	88°	9°23'	+10'	89°	9°24'	+11'	89°	9°25'	+12'	89°	9°26'	+13'	89°	3
4	9°24'	+07'	87°	9°27'	+08'	87°	9°30'	+09'	87°	9°33'	+10'	88°	9°35'	+11'	88°	9°37'	+12'	88°	9°39'	+13'	88°	4
5	9°31'	+06'	86°	9°35'	+08'	86°	9°39'	+09'	86°	9°42'	+10'	87°	9°46'	+11'	87°	9°49'	+12'	87°	9°52'	+13'	87°	5
6	9°37'	+06'	85°	9°42'	+07'	85°	9°47'	+08'	85°	9°52'	+09'	86°	9°57'	+10'	86°	10°01'	+12'	86°	10°05'	+13'	86°	6
7	9°44'	+06'	84°	9°50'	+07'	84°	9°56'	+08'	84°	10°01'	+09'	85°	10°07'	+10'	85°	10°12'	+11'	85°	10°18'	+12'	85°	7
8	9°50'	+06'	83°	9°57'	+07'	83°	10°04'	+08'	83°	10°11'	+09'	84°	10°17'	+10'	84°	10°24'	+11'	84°	10°30'	+12'	84°	8
9	9°56'	+06'	82°	10°04'	+07'	82°	10°12'	+08'	82°	10°20'	+09'	83°	10°27'	+10'	83°	10°35'	+11'	83°	10°42'	+12'	83°	9
10	10°01'	+06'	81°	10°11'	+07'	81°	10°20'	+08'	81°	10°29'	+09'	82°	10°37'	+10'	82°	10°46'	+11'	82°	10°54'	+12'	82°	10
11	10°07'	+05'	80°	10°17'	+06'	80°	10°27'	+07'	80°	10°37'	+09'	81°	10°47'	+10'	81°	10°57'	+11'	81°	11°06'	+12'	81°	11
12	10°12'	+05'	79°	10°24'	+06'	79°	10°35'	+07'	79°	10°46'	+08'	80°	10°57'	+09'	80°	11°07'	+10'	80°	11°18'	+11'	80°	12
13	10°18'	+05'	78°	10°30'	+06'	78°	10°42'	+07'	78°	10°54'	+08'	79°	11°06'	+09'	79°	11°18'	+10'	79°	11°29'	+11'	79°	13
14	10°23'	+05'	77°	10°36'	+06'	77°	10°49'	+07'	77°	11°02'	+08'	78°	11°15'	+09'	78°	11°28'	+10'	78°	11°40'	+11'	78°	14
15	10°27'	+05'	76°	10°42'	+06'	76°	10°56'	+07'	76°	11°10'	+08'	77°	11°24'	+09'	77°	11°38'	+10'	77°	11°51'	+11'	77°	15
16	10°32'	+04'	75°	10°48'	+05'	75°	11°03'	+06'	75°	11°18'	+08'	76°	11°33'	+09'	76°	11°48'	+10'	76°	12°02'	+11'	76°	16
17	10°37'	+04'	74°	10°53'	+05'	74°	11°09'	+06'	74°	11°26'	+07'	74°	11°41'	+08'	75°	11°57'	+09'	75°	12°13'	+10'	75°	17
18	10°41'	+04'	73°	10°58'	+05'	73°	11°16'	+06'	73°	11°33'	+07'	73°	11°50'	+08'	74°	12°07'	+09'	74°	12°23'	+10'	74°	18
19	10°45'	+04'	72°	11°03'	+05'	72°	11°22'	+06'	72°	11°40'	+07'	72°	11°58'	+08'	73°	12°16'	+09'	73°	12°33'	+10'	73°	19
20	10°49'	+04'	71°	11°08'	+05'	71°	11°28'	+06'	71°	11°47'	+07'	71°	12°06'	+08'	72°	12°25'	+09'	72°	12°43'	+10'	72°	20
21	10°52'	+03'	70°	11°13'	+04'	70°	11°33'	+05'	70°	11°53'	+06'	70°	12°13'	+07'	71°	12°33'	+08'	71°	12°53'	+09'	71°	21
22	10°56'	+03'	69°	11°17'	+04'	69°	11°39'	+05'	69°	12°00'	+06'	69°	12°21'	+07'	70°	12°42'	+08'	70°	13°02'	+09'	70°	22
23	10°59'	+03'	68°	11°22'	+04'	68°	11°44'	+05'	68°	12°06'	+06'	68°	12°28'	+07'	69°	12°50'	+08'	69°	13°11'	+09'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	7°56'	+07'	91°	7°55'	+08'	91°	7°54'	+09'	91°	7°53'	+10'	91°	7°51'	+11'	92°	7°49'	+13'	92°	7°48'	+14'	92°	0
1	8°04'	+07'	90°	8°04'	+08'	90°	8°03'	+09'	90°	8°03'	+10'	90°	8°03'	+11'	91°	8°02'	+12'	91°	8°01'	+13'	91°	1
2	8°11'	+07'	89°	8°12'	+08'	89°	8°13'	+09'	89°	8°13'	+10'	89°	8°14'	+11'	90°	8°14'	+12'	90°	8°15'	+13'	90°	2
3	8°18'	+07'	88°	8°20'	+08'	88°	8°22'	+09'	88°	8°24'	+10'	88°	8°25'	+11'	89°	8°27'	+12'	89°	8°28'	+13'	89°	3
4	8°25'	+07'	87°	8°28'	+08'	87°	8°31'	+09'	87°	8°34'	+10'	87°	8°36'	+11'	88°	8°39'	+12'	88°	8°41'	+13'	88°	4
5	8°31'	+07'	86°	8°36'	+08'	86°	8°40'	+09'	86°	8°43'	+10'	86°	8°47'	+11'	87°	8°51'	+12'	87°	8°54'	+13'	87°	5
6	8°38'	+06'	85°	8°43'	+07'	85°	8°48'	+08'	85°	8°53'	+10'	85°	8°58'	+11'	86°	9°02'	+12'	86°	9°07'	+13'	86°	6
7	8°44'	+06'	84°	8°51'	+07'	84°	8°57'	+08'	84°	9°03'	+09'	84°	9°08'	+10'	85°	9°14'	+11'	85°	9°19'	+12'	85°	7
8	8°51'	+06'	83°	8°58'	+07'	83°	9°05'	+08'	83°	9°12'	+09'	83°	9°19'	+10'	84°	9°25'	+11'	84°	9°32'	+12'	84°	8
9	8°57'	+06'	82°	9°05'	+07'	82°	9°13'	+08'	82°	9°21'	+09'	82°	9°29'	+10'	83°	9°37'	+11'	83°	9°44'	+12'	83°	9
10	9°03'	+06'	81°	9°12'	+07'	81°	9°21'	+08'	81°	9°30'	+09'	81°	9°39'	+10'	82°	9°48'	+11'	82°	9°56'	+12'	82°	10
11	9°08'	+06'	80°	9°19'	+07'	80°	9°29'	+08'	80°	9°39'	+09'	80°	9°49'	+10'	81°	9°59'	+11'	81°	10°08'	+12'	81°	11
12	9°14'	+05'	79°	9°25'	+06'	79°	9°37'	+07'	79°	9°48'	+09'	79°	9°59'	+10'	80°	10°10'	+11'	80°	10°20'	+12'	80°	12
13	9°19'	+05'	78°	9°32'	+06'	78°	9°44'	+07'	78°	9°56'	+08'	78°	10°08'	+09'	79°	10°20'	+10'	79°	10°32'	+11'	79°	13
14	9°25'	+05'	77°	9°38'	+06'	77°	9°52'	+07'	77°	10°05'	+08'	77°	10°18'	+09'	78°	10°31'	+10'	78°	10°43'	+11'	78°	14
15	9°30'	+05'	76°	9°44'	+06'	76°	9°59'	+07'	76°	10°13'	+08'	76°	10°27'	+09'	77°	10°41'	+10'	77°	10°54'	+11'	77°	15
16	9°35'	+05'	75°	9°50'	+06'	75°	10°06'	+07'	75°	10°21'	+08'	75°	10°36'	+09'	76°	10°51'	+10'	76°	11°05'	+11'	76°	16
17	9°39'	+05'	74°	9°56'	+06'	74°	10°12'	+07'	74°	10°29'	+08'	74°	10°45'	+09'	75°	11°01'	+10'	75°	11°16'	+11'	75°	17
18	9°44'	+04'	73°	10°02'	+05'	73°	10°19'	+06'	73°	10°36'	+07'	73°	10°53'	+08'	74°	11°10'	+09'	74°	11°27'	+10'	74°	18
19	9°48'	+04'	72°	10°07'	+05'	72°	10°25'	+06'	72°	10°44'	+07'	72°	11°02'	+08'	73°	11°20'	+09'	73°	11°37'	+10'	73°	19
20	9°52'	+04'	71°	10°12'	+05'	71°	10°32'	+06'	71°	10°51'	+07'	71°	11°10'	+08'	72°	11°29'	+09'	72°	11°48'	+10'	72°	20
21	9°56'	+04'	70°	10°17'	+05'	70°	10°38'	+06'	70°	10°58'	+07'	70°	11°18'	+08'	71°	11°38'	+09'	71°	11°58'	+10'	71°	21
22	10°00'	+04'	69°	10°22'	+05'	69°	10°43'	+06'	69°	11°05'	+07'	69°	11°26'	+08'	70°	11°47'	+09'	70°	12°07'	+10'	70°	22
23	10°04'	+03'	68°	10°27'	+04'	68°	10°49'	+05'	68°	11°11'	+06'	68°	11°33'	+07'	68°	11°55'	+08'	69°	12°17'	+09'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°57'	+07'	91°	6°56'	+08'	91°	6°55'	+09'	91°	6°54'	+10'	91°	6°52'	+11'	91°	6°51'	+13'	91°	6°49'	+14'	92°	0
1	7°04'	+07'	90°	7°04'	+08'	90°	7°04'	+09'	90°	7°04'	+10'	90°	7°04'	+11'	90°	7°03'	+12'	90°	7°03'	+13'	91°	1
2	7°11'	+07'	89°	7°12'	+08'	89°	7°13'	+09'	89°	7°14'	+10'	89°	7°15'	+11'	89°	7°16'	+12'	89°	7°16'	+13'	90°	2
3	7°18'	+07'	88°	7°21'	+08'	88°	7°23'	+09'	88°	7°25'	+10'	88°	7°26'	+11'	88°	7°28'	+12'	89°	7°29'	+13'	89°	3
4	7°25'	+07'	87°	7°29'	+08'	87°	7°32'	+09'	87°	7°35'	+10'	87°	7°37'	+11'	87°	7°40'	+12'	88°	7°43'	+13'	88°	4
5	7°32'	+07'	86°	7°36'	+08'	86°	7°40'	+09'	86°	7°44'	+10'	86°	7°48'	+11'	86°	7°52'	+12'	87°	7°56'	+13'	87°	5
6	7°39'	+07'	85°	7°44'	+08'	85°	7°49'	+09'	85°	7°54'	+10'	85°	7°59'	+11'	85°	8°04'	+12'	86°	8°08'	+13'	86°	6
7	7°45'	+06'	84°	7°52'	+07'	84°	7°58'	+08'	84°	8°04'	+09'	84°	8°10'	+11'	84°	8°16'	+12'	85°	8°21'	+13'	85°	7
8	7°52'	+06'	83°	7°59'	+07'	83°	8°06'	+08'	83°	8°13'	+09'	83°	8°20'	+10'	83°	8°27'	+11'	84°	8°34'	+12'	84°	8
9	7°58'	+06'	82°	8°06'	+07'	82°	8°15'	+08'	82°	8°23'	+09'	82°	8°31'	+10'	82°	8°39'	+11'	83°	8°46'	+12'	83°	9
10	8°04'	+06'	81°	8°13'	+07'	81°	8°23'	+08'	81°	8°32'	+09'	81°	8°41'	+10'	81°	8°50'	+11'	82°	8°59'	+12'	82°	10
11	8°10'	+06'	80°	8°20'	+07'	80°	8°31'	+08'	80°	8°41'	+09'	80°	8°51'	+10'	80°	9°01'	+11'	81°	9°11'	+12'	81°	11
12	8°16'	+06'	79°	8°27'	+07'	79°	8°39'	+08'	79°	8°50'	+09'	79°	9°01'	+10'	79°	9°12'	+11'	80°	9°23'	+12'	80°	12
13	8°21'	+05'	78°	8°34'	+07'	78°	8°46'	+08'	78°	8°59'	+09'	78°	9°11'	+10'	78°	9°23'	+11'	79°	9°34'	+12'	79°	13
14	8°27'	+05'	77°	8°40'	+06'	77°	8°54'	+07'	77°	9°07'	+08'	77°	9°20'	+09'	77°	9°33'	+10'	78°	9°46'	+11'	78°	14
15	8°32'	+05'	76°	8°47'	+06'	76°	9°01'	+07'	76°	9°15'	+08'	76°	9°30'	+09'	76°	9°44'	+10'	77°	9°57'	+11'	77°	15
16	8°37'	+05'	75°	8°53'	+06'	75°	9°08'	+07'	75°	9°24'	+08'	75°	9°39'	+09'	75°	9°54'	+10'	76°	10°09'	+11'	76°	16
17	8°42'	+05'	74°	8°59'	+06'	74°	9°15'	+07'	74°	9°32'	+08'	74°	9°48'	+09'	74°	10°04'	+10'	75°	10°20'	+11'	75°	17
18	8°47'	+05'	73°	9°05'	+06'	73°	9°22'	+07'	73°	9°40'	+08'	73°	9°57'	+09'	73°	10°14'	+10'	74°	10°31'	+11'	74°	18
19	8°52'	+05'	72°	9°10'	+06'	72°	9°29'	+07'	72°	9°47'	+08'	72°	10°06'	+09'	72°	10°24'	+10'	73°	10°41'	+11'	73°	19
20	8°56'	+04'	71°	9°16'	+05'	71°	9°35'	+06'	71°	9°55'	+07'	71°	10°14'	+08'	71°	10°33'	+09'	72°	10°52'	+10'	72°	20
21	9°01'	+04'	70°	9°21'	+05'	70°	9°42'	+06'	70°	10°02'	+07'	70°	10°22'	+08'	70°	10°42'	+09'	71°	11°02'	+10'	71°	21
22	9°05'	+04'	69°	9°26'	+05'	69°	9°48'	+06'	69°	10°09'	+07'	69°	10°31'	+08'	69°	10°52'	+09'	70°	11°12'	+10'	70°	22
23	9°09'	+04'	68°	9°31'	+05'	68°	9°54'	+06'	68°	10°16'	+07'	68°	10°39'	+08'	68°	11°01'	+09'	69°	11°22'	+10'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			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'	+07'	91°	5°56'	+08'	91°	5°56'	+09'	91°	5°55'	+10'	91°	5°53'	+11'	91°	5°52'	+12'	91°	5°51'	+14'	91°	0
1	6°05'	+07'	90°	6°05'	+08'	90°	6°05'	+09'	90°	6°05'	+10'	90°	6°05'	+11'	90°	6°05'	+12'	90°	6°04'	+13'	90°	1
2	6°12'	+07'	89°	6°13'	+08'	89°	6°14'	+09'	89°	6°15'	+10'	89°	6°16'	+11'	89°	6°17'	+12'	89°	6°18'	+13'	89°	2
3	6°19'	+07'	88°	6°21'	+08'	88°	6°23'	+09'	88°	6°25'	+10'	88°	6°27'	+11'	88°	6°29'	+12'	88°	6°31'	+13'	88°	3
4	6°26'	+07'	87°	6°29'	+08'	87°	6°32'	+09'	87°	6°36'	+10'	87°	6°39'	+11'	87°	6°41'	+12'	87°	6°44'	+13'	87°	4
5	6°33'	+07'	86°	6°37'	+08'	86°	6°41'	+09'	86°	6°46'	+10'	86°	6°50'	+11'	86°	6°53'	+12'	86°	6°57'	+13'	86°	5
6	6°39'	+07'	85°	6°45'	+08'	85°	6°50'	+09'	85°	6°55'	+10'	85°	7°00'	+11'	85°	7°05'	+12'	85°	7°10'	+13'	85°	6
7	6°46'	+06'	84°	6°52'	+08'	84°	6°59'	+09'	84°	7°05'	+10'	84°	7°11'	+11'	84°	7°17'	+12'	84°	7°23'	+13'	84°	7
8	6°52'	+06'	83°	7°00'	+07'	83°	7°07'	+08'	83°	7°15'	+09'	83°	7°22'	+11'	83°	7°29'	+12'	83°	7°36'	+13'	83°	8
9	6°59'	+06'	82°	7°07'	+07'	82°	7°16'	+08'	82°	7°24'	+09'	82°	7°32'	+10'	82°	7°40'	+11'	82°	7°48'	+12'	83°	9
10	7°05'	+06'	81°	7°15'	+07'	81°	7°24'	+08'	81°	7°33'	+09'	81°	7°43'	+10'	81°	7°52'	+11'	81°	8°01'	+12'	82°	10
11	7°11'	+06'	80°	7°22'	+07'	80°	7°32'	+08'	80°	7°43'	+09'	80°	7°53'	+10'	80°	8°03'	+11'	80°	8°13'	+12'	81°	11
12	7°17'	+06'	79°	7°29'	+07'	79°	7°40'	+08'	79°	7°52'	+09'	79°	8°03'	+10'	79°	8°14'	+11'	79°	8°25'	+12'	80°	12
13	7°23'	+06'	78°	7°36'	+07'	78°	7°48'	+08'	78°	8°01'	+09'	78°	8°13'	+10'	78°	8°25'	+11'	78°	8°37'	+12'	79°	13
14	7°29'	+06'	77°	7°42'	+07'	77°	7°56'	+08'	77°	8°09'	+09'	77°	8°23'	+10'	77°	8°36'	+11'	77°	8°49'	+12'	78°	14
15	7°34'	+05'	76°	7°49'	+06'	76°	8°04'	+07'	76°	8°18'	+08'	76°	8°32'	+09'	76°	8°47'	+11'	76°	9°01'	+12'	77°	15
16	7°40'	+05'	75°	7°55'	+06'	75°	8°11'	+07'	75°	8°27'	+08'	75°	8°42'	+09'	75°	8°57'	+10'	75°	9°12'	+11'	76°	16
17	7°45'	+05'	74°	8°02'	+06'	74°	8°18'	+07'	74°	8°35'	+08'	74°	8°51'	+09'	74°	9°07'	+10'	74°	9°23'	+11'	75°	17
18	7°50'	+05'	73°	8°08'	+06'	73°	8°26'	+07'	73°	8°43'	+08'	73°	9°00'	+09'	73°	9°18'	+10'	73°	9°35'	+11'	74°	18
19	7°55'	+05'	72°	8°14'	+06'	72°	8°33'	+07'	72°	8°51'	+08'	72°	9°09'	+09'	72°	9°28'	+10'	72°	9°46'	+11'	73°	19
20	8°00'	+05'	71°	8°20'	+06'	71°	8°39'	+07'	71°	8°59'	+08'	71°	9°18'	+09'	71°	9°37'	+10'	71°	9°56'	+11'	72°	20
21	8°05'	+05'	70°	8°25'	+06'	70°	8°46'	+07'	70°	9°07'	+08'	70°	9°27'	+09'	70°	9°47'	+09'	70°	10°07'	+10'	71°	21
22	8°09'	+04'	69°	8°31'	+05'	69°	8°53'	+06'	69°	9°14'	+07'	69°	9°35'	+08'	69°	9°57'	+09'	69°	10°18'	+10'	70°	22
23	8°14'	+04'	68°	8°36'	+05'	68°	8°59'	+06'	68°	9°21'	+07'	68°	9°44'	+08'	68°	10°06'	+09'	68°	10°28'	+10'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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°	7			8			9			10			11			12			13			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'	+07'	91°	4°57'	+08'	91°	4°56'	+09'	91°	4°55'	+10'	91°	4°54'	+11'	91°	4°53'	+12'	91°	4°52'	+14'	91°	0
1	5°05'	+07'	90°	5°05'	+08'	90°	5°06'	+09'	90°	5°06'	+10'	90°	5°06'	+11'	90°	5°06'	+12'	90°	5°06'	+13'	90°	1
2	5°12'	+07'	89°	5°14'	+08'	89°	5°15'	+09'	89°	5°16'	+10'	89°	5°17'	+11'	89°	5°18'	+12'	89°	5°19'	+13'	89°	2
3	5°19'	+07'	88°	5°22'	+08'	88°	5°24'	+09'	88°	5°26'	+10'	88°	5°29'	+11'	88°	5°31'	+12'	88°	5°33'	+13'	88°	3
4	5°26'	+07'	87°	5°30'	+08'	87°	5°33'	+09'	87°	5°37'	+10'	87°	5°40'	+11'	87°	5°43'	+12'	87°	5°46'	+13'	87°	4
5	5°33'	+07'	86°	5°38'	+08'	86°	5°42'	+09'	86°	5°47'	+10'	86°	5°51'	+11'	86°	5°55'	+12'	86°	5°59'	+13'	86°	5
6	5°40'	+07'	85°	5°46'	+08'	85°	5°51'	+09'	85°	5°56'	+10'	85°	6°02'	+11'	85°	6°07'	+12'	85°	6°12'	+13'	85°	6
7	5°47'	+07'	84°	5°53'	+08'	84°	6°00'	+09'	84°	6°06'	+10'	84°	6°13'	+11'	84°	6°19'	+12'	84°	6°25'	+13'	84°	7
8	5°53'	+06'	83°	6°01'	+08'	83°	6°09'	+09'	83°	6°16'	+10'	83°	6°23'	+11'	83°	6°31'	+12'	83°	6°38'	+13'	83°	8
9	6°00'	+06'	82°	6°09'	+07'	82°	6°17'	+08'	82°	6°26'	+09'	82°	6°34'	+11'	82°	6°42'	+12'	82°	6°50'	+13'	82°	9
10	6°06'	+06'	81°	6°16'	+07'	81°	6°26'	+08'	81°	6°35'	+09'	81°	6°44'	+10'	81°	6°54'	+11'	81°	7°03'	+12'	81°	10
11	6°13'	+06'	80°	6°23'	+07'	80°	6°34'	+08'	80°	6°44'	+09'	80°	6°55'	+10'	80°	7°05'	+11'	80°	7°15'	+12'	80°	11
12	6°19'	+06'	79°	6°31'	+07'	79°	6°42'	+08'	79°	6°54'	+09'	79°	7°05'	+10'	79°	7°16'	+11'	79°	7°28'	+12'	79°	12
13	6°25'	+06'	78°	6°38'	+07'	78°	6°50'	+08'	78°	7°03'	+09'	78°	7°15'	+10'	78°	7°28'	+11'	78°	7°40'	+12'	78°	13
14	6°31'	+06'	77°	6°45'	+07'	77°	6°58'	+08'	77°	7°12'	+09'	77°	7°25'	+10'	77°	7°39'	+11'	77°	7°52'	+12'	77°	14
15	6°37'	+06'	76°	6°51'	+07'	76°	7°06'	+08'	76°	7°21'	+09'	76°	7°35'	+10'	76°	7°50'	+11'	76°	8°04'	+12'	76°	15
16	6°42'	+06'	75°	6°58'	+07'	75°	7°14'	+08'	75°	7°29'	+09'	75°	7°45'	+10'	75°	8°00'	+11'	75°	8°16'	+12'	75°	16
17	6°48'	+05'	74°	7°05'	+06'	74°	7°21'	+07'	74°	7°38'	+08'	74°	7°55'	+09'	74°	8°11'	+10'	74°	8°27'	+11'	74°	17
18	6°53'	+05'	73°	7°11'	+06'	73°	7°29'	+07'	73°	7°47'	+08'	73°	8°04'	+09'	73°	8°21'	+10'	73°	8°39'	+11'	73°	18
19	6°59'	+05'	72°	7°17'	+06'	72°	7°36'	+07'	72°	7°55'	+08'	72°	8°13'	+09'	72°	8°32'	+10'	72°	8°50'	+11'	72°	19
20	7°04'	+05'	71°	7°24'	+06'	71°	7°43'	+07'	71°	8°03'	+08'	71°	8°23'	+09'	71°	8°42'	+10'	71°	9°01'	+11'	71°	20
21	7°09'	+05'	70°	7°30'	+06'	70°	7°50'	+07'	70°	8°11'	+08'	70°	8°32'	+09'	70°	8°52'	+10'	70°	9°12'	+11'	70°	21
22	7°14'	+05'	69°	7°36'	+06'	69°	7°57'	+07'	69°	8°19'	+08'	69°	8°40'	+09'	69°	9°02'	+10'	69°	9°23'	+11'	69°	22
23	7°19'	+05'	68°	7°41'	+06'	68°	8°04'	+07'	68°	8°27'	+08'	68°	8°49'	+09'	68°	9°11'	+10'	68°	9°34'	+10'	68°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°58'	+07'	90°	3°58'	+08'	91°	3°57'	+09'	91°	3°56'	+10'	91°	3°56'	+11'	91°	3°55'	+12'	91°	3°54'	+13'	91°	0
1	4°06'	+07'	89°	4°06'	+08'	90°	4°06'	+09'	90°	4°07'	+10'	90°	4°07'	+11'	90°	4°07'	+12'	90°	4°07'	+13'	90°	1
2	4°13'	+07'	88°	4°14'	+08'	89°	4°16'	+09'	89°	4°17'	+10'	89°	4°18'	+11'	89°	4°20'	+12'	89°	4°21'	+13'	89°	2
3	4°20'	+07'	88°	4°22'	+08'	88°	4°25'	+09'	88°	4°27'	+10'	88°	4°30'	+11'	88°	4°32'	+12'	88°	4°34'	+13'	88°	3
4	4°27'	+07'	87°	4°31'	+08'	87°	4°34'	+09'	87°	4°38'	+10'	87°	4°41'	+11'	87°	4°44'	+12'	87°	4°47'	+13'	87°	4
5	4°34'	+07'	86°	4°39'	+08'	86°	4°43'	+09'	86°	4°48'	+10'	86°	4°52'	+11'	86°	4°56'	+12'	86°	5°01'	+13'	86°	5
6	4°41'	+07'	85°	4°47'	+08'	85°	4°52'	+09'	85°	4°58'	+10'	85°	5°03'	+11'	85°	5°08'	+12'	85°	5°14'	+13'	85°	6
7	4°48'	+07'	84°	4°54'	+08'	84°	5°01'	+09'	84°	5°08'	+10'	84°	5°14'	+11'	84°	5°20'	+12'	84°	5°27'	+13'	84°	7
8	4°54'	+07'	83°	5°02'	+08'	83°	5°10'	+09'	83°	5°17'	+10'	83°	5°25'	+11'	83°	5°32'	+12'	83°	5°40'	+13'	83°	8
9	5°01'	+07'	82°	5°10'	+08'	82°	5°19'	+09'	82°	5°27'	+10'	82°	5°36'	+11'	82°	5°44'	+12'	82°	5°52'	+13'	82°	9
10	5°08'	+06'	81°	5°17'	+07'	81°	5°27'	+09'	81°	5°37'	+10'	81°	5°46'	+11'	81°	5°56'	+12'	81°	6°05'	+13'	81°	10
11	5°14'	+06'	80°	5°25'	+07'	80°	5°36'	+08'	80°	5°46'	+09'	80°	5°57'	+10'	80°	6°07'	+11'	80°	6°18'	+12'	80°	11
12	5°20'	+06'	79°	5°32'	+07'	79°	5°44'	+08'	79°	5°56'	+09'	79°	6°07'	+10'	79°	6°19'	+11'	79°	6°30'	+12'	79°	12
13	5°27'	+06'	78°	5°40'	+07'	78°	5°52'	+08'	78°	6°05'	+09'	78°	6°18'	+10'	78°	6°30'	+11'	78°	6°43'	+12'	78°	13
14	5°33'	+06'	77°	5°47'	+07'	77°	6°01'	+08'	77°	6°14'	+09'	77°	6°28'	+10'	77°	6°41'	+11'	77°	6°55'	+12'	77°	14
15	5°39'	+06'	76°	5°54'	+07'	76°	6°09'	+08'	76°	6°23'	+09'	76°	6°38'	+10'	76°	6°53'	+11'	76°	7°07'	+12'	76°	15
16	5°45'	+06'	75°	6°01'	+07'	75°	6°17'	+08'	75°	6°32'	+09'	75°	6°48'	+10'	75°	7°04'	+11'	75°	7°19'	+12'	75°	16
17	5°51'	+06'	74°	6°08'	+07'	74°	6°25'	+08'	74°	6°41'	+09'	74°	6°58'	+10'	74°	7°14'	+11'	74°	7°31'	+12'	74°	17
18	5°56'	+06'	73°	6°14'	+07'	73°	6°32'	+08'	73°	6°50'	+09'	73°	7°08'	+10'	73°	7°25'	+11'	73°	7°43'	+12'	73°	18
19	6°02'	+06'	72°	6°21'	+07'	72°	6°40'	+08'	72°	6°59'	+09'	72°	7°17'	+09'	72°	7°36'	+10'	72°	7°54'	+11'	72°	19
20	6°08'	+05'	71°	6°28'	+06'	71°	6°47'	+07'	71°	7°07'	+08'	71°	7°27'	+09'	71°	7°46'	+10'	71°	8°06'	+11'	71°	20
21	6°13'	+05'	70°	6°34'	+06'	70°	6°55'	+07'	70°	7°16'	+08'	70°	7°36'	+09'	70°	7°57'	+10'	70°	8°17'	+11'	70°	21
22	6°18'	+05'	69°	6°40'	+06'	69°	7°02'	+07'	69°	7°24'	+08'	69°	7°45'	+09'	69°	8°07'	+10'	69°	8°28'	+11'	69°	22
23	6°24'	+05'	68°	6°46'	+06'	68°	7°09'	+07'	68°	7°32'	+08'	68°	7°54'	+09'	68°	8°17'	+10'	68°	8°39'	+11'	68°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	2°59'	+07'	90°	2°58'	+08'	90°	2°58'	+09'	90°	2°57'	+10'	91°	2°57'	+11'	91°	2°56'	+12'	91°	2°55'	+13'	91°	0
1	3°06'	+07'	89°	3°07'	+08'	89°	3°07'	+09'	89°	3°08'	+10'	90°	3°08'	+11'	90°	3°09'	+12'	90°	3°09'	+13'	90°	1
2	3°13'	+07'	88°	3°15'	+08'	88°	3°16'	+09'	88°	3°18'	+10'	89°	3°20'	+11'	89°	3°21'	+12'	89°	3°22'	+13'	89°	2
3	3°20'	+07'	87°	3°23'	+08'	87°	3°26'	+09'	88°	3°28'	+10'	88°	3°31'	+11'	88°	3°33'	+12'	88°	3°36'	+13'	88°	3
4	3°27'	+07'	86°	3°31'	+08'	86°	3°35'	+09'	87°	3°39'	+10'	87°	3°42'	+11'	87°	3°46'	+12'	87°	3°49'	+13'	87°	4
5	3°35'	+07'	85°	3°39'	+08'	85°	3°44'	+09'	86°	3°49'	+10'	86°	3°53'	+11'	86°	3°58'	+12'	86°	4°02'	+13'	86°	5
6	3°42'	+07'	84°	3°47'	+08'	84°	3°53'	+09'	85°	3°59'	+10'	85°	4°04'	+11'	85°	4°10'	+12'	85°	4°15'	+13'	85°	6
7	3°48'	+07'	83°	3°55'	+08'	83°	4°02'	+09'	84°	4°09'	+10'	84°	4°15'	+11'	84°	4°22'	+12'	84°	4°29'	+13'	84°	7
8	3°55'	+07'	82°	4°03'	+08'	82°	4°11'	+09'	83°	4°19'	+10'	83°	4°26'	+11'	83°	4°34'	+12'	83°	4°42'	+13'	83°	8
9	4°02'	+07'	81°	4°11'	+08'	81°	4°20'	+09'	82°	4°29'	+10'	82°	4°37'	+11'	82°	4°46'	+12'	82°	4°54'	+13'	82°	9
10	4°09'	+07'	80°	4°19'	+08'	80°	4°29'	+09'	81°	4°38'	+10'	81°	4°48'	+11'	81°	4°58'	+12'	81°	5°07'	+13'	81°	10
11	4°15'	+07'	79°	4°26'	+08'	79°	4°37'	+09'	80°	4°48'	+10'	80°	4°59'	+11'	80°	5°10'	+12'	80°	5°20'	+13'	80°	11
12	4°22'	+06'	78°	4°34'	+08'	78°	4°46'	+09'	79°	4°58'	+10'	79°	5°10'	+11'	79°	5°21'	+12'	79°	5°33'	+13'	79°	12
13	4°29'	+06'	77°	4°42'	+07'	78°	4°54'	+08'	78°	5°07'	+09'	78°	5°20'	+10'	78°	5°33'	+11'	78°	5°45'	+12'	78°	13
14	4°35'	+06'	76°	4°49'	+07'	77°	5°03'	+08'	77°	5°17'	+09'	77°	5°31'	+10'	77°	5°44'	+11'	77°	5°58'	+12'	77°	14
15	4°41'	+06'	75°	4°56'	+07'	76°	5°11'	+08'	76°	5°26'	+09'	76°	5°41'	+10'	76°	5°56'	+11'	76°	6°10'	+12'	76°	15
16	4°47'	+06'	74°	5°04'	+07'	75°	5°20'	+08'	75°	5°35'	+09'	75°	5°51'	+10'	75°	6°07'	+11'	75°	6°22'	+12'	75°	16
17	4°54'	+06'	73°	5°11'	+07'	74°	5°28'	+08'	74°	5°45'	+09'	74°	6°01'	+10'	74°	6°18'	+11'	74°	6°35'	+12'	74°	17
18	5°00'	+06'	72°	5°18'	+07'	73°	5°36'	+08'	73°	5°54'	+09'	73°	6°11'	+10'	73°	6°29'	+11'	73°	6°47'	+12'	73°	18
19	5°06'	+06'	71°	5°25'	+07'	72°	5°44'	+08'	72°	6°03'	+09'	72°	6°21'	+10'	72°	6°40'	+11'	72°	6°59'	+12'	72°	19
20	5°12'	+06'	70°	5°32'	+07'	71°	5°52'	+08'	71°	6°11'	+09'	71°	6°31'	+10'	71°	6°51'	+11'	71°	7°10'	+12'	71°	20
21	5°17'	+06'	69°	5°38'	+07'	70°	5°59'	+08'	70°	6°20'	+09'	70°	6°41'	+10'	70°	7°01'	+11'	70°	7°22'	+12'	70°	21
22	5°23'	+06'	68°	5°45'	+07'	69°	6°07'	+08'	69°	6°29'	+08'	69°	6°50'	+09'	69°	7°12'	+10'	69°	7°34'	+11'	69°	22
23	5°29'	+05'	67°	5°52'	+06'	68°	6°14'	+07'	68°	6°37'	+08'	68°	7°00'	+09'	68°	7°22'	+10'	68°	7°45'	+11'	68°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**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°	7			8			9			10			11			12			13			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	1°59'	+07'	90°	1°59'	+08'	90°	1°59'	+09'	90°	1°58'	+10'	90°	1°58'	+11'	90°	1°57'	+12'	90°	1°57'	+13'	90°	0			
1	2°06'	+07'	89°	2°07'	+08'	89°	2°08'	+09'	89°	2°09'	+10'	89°	2°09'	+11'	89°	2°10'	+12'	89°	2°10'	+13'	89°	1			
2	2°14'	+07'	88°	2°15'	+08'	88°	2°17'	+09'	88°	2°19'	+10'	88°	2°21'	+11'	88°	2°22'	+12'	88°	2°24'	+13'	88°	2			
3	2°21'	+07'	87°	2°24'	+08'	87°	2°27'	+09'	87°	2°29'	+10'	87°	2°32'	+11'	87°	2°35'	+12'	87°	2°37'	+13'	88°	3			
4	2°28'	+07'	86°	2°32'	+08'	86°	2°36'	+09'	86°	2°40'	+10'	86°	2°43'	+11'	86°	2°47'	+12'	86°	2°51'	+13'	87°	4			
5	2°35'	+07'	85°	2°40'	+08'	85°	2°45'	+09'	85°	2°50'	+10'	85°	2°55'	+11'	85°	2°59'	+12'	86°	3°04'	+13'	86°	5			
6	2°42'	+07'	84°	2°48'	+08'	84°	2°54'	+09'	84°	3°00'	+10'	84°	3°06'	+11'	84°	3°12'	+12'	85°	3°17'	+13'	85°	6			
7	2°49'	+07'	83°	2°56'	+08'	83°	3°03'	+09'	83°	3°10'	+10'	83°	3°17'	+11'	83°	3°24'	+12'	84°	3°30'	+13'	84°	7			
8	2°56'	+07'	82°	3°04'	+08'	82°	3°12'	+09'	82°	3°20'	+10'	82°	3°28'	+11'	83°	3°36'	+12'	83°	3°44'	+13'	83°	8			
9	3°03'	+07'	81°	3°12'	+08'	81°	3°21'	+09'	81°	3°30'	+10'	81°	3°39'	+11'	82°	3°48'	+12'	82°	3°57'	+13'	82°	9			
10	3°10'	+07'	80°	3°20'	+08'	80°	3°30'	+09'	80°	3°40'	+10'	80°	3°50'	+11'	81°	4°00'	+12'	81°	4°10'	+13'	81°	10			
11	3°17'	+07'	79°	3°28'	+08'	79°	3°39'	+09'	79°	3°50'	+10'	79°	4°01'	+11'	80°	4°12'	+12'	80°	4°23'	+13'	80°	11			
12	3°24'	+07'	78°	3°36'	+08'	78°	3°48'	+09'	78°	4°00'	+10'	79°	4°12'	+11'	79°	4°24'	+12'	79°	4°35'	+13'	79°	12			
13	3°30'	+07'	77°	3°44'	+08'	77°	3°57'	+09'	77°	4°10'	+10'	78°	4°23'	+11'	78°	4°35'	+12'	78°	4°48'	+13'	78°	13			
14	3°37'	+07'	76°	3°51'	+08'	76°	4°05'	+09'	76°	4°19'	+10'	77°	4°33'	+11'	77°	4°47'	+12'	77°	5°01'	+13'	77°	14			
15	3°44'	+07'	75°	3°59'	+08'	75°	4°14'	+09'	75°	4°29'	+10'	76°	4°44'	+11'	76°	4°59'	+12'	76°	5°14'	+13'	76°	15			
16	3°50'	+06'	74°	4°06'	+07'	74°	4°22'	+08'	74°	4°38'	+09'	75°	4°54'	+10'	75°	5°10'	+11'	75°	5°26'	+12'	75°	16			
17	3°57'	+06'	73°	4°14'	+07'	73°	4°31'	+08'	73°	4°48'	+09'	74°	5°05'	+10'	74°	5°22'	+11'	74°	5°38'	+12'	74°	17			
18	4°03'	+06'	72°	4°21'	+07'	72°	4°39'	+08'	72°	4°57'	+09'	73°	5°15'	+10'	73°	5°33'	+11'	73°	5°51'	+12'	73°	18			
19	4°09'	+06'	71°	4°28'	+07'	71°	4°47'	+08'	71°	5°06'	+09'	72°	5°25'	+10'	72°	5°44'	+11'	72°	6°03'	+12'	72°	19			
20	4°15'	+06'	70°	4°36'	+07'	70°	4°56'	+08'	70°	5°16'	+09'	71°	5°36'	+10'	71°	5°55'	+11'	71°	6°15'	+12'	71°	20			
21	4°22'	+06'	69°	4°43'	+07'	69°	5°04'	+08'	69°	5°25'	+09'	70°	5°46'	+10'	70°	6°06'	+11'	70°	6°27'	+12'	70°	21			
22	4°28'	+06'	68°	4°50'	+07'	68°	5°12'	+08'	69°	5°34'	+09'	69°	5°56'	+10'	69°	6°17'	+11'	69°	6°39'	+12'	69°	22			
23	4°34'	+06'	67°	4°57'	+07'	67°	5°20'	+08'	68°	5°43'	+09'	68°	6°05'	+10'	68°	6°28'	+11'	68°	6°51'	+12'	68°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13						

**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°	7			8			9			10			11			12			13			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	1°00'	+07'	90°	0°59'	+08'	90°	0°59'	+09'	90°	0°59'	+10'	90°	0°59'	+11'	90°	0°59'	+12'	90°	0°58'	+13'	90°	0			
1	1°07'	+07'	89°	1°08'	+08'	89°	1°09'	+09'	89°	1°09'	+10'	89°	1°10'	+11'	89°	1°11'	+12'	89°	1°12'	+13'	89°	1			
2	1°14'	+07'	88°	1°16'	+08'	88°	1°18'	+09'	88°	1°20'	+10'	88°	1°22'	+11'	88°	1°24'	+12'	88°	1°25'	+13'	88°	2			
3	1°21'	+07'	87°	1°24'	+08'	87°	1°27'	+09'	87°	1°30'	+10'	87°	1°33'	+11'	87°	1°36'	+12'	87°	1°39'	+13'	87°	3			
4	1°29'	+07'	86°	1°33'	+08'	86°	1°37'	+09'	86°	1°41'	+10'	86°	1°45'	+11'	86°	1°48'	+12'	86°	1°52'	+13'	86°	4			
5	1°36'	+07'	85°	1°41'	+08'	85°	1°46'	+09'	85°	1°51'	+10'	85°	1°56'	+11'	85°	2°01'	+12'	85°	2°06'	+13'	85°	5			
6	1°43'	+07'	84°	1°49'	+08'	84°	1°55'	+09'	84°	2°01'	+10'	84°	2°07'	+11'	84°	2°13'	+12'	84°	2°19'	+13'	84°	6			
7	1°50'	+07'	83°	1°57'	+08'	83°	2°04'	+09'	83°	2°11'	+10'	83°	2°18'	+11'	83°	2°25'	+12'	83°	2°32'	+13'	83°	7			
8	1°57'	+07'	82°	2°05'	+08'	82°	2°14'	+09'	82°	2°22'	+10'	82°	2°30'	+11'	82°	2°38'	+12'	82°	2°46'	+13'	82°	8			
9	2°04'	+07'	81°	2°14'	+08'	81°	2°23'	+09'	81°	2°32'	+10'	81°	2°41'	+11'	81°	2°50'	+12'	81°	2°59'	+13'	81°	9			
10	2°11'	+07'	80°	2°22'	+08'	80°	2°32'	+09'	80°	2°42'	+10'	80°	2°52'	+11'	80°	3°02'	+12'	80°	3°12'	+13'	80°	10			
11	2°18'	+07'	79°	2°30'	+08'	79°	2°41'	+09'	79°	2°52'	+10'	79°	3°03'	+11'	79°	3°14'	+12'	79°	3°25'	+13'	79°	11			
12	2°25'	+07'	78°	2°38'	+08'	78°	2°50'	+09'	78°	3°02'	+10'	78°	3°14'	+11'	78°	3°26'	+12'	78°	3°38'	+13'	79°	12			
13	2°32'	+07'	77°	2°46'	+08'	77°	2°59'	+09'	77°	3°12'	+10'	77°	3°25'	+11'	77°	3°38'	+12'	77°	3°51'	+13'	78°	13			
14	2°39'	+07'	76°	2°53'	+08'	76°	3°08'	+09'	76°	3°22'	+10'	76°	3°36'	+11'	76°	3°50'	+12'	76°	4°04'	+13'	77°	14			
15	2°46'	+07'	75°	3°01'	+08'	75°	3°17'	+09'	75°	3°32'	+10'	75°	3°47'	+11'	75°	4°02'	+12'	76°	4°17'	+13'	76°	15			
16	2°53'	+07'	74°	3°09'	+08'	74°	3°25'	+09'	74°	3°41'	+10'	74°	3°58'	+11'	74°	4°14'	+12'	75°	4°30'	+13'	75°	16			
17	3°00'	+07'	73°	3°17'	+08'	73°	3°34'	+09'	73°	3°51'	+10'	73°	4°08'	+11'	73°	4°25'	+12'	74°	4°42'	+13'	74°	17			
18	3°06'	+07'	72°	3°24'	+08'	72°	3°43'	+09'	72°	4°01'	+10'	72°	4°19'	+11'	72°	4°37'	+12'	73°	4°55'	+13'	73°	18			
19	3°13'	+07'	71°	3°32'	+08'	71°	3°51'	+09'	71°	4°10'	+10'	71°	4°30'	+10'	71°	4°49'	+11'	72°	5°07'	+12'	72°	19			
20	3°19'	+06'	70°	3°40'	+07'	70°	4°00'	+08'	70°	4°20'	+09'	70°	4°40'	+10'	71°	5°00'	+11'	71°	5°20'	+12'	71°	20			
21	3°26'	+06'	69°	3°47'	+07'	69°	4°08'	+08'	69°	4°29'	+09'	69°	4°50'	+10'	70°	5°11'	+11'	70°	5°32'	+12'	70°	21			
22	3°32'	+06'	68°	3°54'	+07'	68°	4°17'	+08'	68°	4°39'	+09'	68°	5°01'	+10'	69°	5°23'	+11'	69°	5°44'	+12'	69°	22			
23	3°39'	+06'	67°	4°02'	+07'	67°	4°25'	+08'	67°	4°48'	+09'	67°	5°11'	+10'	68°	5°34'	+11'	68°	5°57'	+12'	68°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13						

**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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°00'	+07'	90°	0°00'	+08'	90°	0°00'	+09'	90°	0°00'	+10'	90°	0°00'	+11'	90°	0°00'	+12'	90°	0°00'	+13'	90°	0
1	0°07'	+07'	89°	0°08'	+08'	89°	0°09'	+09'	89°	0°10'	+10'	89°	0°11'	+11'	89°	0°12'	+12'	89°	0°13'	+13'	89°	1
2	0°15'	+07'	88°	0°17'	+08'	88°	0°19'	+09'	88°	0°21'	+10'	88°	0°23'	+11'	88°	0°25'	+12'	88°	0°27'	+13'	88°	2
3	0°22'	+07'	87°	0°25'	+08'	87°	0°28'	+09'	87°	0°31'	+10'	87°	0°34'	+11'	87°	0°37'	+12'	87°	0°40'	+13'	87°	3
4	0°29'	+07'	86°	0°33'	+08'	86°	0°38'	+09'	86°	0°42'	+10'	86°	0°46'	+11'	86°	0°50'	+12'	86°	0°54'	+13'	86°	4
5	0°37'	+07'	85°	0°42'	+08'	85°	0°47'	+09'	85°	0°52'	+10'	85°	0°57'	+11'	85°	1°02'	+12'	85°	1°07'	+13'	85°	5
6	0°44'	+07'	84°	0°50'	+08'	84°	0°56'	+09'	84°	1°02'	+10'	84°	1°09'	+11'	84°	1°15'	+12'	84°	1°21'	+13'	84°	6
7	0°51'	+07'	83°	0°58'	+08'	83°	1°06'	+09'	83°	1°13'	+10'	83°	1°20'	+11'	83°	1°27'	+12'	83°	1°34'	+13'	83°	7
8	0°58'	+07'	82°	1°07'	+08'	82°	1°15'	+09'	82°	1°23'	+10'	82°	1°31'	+11'	82°	1°39'	+12'	82°	1°48'	+13'	82°	8
9	1°06'	+07'	81°	1°15'	+08'	81°	1°24'	+09'	81°	1°33'	+10'	81°	1°43'	+11'	81°	1°52'	+12'	81°	2°01'	+13'	81°	9
10	1°13'	+07'	80°	1°23'	+08'	80°	1°33'	+09'	80°	1°44'	+10'	80°	1°54'	+11'	80°	2°04'	+12'	80°	2°14'	+13'	80°	10
11	1°20'	+07'	79°	1°31'	+08'	79°	1°43'	+09'	79°	1°54'	+10'	79°	2°05'	+11'	79°	2°16'	+12'	79°	2°28'	+13'	79°	11
12	1°27'	+07'	78°	1°39'	+08'	78°	1°52'	+09'	78°	2°04'	+10'	78°	2°16'	+11'	78°	2°29'	+12'	78°	2°41'	+13'	78°	12
13	1°34'	+07'	77°	1°48'	+08'	77°	2°01'	+09'	77°	2°14'	+10'	77°	2°28'	+11'	77°	2°41'	+12'	77°	2°54'	+13'	77°	13
14	1°41'	+07'	76°	1°56'	+08'	76°	2°10'	+09'	76°	2°24'	+10'	76°	2°39'	+11'	76°	2°53'	+12'	76°	3°07'	+13'	76°	14
15	1°48'	+07'	75°	2°04'	+08'	75°	2°19'	+09'	75°	2°35'	+10'	75°	2°50'	+11'	75°	3°05'	+12'	75°	3°20'	+13'	75°	15
16	1°56'	+07'	74°	2°12'	+08'	74°	2°28'	+09'	74°	2°45'	+10'	74°	3°01'	+11'	74°	3°17'	+12'	74°	3°33'	+13'	74°	16
17	2°03'	+07'	73°	2°20'	+08'	73°	2°37'	+09'	73°	2°55'	+10'	73°	3°12'	+11'	73°	3°29'	+12'	73°	3°46'	+13'	73°	17
18	2°09'	+07'	72°	2°28'	+08'	72°	2°46'	+09'	72°	3°05'	+10'	72°	3°23'	+11'	72°	3°41'	+12'	72°	3°59'	+13'	72°	18
19	2°16'	+07'	71°	2°36'	+08'	71°	2°55'	+09'	71°	3°14'	+10'	71°	3°34'	+11'	71°	3°53'	+12'	71°	4°12'	+13'	71°	19
20	2°23'	+07'	70°	2°44'	+08'	70°	3°04'	+09'	70°	3°24'	+10'	70°	3°45'	+11'	70°	4°05'	+12'	70°	4°25'	+13'	70°	20
21	2°30'	+07'	69°	2°52'	+08'	69°	3°13'	+09'	69°	3°34'	+10'	69°	3°55'	+11'	69°	4°16'	+12'	69°	4°37'	+13'	69°	21
22	2°37'	+07'	68°	2°59'	+08'	68°	3°22'	+09'	68°	3°44'	+10'	68°	4°06'	+11'	68°	4°28'	+12'	68°	4°50'	+13'	68°	22
23	2°44'	+07'	67°	3°07'	+08'	67°	3°30'	+09'	67°	3°53'	+10'	67°	4°17'	+11'	67°	4°40'	+11'	67°	5°03'	+12'	68°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°00'	-07'	90°	0°59'	-08'	90°	0°59'	-09'	90°	0°59'	-10'	90°	0°59'	-11'	90°	0°59'	-12'	90°	0°58'	-14'	90°	0
1	0°52'	-07'	91°	0°51'	-08'	91°	0°50'	-09'	91°	0°49'	-10'	91°	0°47'	-11'	91°	0°46'	-12'	91°	0°45'	-14'	91°	1
2	0°45'	-07'	92°	0°43'	-08'	92°	0°40'	-09'	92°	0°38'	-10'	92°	0°36'	-11'	92°	0°34'	-13'	92°	0°31'	-14'	92°	2
3	0°38'	-07'	93°	0°34'	-08'	93°	0°31'	-09'	93°	0°28'	-10'	93°	0°24'	-11'	93°	0°21'	-13'	93°	0°18'	-14'	93°	3
4	0°30'	-07'	94°	0°26'	-08'	94°	0°22'	-09'	94°	0°17'	-10'	94°	0°13'	-11'	94°	<u>0°09'</u>	-13'	94°	<u>0°04'</u>	-14'	94°	4
5	0°23'	-07'	95°	0°17'	-08'	95°	0°12'	-09'	95°	<u>0°07'</u>	-10'	95°	<u>0°02'</u>	-11'	95°	0°04'	+13'	85°	0°09'	+14'	85°	5
6	0°15'	-07'	96°	0°09'	-08'	96°	<u>0°03'</u>	-09'	96°	0°04'	+10'	84°	0°10'	+11'	84°	0°16'	+13'	84°	0°23'	+14'	84°	6
7	0°08'	-07'	97°	<u>0°01'</u>	-08'	97°	0°07'	+09'	83°	0°14'	+10'	83°	0°21'	+11'	83°	0°29'	+13'	83°	0°36'	+14'	83°	7
8	<u>0°01'</u>	-07'	98°	0°08'	+08'	82°	0°16'	+09'	82°	0°25'	+10'	82°	0°33'	+11'	82°	0°41'	+12'	82°	0°50'	+14'	82°	8
9	0°07'	+07'	81°	0°16'	+08'	81°	0°26'	+09'	81°	0°35'	+10'	81°	0°44'	+11'	81°	0°54'	+12'	81°	1°03'	+13'	81°	9
10	0°14'	+07'	80°	0°25'	+08'	80°	0°35'	+09'	80°	0°45'	+10'	80°	0°56'	+11'	80°	1°06'	+12'	80°	1°17'	+13'	80°	10
11	0°21'	+07'	79°	0°33'	+08'	79°	0°44'	+09'	79°	0°56'	+10'	79°	1°07'	+11'	79°	1°19'	+12'	79°	1°30'	+13'	79°	11
12	0°29'	+07'	78°	0°41'	+08'	78°	0°54'	+09'	78°	1°06'	+10'	78°	1°19'	+11'	78°	1°31'	+12'	78°	1°44'	+13'	78°	12
13	0°36'	+07'	77°	0°50'	+08'	77°	1°03'	+09'	77°	1°17'	+10'	77°	1°30'	+11'	77°	1°44'	+12'	77°	1°57'	+13'	77°	13
14	0°44'	+07'	76°	0°58'	+08'	76°	1°13'	+09'	76°	1°27'	+10'	76°	1°42'	+11'	76°	1°56'	+12'	76°	2°10'	+13'	76°	14
15	0°51'	+07'	75°	1°06'	+08'	75°	1°22'	+09'	75°	1°37'	+10'	75°	1°53'	+11'	75°	2°08'	+12'	75°	2°24'	+13'	75°	15
16	0°58'	+07'	74°	1°15'	+08'	74°	1°31'	+09'	74°	1°48'	+10'	74°	2°04'	+11'	74°	2°21'	+12'	74°	2°37'	+13'	74°	16
17	1°06'	+07'	73°	1°23'	+08'	73°	1°41'	+09'	73°	1°58'	+10'	73°	2°15'	+11'	73°	2°33'	+12'	73°	2°50'	+13'	73°	17
18	1°13'	+07'	72°	1°31'	+08'	72°	1°50'	+09'	72°	2°08'	+10'	72°	2°27'	+11'	72°	2°45'	+12'	72°	3°03'	+13'	72°	18
19	1°20'	+07'	71°	1°40'	+08'	71°	1°59'	+09'	71°	2°19'	+10'	71°	2°38'	+11'	71°	2°57'	+12'	71°	3°17'	+13'	71°	19
20	1°27'	+07'	70°	1°48'	+08'	70°	2°08'	+09'	70°	2°29'	+10'	70°	2°49'	+11'	70°	3°09'	+12'	70°	3°30'	+13'	70°	20
21	1°35'	+07'	69°	1°56'	+08'	69°	2°17'	+09'	69°	2°39'	+10'	69°	3°00'	+11'	69°	3°21'	+12'	69°	3°43'	+13'	69°	21
22	1°42'	+07'	68°	2°04'	+08'	68°	2°27'	+09'	68°	2°49'	+10'	68°	3°11'	+11'	68°	3°33'	+12'	68°	3°56'	+13'	68°	22
23	1°49'	+07'	67°	2°12'	+08'	67°	2°36'	+09'	67°	2°59'	+10'	67°	3°22'	+11'	67°	3°45'	+12'	67°	4°09'	+13'	67°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°59'	-07'	90°	1°59'	-08'	90°	1°59'	-09'	90°	1°58'	-10'	90°	1°58'	-11'	90°	1°57'	-12'	90°	1°57'	-14'	90°	0
1	1°52'	-07'	91°	1°50'	-08'	91°	1°49'	-09'	91°	1°48'	-10'	91°	1°46'	-12'	91°	1°45'	-13'	91°	1°43'	-14'	91°	1
2	1°44'	-07'	92°	1°42'	-08'	92°	1°40'	-09'	92°	1°37'	-11'	92°	1°35'	-12'	92°	1°32'	-13'	92°	1°30'	-14'	92°	2
3	1°37'	-07'	93°	1°34'	-08'	93°	1°30'	-09'	93°	1°27'	-11'	93°	1°23'	-12'	93°	1°20'	-13'	93°	1°16'	-14'	93°	3
4	1°30'	-07'	94°	1°25'	-08'	94°	1°21'	-10'	94°	1°16'	-11'	94°	1°12'	-12'	94°	1°07'	-13'	94°	1°03'	-14'	94°	4
5	1°22'	-07'	95°	1°17'	-09'	95°	1°11'	-10'	95°	1°06'	-11'	95°	1°00'	-12'	95°	0°55'	-13'	95°	0°49'	-14'	95°	5
6	1°15'	-08'	96°	1°08'	-09'	96°	1°02'	-10'	96°	0°55'	-11'	96°	0°49'	-12'	96°	0°42'	-13'	96°	0°35'	-14'	96°	6
7	1°07'	-08'	97°	1°00'	-09'	97°	0°52'	-10'	97°	0°45'	-11'	97°	0°37'	-12'	97°	0°29'	-13'	97°	0°22'	-14'	97°	7
8	1°00'	-08'	98°	0°51'	-09'	98°	0°43'	-10'	98°	0°34'	-11'	98°	0°25'	-12'	98°	0°17'	-13'	98°	<u>0°08' -14' 98°</u>		8	
9	0°52'	-08'	99°	0°43'	-09'	99°	0°33'	-10'	99°	0°23'	-11'	99°	0°14'	-12'	99°	<u>0°04' -13' 99°</u>			0°06'	+14'	81°	9
10	0°45'	-08'	100°	0°34'	-09'	100°	0°23'	-10'	100°	0°13'	-11'	100°	<u>0°02' -12' 100°</u>			0°09'	+13'	80°	0°19'	+14'	80°	10
11	0°37'	-08'	101°	0°25'	-09'	101°	0°14'	-10'	101°	<u>0°02' -11' 101°</u>			0°10'	+12'	79°	0°21'	+13'	79°	0°33'	+14'	79°	11
12	0°29'	-08'	102°	0°17'	-09'	102°	<u>0°04' -10' 102°</u>			0°09'	+11'	78°	0°21'	+12'	78°	0°34'	+13'	78°	0°46'	+14'	78°	12
13	0°22'	-08'	103°	<u>0°08' -09' 103°</u>			0°06'	+10'	77°	0°19'	+11'	77°	0°33'	+12'	77°	0°46'	+13'	77°	1°00'	+14'	77°	13
14	0°14'	-08'	104°	0°00'	+09'	76°	0°15'	+10'	76°	0°30'	+11'	76°	0°44'	+12'	76°	0°59'	+13'	76°	1°14'	+14'	76°	14
15	<u>0°07' -08' 105°</u>			0°09'	+09'	75°	0°25'	+10'	75°	0°40'	+11'	75°	0°56'	+12'	75°	1°12'	+13'	75°	1°27'	+14'	75°	15
16	0°01'	+08'	74°	0°18'	+09'	74°	0°34'	+10'	74°	0°51'	+11'	74°	1°08'	+12'	74°	1°24'	+13'	74°	1°41'	+14'	74°	16
17	0°09'	+08'	73°	0°26'	+09'	73°	0°44'	+10'	73°	1°02'	+11'	73°	1°19'	+12'	73°	1°37'	+13'	73°	1°54'	+13'	73°	17
18	0°16'	+08'	72°	0°35'	+09'	72°	0°53'	+10'	72°	1°12'	+11'	72°	1°31'	+12'	72°	1°49'	+12'	72°	2°08'	+13'	72°	18
19	0°24'	+08'	71°	0°43'	+09'	71°	1°03'	+10'	71°	1°23'	+11'	71°	1°42'	+11'	71°	2°02'	+12'	71°	2°21'	+13'	71°	19
20	0°31'	+08'	70°	0°52'	+09'	70°	1°13'	+10'	70°	1°33'	+10'	70°	1°54'	+11'	70°	2°14'	+12'	70°	2°35'	+13'	70°	20
21	0°39'	+08'	69°	1°01'	+09'	69°	1°22'	+09'	69°	1°44'	+10'	69°	2°05'	+11'	69°	2°27'	+12'	69°	2°48'	+13'	69°	21
22	0°47'	+08'	68°	1°09'	+09'	68°	1°32'	+09'	68°	1°54'	+10'	68°	2°17'	+11'	68°	2°39'	+12'	68°	3°01'	+13'	68°	22
23	0°54'	+08'	67°	1°18'	+08'	67°	1°41'	+09'	67°	2°05'	+10'	67°	2°28'	+11'	67°	2°51'	+12'	67°	3°15'	+13'	67°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	2°59'	-07'	90°	2°58'	-08'	90°	2°58'	-09'	90°	2°57'	-10'	91°	2°57'	-11'	91°	2°56'	-13'	91°	2°55'	-14'	91°	0
1	2°51'	-07'	91°	2°50'	-08'	91°	2°48'	-09'	91°	2°47'	-11'	92°	2°45'	-12'	92°	2°44'	-13'	92°	2°42'	-14'	92°	1
2	2°44'	-07'	92°	2°41'	-08'	92°	2°39'	-10'	92°	2°36'	-11'	92°	2°34'	-12'	93°	2°31'	-13'	93°	2°28'	-14'	93°	2
3	2°36'	-07'	93°	2°33'	-09'	93°	2°29'	-10'	93°	2°26'	-11'	93°	2°22'	-12'	94°	2°18'	-13'	94°	2°15'	-14'	94°	3
4	2°29'	-08'	94°	2°24'	-09'	94°	2°20'	-10'	94°	2°15'	-11'	94°	2°10'	-12'	95°	2°06'	-13'	95°	2°01'	-14'	95°	4
5	2°21'	-08'	95°	2°16'	-09'	95°	2°10'	-10'	95°	2°05'	-11'	95°	1°59'	-12'	95°	1°53'	-13'	96°	1°47'	-14'	96°	5
6	2°14'	-08'	96°	2°07'	-09'	96°	2°01'	-10'	96°	1°54'	-11'	96°	1°47'	-12'	96°	1°40'	-13'	96°	1°34'	-14'	97°	6
7	2°06'	-08'	97°	1°59'	-09'	97°	1°51'	-10'	97°	1°43'	-11'	97°	1°35'	-12'	97°	1°28'	-13'	97°	1°20'	-14'	97°	7
8	1°59'	-08'	98°	1°50'	-09'	98°	1°41'	-10'	98°	1°32'	-11'	98°	1°24'	-12'	98°	1°15'	-13'	98°	1°06'	-14'	98°	8
9	1°51'	-08'	99°	1°41'	-09'	99°	1°31'	-10'	99°	1°22'	-11'	99°	1°12'	-12'	99°	1°02'	-13'	99°	0°52'	-14'	99°	9
10	1°43'	-08'	100°	1°32'	-09'	100°	1°22'	-10'	100°	1°11'	-11'	100°	1°00'	-12'	100°	0°49'	-13'	100°	0°38'	-14'	100°	10
11	1°35'	-08'	101°	1°24'	-09'	101°	1°12'	-10'	101°	1°00'	-11'	101°	0°48'	-12'	101°	0°36'	-13'	101°	0°25'	-14'	101°	11
12	1°28'	-08'	102°	1°15'	-09'	102°	1°02'	-10'	102°	0°49'	-11'	102°	0°36'	-12'	102°	0°24'	-13'	102°	<u>0°11' -14' 102°</u>		12	
13	1°20'	-08'	103°	1°06'	-09'	103°	0°52'	-10'	103°	0°38'	-11'	103°	0°25'	-12'	103°	<u>0°11' -13' 103°</u>			0°03'	+14'	77°	13
14	1°12'	-08'	104°	0°57'	-09'	104°	0°42'	-10'	104°	0°28'	-11'	104°	0°13'	-12'	104°	0°02'	+13'	76°	0°17'	+14'	76°	14
15	1°04'	-08'	105°	0°48'	-09'	105°	0°32'	-10'	105°	0°17'	-11'	105°	<u>0°01' -12' 105°</u>			0°15'	+13'	75°	0°31'	+14'	75°	15
16	0°56'	-08'	106°	0°39'	-09'	106°	0°23'	-10'	106°	<u>0°06' -11' 106°</u>			0°11'	+12'	74°	0°28'	+13'	74°	0°45'	+14'	74°	16
17	0°48'	-08'	107°	0°30'	-09'	107°	0°13'	-10'	107°	0°05'	+11'	73°	0°23'	+12'	73°	0°41'	+13'	73°	0°58'	+14'	73°	17
18	0°40'	-08'	108°	0°22'	-09'	108°	<u>0°03' -10' 108°</u>			0°16'	+11'	72°	0°35'	+12'	72°	0°53'	+13'	72°	1°12'	+14'	72°	18
19	0°32'	-08'	109°	0°13'	-09'	109°	0°07'	+10'	71°	0°27'	+11'	71°	0°47'	+12'	71°	1°06'	+13'	71°	1°26'	+14'	71°	19
20	0°25'	-08'	110°	<u>0°04' -09' 110°</u>			0°17'	+10'	70°	0°38'	+11'	70°	0°58'	+12'	70°	1°19'	+13'	70°	1°40'	+14'	70°	20
21	0°17'	-08'	111°	0°05'	+09'	69°	0°27'	+10'	69°	0°49'	+11'	69°	1°10'	+12'	69°	1°32'	+13'	69°	1°53'	+14'	69°	21
22	0°09'	-08'	112°	0°14'	+09'	68°	0°37'	+10'	68°	0°59'	+11'	68°	1°22'	+12'	68°	1°45'	+13'	68°	2°07'	+14'	68°	22
23	<u>0°01' -08' 113°</u>			0°23'	+09'	67°	0°47'	+10'	67°	1°10'	+11'	67°	1°34'	+12'	67°	1°57'	+13'	67°	2°21'	+14'	67°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°58'	-07'	90°	3°58'	-08'	91°	3°57'	-09'	91°	3°56'	-10'	91°	3°56'	-12'	91°	3°55'	-13'	91°	3°54'	-14'	91°	0
1	3°51'	-07'	91°	3°49'	-08'	92°	3°48'	-10'	92°	3°46'	-11'	92°	3°44'	-12'	92°	3°42'	-13'	92°	3°40'	-14'	92°	1
2	3°43'	-08'	92°	3°41'	-09'	93°	3°38'	-10'	93°	3°35'	-11'	93°	3°32'	-12'	93°	3°30'	-13'	93°	3°27'	-14'	93°	2
3	3°36'	-08'	93°	3°32'	-09'	94°	3°29'	-10'	94°	3°25'	-11'	94°	3°21'	-12'	94°	3°17'	-13'	94°	3°13'	-14'	94°	3
4	3°28'	-08'	94°	3°24'	-09'	95°	3°19'	-10'	95°	3°14'	-11'	95°	3°09'	-12'	95°	3°04'	-13'	95°	2°59'	-14'	95°	4
5	3°21'	-08'	95°	3°15'	-09'	96°	3°09'	-10'	96°	3°03'	-11'	96°	2°57'	-12'	96°	2°51'	-13'	96°	2°45'	-14'	96°	5
6	3°13'	-08'	96°	3°06'	-09'	97°	2°59'	-10'	97°	2°53'	-11'	97°	2°46'	-12'	97°	2°39'	-13'	97°	2°32'	-14'	97°	6
7	3°05'	-08'	97°	2°57'	-09'	97°	2°50'	-10'	98°	2°42'	-11'	98°	2°34'	-12'	98°	2°26'	-13'	98°	2°18'	-14'	98°	7
8	2°57'	-08'	98°	2°49'	-09'	98°	2°40'	-10'	99°	2°31'	-11'	99°	2°22'	-12'	99°	2°13'	-13'	99°	2°04'	-14'	99°	8
9	2°50'	-08'	99°	2°40'	-09'	99°	2°30'	-10'	100°	2°20'	-11'	100°	2°10'	-12'	100°	2°00'	-13'	100°	1°50'	-14'	100°	9
10	2°42'	-08'	100°	2°31'	-09'	100°	2°20'	-10'	101°	2°09'	-11'	101°	1°58'	-12'	101°	1°47'	-13'	101°	1°36'	-14'	101°	10
11	2°34'	-08'	101°	2°22'	-09'	101°	2°10'	-10'	101°	1°58'	-11'	102°	1°46'	-12'	102°	1°34'	-13'	102°	1°22'	-14'	102°	11
12	2°26'	-08'	102°	2°13'	-09'	102°	2°00'	-10'	102°	1°47'	-11'	103°	1°34'	-12'	103°	1°21'	-13'	103°	1°08'	-14'	103°	12
13	2°18'	-08'	103°	2°04'	-09'	103°	1°50'	-10'	103°	1°36'	-11'	103°	1°22'	-12'	104°	1°08'	-13'	104°	0°54'	-14'	104°	13
14	2°10'	-08'	104°	1°55'	-09'	104°	1°40'	-10'	104°	1°25'	-11'	104°	1°10'	-12'	105°	0°55'	-13'	105°	0°40'	-14'	105°	14
15	2°01'	-08'	105°	1°46'	-09'	105°	1°30'	-10'	105°	1°14'	-11'	105°	0°58'	-12'	105°	0°42'	-13'	105°	0°26'	-14'	106°	15
16	1°53'	-08'	106°	1°36'	-09'	106°	1°19'	-10'	106°	1°02'	-11'	106°	0°45'	-12'	106°	0°28'	-13'	106°	<u>0°11' -14' 106°</u>			16
17	1°45'	-08'	107°	1°27'	-09'	107°	1°09'	-10'	107°	0°51'	-11'	107°	0°33'	-12'	107°	0°15'	-13'	107°	0°03'	+14'	73°	17
18	1°37'	-08'	108°	1°18'	-09'	108°	0°59'	-10'	108°	0°40'	-11'	108°	0°21'	-12'	108°	<u>0°02' -13' 108°</u>			0°17'	+14'	72°	18
19	1°29'	-08'	109°	1°09'	-09'	109°	0°49'	-10'	109°	0°29'	-11'	109°	<u>0°09' -12' 109°</u>			0°11'	+13'	71°	0°31'	+14'	71°	19
20	1°20'	-08'	110°	1°00'	-09'	110°	0°39'	-10'	110°	0°18'	-11'	110°	0°03'	+12'	70°	0°24'	+13'	70°	0°45'	+14'	70°	20
21	1°12'	-08'	111°	0°50'	-09'	111°	0°28'	-10'	111°	<u>0°07' -11' 111°</u>			0°15'	+12'	69°	0°37'	+13'	69°	0°59'	+14'	69°	21
22	1°04'	-08'	112°	0°41'	-09'	112°	0°18'	-10'	112°	0°05'	+11'	68°	0°27'	+12'	68°	0°50'	+13'	68°	1°13'	+14'	68°	22
23	<u>0°55' -08' 113°</u>	<u>0°32' -09' 113°</u>	<u>0°08' -10' 113°</u>				0°16'	+11'	67°	0°40'	+12'	67°	0°40'	+12'	67°	1°03'	+13'	67°	1°27'	+14'	67°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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°	7			8			9			10			11			12			13			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'	-07'	91°	4°57'	-08'	91°	4°56'	-09'	91°	4°55'	-11'	91°	4°54'	-12'	91°	4°53'	-13'	91°	4°52'	-14'	91°	0
1	4°50'	-07'	92°	4°49'	-09'	92°	4°47'	-10'	92°	4°45'	-11'	92°	4°43'	-12'	92°	4°41'	-13'	92°	4°39'	-14'	92°	1
2	4°43'	-08'	93°	4°40'	-09'	93°	4°37'	-10'	93°	4°34'	-11'	93°	4°31'	-12'	93°	4°28'	-13'	93°	4°25'	-14'	93°	2
3	4°35'	-08'	94°	4°32'	-09'	94°	4°28'	-10'	94°	4°24'	-11'	94°	4°20'	-12'	94°	4°15'	-13'	94°	4°11'	-14'	94°	3
4	4°28'	-08'	95°	4°23'	-09'	95°	4°18'	-10'	95°	4°13'	-11'	95°	4°08'	-12'	95°	4°03'	-13'	95°	3°57'	-14'	95°	4
5	4°20'	-08'	96°	4°14'	-09'	96°	4°08'	-10'	96°	4°02'	-11'	96°	3°56'	-12'	96°	3°50'	-13'	96°	3°44'	-14'	96°	5
6	4°12'	-08'	97°	4°05'	-09'	97°	3°58'	-10'	97°	3°51'	-11'	97°	3°44'	-12'	97°	3°37'	-13'	97°	3°30'	-14'	97°	6
7	4°04'	-08'	98°	3°56'	-09'	98°	3°48'	-10'	98°	3°40'	-11'	98°	3°32'	-12'	98°	3°24'	-13'	98°	3°16'	-14'	98°	7
8	3°56'	-08'	99°	3°47'	-09'	99°	3°38'	-10'	99°	3°29'	-11'	99°	3°20'	-12'	99°	3°11'	-13'	99°	3°02'	-14'	99°	8
9	3°48'	-08'	100°	3°38'	-09'	100°	3°28'	-10'	100°	3°18'	-11'	100°	3°08'	-12'	100°	2°58'	-13'	100°	2°47'	-14'	100°	9
10	3°40'	-08'	101°	3°29'	-09'	101°	3°18'	-10'	101°	3°07'	-11'	101°	2°56'	-12'	101°	2°45'	-13'	101°	2°33'	-14'	101°	10
11	3°32'	-08'	102°	3°20'	-09'	102°	3°08'	-10'	102°	2°56'	-11'	102°	2°44'	-12'	102°	2°31'	-13'	102°	2°19'	-14'	102°	11
12	3°24'	-08'	103°	3°11'	-09'	103°	2°58'	-10'	103°	2°45'	-11'	103°	2°31'	-12'	103°	2°18'	-13'	103°	2°05'	-14'	103°	12
13	3°16'	-08'	104°	3°02'	-09'	104°	2°47'	-10'	104°	2°33'	-11'	104°	2°19'	-12'	104°	2°05'	-13'	104°	1°51'	-14'	104°	13
14	3°07'	-08'	105°	2°52'	-09'	105°	2°37'	-10'	105°	2°22'	-11'	105°	2°07'	-12'	105°	1°51'	-13'	105°	1°36'	-14'	105°	14
15	2°59'	-08'	106°	2°43'	-09'	106°	2°27'	-10'	106°	2°11'	-11'	106°	1°54'	-12'	106°	1°38'	-13'	106°	1°22'	-14'	106°	15
16	2°50'	-08'	107°	2°33'	-09'	107°	2°16'	-10'	107°	1°59'	-11'	107°	1°42'	-12'	107°	1°25'	-13'	107°	1°07'	-14'	107°	16
17	2°42'	-09'	107°	2°24'	-10'	108°	2°06'	-11'	108°	1°48'	-11'	108°	1°29'	-12'	108°	1°11'	-13'	108°	0°53'	-14'	108°	17
18	2°33'	-09'	108°	2°14'	-10'	109°	1°55'	-11'	109°	1°36'	-12'	109°	1°17'	-12'	109°	0°58'	-13'	109°	0°39'	-14'	109°	18
19	2°25'	-09'	109°	2°05'	-10'	110°	1°45'	-11'	110°	1°25'	-12'	110°	1°05'	-13'	110°	0°44'	-13'	110°	0°24'	-14'	110°	19
20	2°16'	-09'	110°	1°55'	-10'	111°	1°34'	-11'	111°	1°13'	-12'	111°	0°52'	-13'	111°	0°31'	-13'	111°	<u>0°10' -14' 111°</u>			20
21	2°08'	-09'	111°	1°46'	-10'	111°	1°24'	-11'	112°	1°02'	-12'	112°	0°40'	-13'	112°	0°17'	-13'	112°	0°05'	+14'	68°	21
22	1°59'	-09'	112°	1°36'	-10'	112°	1°13'	-11'	113°	0°50'	-12'	113°	0°27'	-13'	113°	<u>0°04' -13' 113°</u>			0°19'	+14'	67°	22
23	<u>1°50' -09' 113°</u>	<u>1°26' -10' 113°</u>	<u>1°02' -11' 113°</u>				0°38'	-12'	114°	0°14'	-13'	114°	0°14'	-13'	114°	0°10'	+13'	66°	0°33'	+14'	66°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

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

Dec°	7			8			9			10			11			12			13			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'	-07'	91°	5°56'	-08'	91°	5°56'	-09'	91°	5°55'	-11'	91°	5°53'	-12'	91°	5°52'	-13'	91°	5°51'	-14'	91°	0
1	5°50'	-08'	92°	5°48'	-09'	92°	5°46'	-10'	92°	5°44'	-11'	92°	5°42'	-12'	92°	5°40'	-13'	92°	5°37'	-14'	92°	1
2	5°42'	-08'	93°	5°39'	-09'	93°	5°36'	-10'	93°	5°33'	-11'	93°	5°30'	-12'	93°	5°27'	-13'	93°	5°23'	-14'	93°	2
3	5°35'	-08'	94°	5°31'	-09'	94°	5°27'	-10'	94°	5°23'	-11'	94°	5°18'	-12'	94°	5°14'	-13'	94°	5°10'	-14'	94°	3
4	5°27'	-08'	95°	5°22'	-09'	95°	5°17'	-10'	95°	5°12'	-11'	95°	5°07'	-12'	95°	5°01'	-13'	95°	4°56'	-14'	95°	4
5	5°19'	-08'	96°	5°13'	-09'	96°	5°07'	-10'	96°	5°01'	-11'	96°	4°55'	-12'	96°	4°48'	-13'	96°	4°42'	-14'	96°	5
6	5°11'	-08'	97°	5°04'	-09'	97°	4°57'	-10'	97°	4°50'	-11'	97°	4°43'	-12'	97°	4°35'	-13'	97°	4°28'	-14'	97°	6
7	5°03'	-08'	98°	4°55'	-09'	98°	4°47'	-10'	98°	4°39'	-11'	98°	4°30'	-12'	98°	4°22'	-13'	98°	4°14'	-14'	98°	7
8	4°55'	-08'	99°	4°46'	-09'	99°	4°37'	-10'	99°	4°28'	-11'	99°	4°18'	-12'	99°	4°09'	-13'	99°	3°59'	-14'	99°	8
9	4°47'	-08'	100°	4°37'	-09'	100°	4°27'	-10'	100°	4°16'	-11'	100°	4°06'	-12'	100°	3°56'	-13'	100°	3°45'	-14'	100°	9
10	4°39'	-08'	101°	4°28'	-09'	101°	4°16'	-10'	101°	4°05'	-11'	101°	3°54'	-12'	101°	3°42'	-13'	101°	3°31'	-14'	101°	10
11	4°30'	-08'	102°	4°18'	-09'	102°	4°06'	-10'	102°	3°54'	-11'	102°	3°41'	-12'	102°	3°29'	-13'	102°	3°16'	-14'	102°	11
12	4°22'	-09'	103°	4°09'	-10'	103°	3°56'	-11'	103°	3°42'	-12'	103°	3°29'	-13'	103°	3°15'	-14'	103°	3°02'	-15'	103°	12
13	4°14'	-09'	104°	3°59'	-10'	104°	3°45'	-11'	104°	3°31'	-12'	104°	3°16'	-13'	104°	3°02'	-14'	104°	2°47'	-15'	104°	13
14	4°05'	-09'	105°	3°50'	-10'	105°	3°34'	-11'	105°	3°19'	-12'	105°	3°04'	-13'	105°	2°48'	-14'	105°	2°33'	-15'	105°	14
15	3°56'	-09'	106°	3°40'	-10'	106°	3°24'	-11'	106°	3°07'	-12'	106°	2°51'	-13'	106°	2°35'	-14'	106°	2°18'	-15'	106°	15
16	3°48'	-09'	107°	3°30'	-10'	107°	3°13'	-11'	107°	2°56'	-12'	107°	2°38'	-13'	107°	2°21'	-14'	107°	2°03'	-15'	107°	16
17	3°39'	-09'	108°	3°21'	-10'	108°	3°02'	-11'	108°	2°44'	-12'	108°	2°26'	-13'	108°	2°07'	-14'	108°	1°49'	-15'	108°	17
18	3°30'	-09'	109°	3°11'	-10'	109°	2°51'	-11'	109°	2°32'	-12'	109°	2°13'	-13'	109°	1°53'	-14'	109°	1°34'	-15'	109°	18
19	3°21'	-09'	110°	3°01'	-10'	110°	2°41'	-11'	110°	2°20'	-12'	110°	2°00'	-13'	110°	1°40'	-14'	110°	1°19'	-15'	110°	19
20	3°12'	-09'	111°	2°51'	-10'	111°	2°30'	-11'	111°	2°08'	-12'	111°	1°47'	-13'	111°	1°26'	-14'	111°	1°05'	-15'	111°	20
21	3°03'	-09'	112°	2°41'	-10'	112°	2°19'	-11'	112°	1°56'	-12'	112°	1°34'	-13'	112°	1°12'	-14'	112°	0°50'	-15'	112°	21
22	2°54'	-09'	113°	2°31'	-10'	113°	2°08'	-11'	113°	1°45'	-12'	113°	1°21'	-13'	113°	0°58'	-14'	113°	0°35'	-15'	113°	22
23	2°45'	-09'	114°	2°21'	-10'	114°	1°57'	-11'	114°	1°33'	-12'	114°	1°08'	-13'	114°	0°44'	-14'	114°	0°20'	-15'	114°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

84° 276° LHA

**Latitude CONTRARY to 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

83° 277° LHA

**Latitude CONTRARY to Declination**

83° 277° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°57'	-07'	91°	6°56'	-08'	91°	6°55'	-10'	91°	6°54'	-11'	91°	6°52'	-12'	91°	6°51'	-13'	91°	6°49'	-14'	92°	0
1	6°49'	-08'	92°	6°47'	-09'	92°	6°45'	-10'	92°	6°43'	-11'	92°	6°41'	-12'	92°	6°38'	-13'	92°	6°36'	-14'	93°	1
2	6°42'	-08'	93°	6°39'	-09'	93°	6°36'	-10'	93°	6°32'	-11'	93°	6°29'	-12'	93°	6°25'	-13'	93°	6°22'	-14'	94°	2
3	6°34'	-08'	94°	6°30'	-09'	94°	6°26'	-10'	94°	6°22'	-11'	94°	6°17'	-12'	94°	6°13'	-13'	94°	6°08'	-14'	95°	3
4	6°26'	-08'	95°	6°21'	-09'	95°	6°16'	-10'	95°	6°11'	-11'	95°	6°05'	-12'	95°	6°00'	-13'	95°	5°54'	-14'	95°	4
5	6°19'	-08'	96°	6°12'	-09'	96°	6°06'	-10'	96°	6°00'	-11'	96°	5°53'	-12'	96°	5°47'	-13'	96°	5°40'	-14'	96°	5
6	6°10'	-08'	97°	6°03'	-09'	97°	5°56'	-10'	97°	5°49'	-11'	97°	5°41'	-12'	97°	5°33'	-13'	97°	5°26'	-14'	97°	6
7	6°02'	-08'	98°	5°54'	-09'	98°	5°46'	-10'	98°	5°37'	-11'	98°	5°29'	-12'	98°	5°20'	-13'	98°	5°11'	-14'	98°	7
8	5°54'	-08'	99°	5°45'	-09'	99°	5°35'	-10'	99°	5°26'	-11'	99°	5°16'	-12'	99°	5°07'	-13'	99°	4°57'	-14'	99°	8
9	5°46'	-08'	100°	5°35'	-09'	100°	5°25'	-10'	100°	5°15'	-12'	100°	5°04'	-13'	100°	4°53'	-14'	100°	4°43'	-15'	100°	9
10	5°37'	-09'	101°	5°26'	-10'	101°	5°15'	-11'	101°	5°03'	-12'	101°	4°51'	-13'	101°	4°40'	-14'	101°	4°28'	-15'	101°	10
11	5°29'	-09'	102°	5°16'	-10'	102°	5°04'	-11'	102°	4°51'	-12'	102°	4°39'	-13'	102°	4°26'	-14'	102°	4°13'	-15'	102°	11
12	5°20'	-09'	103°	5°07'	-10'	103°	4°53'	-11'	103°	4°40'	-12'	103°	4°26'	-13'	103°	4°12'	-14'	103°	3°59'	-15'	103°	12
13	5°11'	-09'	104°	4°57'	-10'	104°	4°43'	-11'	104°	4°28'	-12'	104°	4°13'	-13'	104°	3°59'	-14'	104°	3°44'	-15'	104°	13
14	5°03'	-09'	105°	4°47'	-10'	105°	4°32'	-11'	105°	4°16'	-12'	105°	4°01'	-13'	105°	3°45'	-14'	105°	3°29'	-15'	105°	14
15	4°54'	-09'	106°	4°37'	-10'	106°	4°21'	-11'	106°	4°04'	-12'	106°	3°48'	-13'	106°	3°31'	-14'	106°	3°14'	-15'	106°	15
16	4°45'	-09'	107°	4°27'	-10'	107°	4°10'	-11'	107°	3°52'	-12'	107°	3°35'	-13'	107°	3°17'	-14'	107°	2°59'	-15'	107°	16
17	4°35'	-09'	108°	4°17'	-10'	108°	3°59'	-11'	108°	3°40'	-12'	108°	3°22'	-13'	108°	3°03'	-14'	108°	2°44'	-15'	108°	17
18	4°26'	-09'	109°	4°07'	-10'	109°	3°48'	-11'	109°	3°28'	-12'	109°	3°09'	-13'	109°	2°49'	-14'	109°	2°29'	-15'	109°	18
19	4°17'	-09'	110°	3°57'	-10'	110°	3°36'	-11'	110°	3°16'	-12'	110°	2°55'	-13'	110°	2°35'	-14'	110°	2°14'	-15'	110°	19
20	4°08'	-09'	111°	3°46'	-10'	111°	3°25'	-11'	111°	3°04'	-12'	111°	2°42'	-13'	111°	2°21'	-14'	111°	1°59'	-15'	111°	20
21	3°58'	-09'	112°	3°36'	-10'	112°	3°14'	-11'	112°	2°51'	-12'	112°	2°29'	-13'	112°	2°06'	-14'	112°	1°44'	-15'	112°	21
22	3°49'	-10'	113°	3°26'	-11'	113°	3°02'	-11'	113°	2°39'	-12'	113°	2°16'	-13'	113°	1°52'	-14'	113°	1°29'	-15'	113°	22
23	3°39'	-10'	114°	3°15'	-11'	114°	2°51'	-12'	114°	2°27'	-12'	114°	2°02'	-13'	114°	1°38'	-14'	114°	1°14'	-15'	114°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

83° 277° LHA

**Latitude CONTRARY to 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

82° 278° LHA

**Latitude CONTRARY to Declination**

82° 278° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	7°56'	-07'	91°	7°55'	-09'	91°	7°54'	-10'	91°	7°53'	-11'	91°	7°51'	-12'	92°	7°49'	-13'	92°	7°48'	-14'	92°	0
1	7°49'	-08'	92°	7°47'	-09'	92°	7°45'	-10'	92°	7°42'	-11'	92°	7°39'	-12'	93°	7°37'	-13'	93°	7°34'	-14'	93°	1
2	7°41'	-08'	93°	7°38'	-09'	93°	7°35'	-10'	93°	7°31'	-11'	93°	7°28'	-12'	94°	7°24'	-13'	94°	7°20'	-14'	94°	2
3	7°34'	-08'	94°	7°29'	-09'	94°	7°25'	-10'	94°	7°20'	-11'	94°	7°16'	-12'	95°	7°11'	-13'	95°	7°06'	-14'	95°	3
4	7°26'	-08'	95°	7°20'	-09'	95°	7°15'	-10'	95°	7°10'	-11'	95°	7°04'	-12'	95°	6°58'	-13'	96°	6°52'	-14'	96°	4
5	7°18'	-08'	96°	7°11'	-09'	96°	7°05'	-10'	96°	6°58'	-11'	96°	6°52'	-12'	96°	6°45'	-13'	97°	6°38'	-14'	97°	5
6	7°10'	-08'	97°	7°02'	-09'	97°	6°55'	-10'	97°	6°47'	-11'	97°	6°39'	-12'	97°	6°32'	-13'	98°	6°24'	-14'	98°	6
7	7°01'	-08'	98°	6°53'	-09'	98°	6°44'	-10'	98°	6°36'	-11'	98°	6°27'	-12'	98°	6°18'	-14'	99°	6°09'	-15'	99°	7
8	6°53'	-09'	99°	6°44'	-10'	99°	6°34'	-11'	99°	6°24'	-12'	99°	6°15'	-13'	99°	6°05'	-14'	100°	5°55'	-15'	100°	8
9	6°44'	-09'	100°	6°34'	-10'	100°	6°23'	-11'	100°	6°13'	-12'	100°	6°02'	-13'	100°	5°51'	-14'	101°	5°40'	-15'	101°	9
10	6°36'	-09'	101°	6°24'	-10'	101°	6°13'	-11'	101°	6°01'	-12'	101°	5°49'	-13'	101°	5°37'	-14'	101°	5°25'	-15'	102°	10
11	6°27'	-09'	102°	6°15'	-10'	102°	6°02'	-11'	102°	5°49'	-12'	102°	5°36'	-13'	102°	5°23'	-14'	102°	5°10'	-15'	103°	11
12	6°18'	-09'	103°	6°05'	-10'	103°	5°51'	-11'	103°	5°37'	-12'	103°	5°23'	-13'	103°	5°10'	-14'	103°	4°56'	-15'	104°	12
13	6°09'	-09'	104°	5°55'	-10'	104°	5°40'	-11'	104°	5°25'	-12'	104°	5°10'	-13'	104°	4°56'	-14'	104°	4°41'	-15'	105°	13
14	6°00'	-09'	105°	5°45'	-10'	105°	5°29'	-11'	105°	5°13'	-12'	105°	4°57'	-13'	105°	4°41'	-14'	105°	4°26'	-15'	105°	14
15	5°51'	-09'	106°	5°34'	-10'	106°	5°18'	-11'	106°	5°01'	-12'	106°	4°44'	-13'	106°	4°27'	-14'	106°	4°10'	-15'	106°	15
16	5°42'	-09'	107°	5°24'	-10'	107°	5°06'	-11'	107°	4°49'	-12'	107°	4°31'	-13'	107°	4°13'	-14'	107°	3°55'	-15'	107°	16
17	5°32'	-10'	108°	5°14'	-10'	108°	4°55'	-11'	108°	4°36'	-12'	108°	4°18'	-13'	108°	3°59'	-14'	108°	3°40'	-15'	108°	17
18	5°23'	-10'	109°	5°03'	-11'	109°	4°44'	-12'	109°	4°24'	-13'	109°	4°04'	-13'	109°	3°44'	-14'	109°	3°25'	-15'	109°	18
19	5°13'	-10'	110°	4°53'	-11'	110°	4°32'	-12'	110°	4°11'	-13'	110°	3°51'	-14'	110°	3°30'	-15'	110°	3°09'	-15'	110°	19
20	5°03'	-10'	111°	4°42'	-11'	111°	4°20'	-12'	111°	3°59'	-13'	111°	3°37'	-14'	111°	3°15'	-15'	111°	2°54'	-16'	111°	20
21	4°54'	-10'	112°	4°31'	-11'	112°	4°09'	-12'	112°	3°46'	-13'	112°	3°24'	-14'	112°	3°01'	-15'	112°	2°38'	-16'	112°	21
22	4°44'	-10'	113°	4°20'	-11'	113°	3°57'	-12'	113°	3°33'	-13'	113°	3°10'	-14'	113°	2°46'	-15'	113°	2°23'	-16'	113°	22
23	4°34'	-10'	114°	4°09'	-11'	114°	3°45'	-12'	114°	3°21'	-13'	114°	2°56'	-14'	114°	2°32'	-15'	114°	2°07'	-16'	114°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

82° 278° LHA

**Latitude CONTRARY to 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

81° 279° LHA

**Latitude CONTRARY to Declination**

81° 279° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	8°56'	-07'	91°	8°55'	-09'	91°	8°53'	-10'	91°	8°52'	-11'	92°	8°50'	-12'	92°	8°48'	-13'	92°	8°46'	-14'	92°	0
1	8°48'	-08'	92°	8°46'	-09'	92°	8°44'	-10'	92°	8°41'	-11'	93°	8°38'	-12'	93°	8°35'	-13'	93°	8°32'	-14'	93°	1
2	8°41'	-08'	93°	8°37'	-09'	93°	8°34'	-10'	93°	8°30'	-11'	94°	8°27'	-12'	94°	8°23'	-13'	94°	8°18'	-14'	94°	2
3	8°33'	-08'	94°	8°29'	-09'	94°	8°24'	-10'	94°	8°19'	-11'	95°	8°15'	-12'	95°	8°10'	-13'	95°	8°04'	-14'	95°	3
4	8°25'	-08'	95°	8°20'	-09'	95°	8°14'	-10'	95°	8°08'	-11'	96°	8°02'	-12'	96°	7°56'	-13'	96°	7°50'	-14'	96°	4
5	8°17'	-08'	96°	8°10'	-09'	96°	8°04'	-10'	96°	7°57'	-11'	97°	7°50'	-12'	97°	7°43'	-13'	97°	7°36'	-14'	97°	5
6	8°09'	-08'	97°	8°01'	-09'	97°	7°54'	-10'	97°	7°46'	-12'	98°	7°38'	-13'	98°	7°30'	-14'	98°	7°22'	-15'	98°	6
7	8°00'	-09'	98°	7°52'	-10'	98°	7°43'	-11'	98°	7°34'	-12'	99°	7°25'	-13'	99°	7°16'	-14'	99°	7°07'	-15'	99°	7
8	7°52'	-09'	99°	7°42'	-10'	99°	7°32'	-11'	99°	7°23'	-12'	100°	7°13'	-13'	100°	7°03'	-14'	100°	6°52'	-15'	100°	8
9	7°43'	-09'	100°	7°32'	-10'	100°	7°22'	-11'	100°	7°11'	-12'	101°	7°00'	-13'	101°	6°49'	-14'	101°	6°37'	-15'	101°	9
10	7°34'	-09'	101°	7°23'	-10'	101°	7°11'	-11'	101°	6°59'	-12'	101°	6°47'	-13'	102°	6°35'	-14'	102°	6°23'	-15'	102°	10
11	7°25'	-09'	102°	7°13'	-10'	102°	7°00'	-11'	102°	6°47'	-12'	102°	6°34'	-13'	103°	6°21'	-14'	103°	6°08'	-15'	103°	11
12	7°16'	-09'	103°	7°03'	-10'	103°	6°49'	-11'	103°	6°35'	-12'	103°	6°21'	-13'	104°	6°07'	-14'	104°	5°52'	-15'	104°	12
13	7°07'	-09'	104°	6°52'	-10'	104°	6°37'	-11'	104°	6°23'	-12'	104°	6°08'	-13'	105°	5°52'	-14'	105°	5°37'	-15'	105°	13
14	6°58'	-09'	105°	6°42'	-10'	105°	6°26'	-11'	105°	6°10'	-12'	105°	5°54'	-13'	106°	5°38'	-14'	106°	5°22'	-15'	106°	14
15	6°48'	-10'	106°	6°31'	-11'	106°	6°15'	-12'	106°	5°58'	-13'	106°	5°41'	-14'	107°	5°24'	-15'	107°	5°06'	-16'	107°	15
16	6°39'	-10'	107°	6°21'	-11'	107°	6°03'	-12'	107°	5°45'	-13'	107°	5°27'	-14'	107°	5°09'	-15'	108°	4°51'	-16'	108°	16
17	6°29'	-10'	108°	6°10'	-11'	108°	5°51'	-12'	108°	5°32'	-13'	108°	5°13'	-14'	108°	4°54'	-15'	109°	4°35'	-16'	109°	17
18	6°19'	-10'	109°	5°59'	-11'	109°	5°40'	-12'	109°	5°20'	-13'	109°	5°00'	-14'	109°	4°40'	-15'	110°	4°20'	-16'	110°	18
19	6°09'	-10'	110°	5°48'	-11'	110°	5°28'	-12'	110°	5°07'	-13'	110°	4°46'	-14'	110°	4°25'	-15'	111°	4°04'	-16'	111°	19
20	5°59'	-10'	111°	5°37'	-11'	111°	5°16'	-12'	111°	4°54'	-13'	111°	4°32'	-14'	111°	4°10'	-15'	111°	3°48'	-16'	112°	20
21	5°49'	-10'	112°	5°26'	-11'	112°	5°04'	-12'	112°	4°41'	-13'	112°	4°18'	-14'	112°	3°55'	-15'	112°	3°32'	-16'	113°	21
22	5°39'	-10'	113°	5°15'	-11'	113°	4°51'	-12'	113°	4°28'	-13'	113°	4°04'	-14'	113°	3°40'	-15'	113°	3°16'	-16'	113°	22
23	5°28'	-10'	114°	5°04'	-11'	114°	4°39'	-12'	114°	4°14'	-13'	114°	3°50'	-14'	114°	3°25'	-15'	114°	3°00'	-16'	114°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

81° 279° LHA

**Latitude CONTRARY to 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

80° 280° LHA

**Latitude CONTRARY to Declination**

80° 280° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	9°55'	-08'	91°	9°54'	-09'	91°	9°53'	-10'	92°	9°51'	-11'	92°	9°49'	-12'	92°	9°47'	-13'	92°	9°44'	-14'	92°	0
1	9°48'	-08'	92°	9°46'	-09'	92°	9°43'	-10'	93°	9°40'	-11'	93°	9°37'	-12'	93°	9°34'	-13'	93°	9°31'	-14'	93°	1
2	9°40'	-08'	93°	9°37'	-09'	93°	9°33'	-10'	94°	9°29'	-11'	94°	9°25'	-12'	94°	9°21'	-13'	94°	9°17'	-14'	94°	2
3	9°32'	-08'	94°	9°28'	-09'	94°	9°23'	-10'	95°	9°18'	-11'	95°	9°13'	-12'	95°	9°08'	-13'	95°	9°03'	-14'	95°	3
4	9°24'	-08'	95°	9°19'	-09'	95°	9°13'	-10'	96°	9°07'	-11'	96°	9°01'	-12'	96°	8°55'	-13'	96°	8°48'	-14'	96°	4
5	9°16'	-08'	96°	9°10'	-09'	96°	9°03'	-10'	97°	8°56'	-11'	97°	8°49'	-13'	97°	8°41'	-14'	97°	8°34'	-15'	97°	5
6	9°08'	-09'	97°	9°00'	-10'	97°	8°52'	-11'	98°	8°44'	-12'	98°	8°36'	-13'	98°	8°28'	-14'	98°	8°19'	-15'	98°	6
7	8°59'	-09'	98°	8°51'	-10'	98°	8°42'	-11'	99°	8°33'	-12'	99°	8°23'	-13'	99°	8°14'	-14'	99°	8°05'	-15'	99°	7
8	8°51'	-09'	99°	8°41'	-10'	99°	8°31'	-11'	100°	8°21'	-12'	100°	8°11'	-13'	100°	8°00'	-14'	100°	7°50'	-15'	100°	8
9	8°42'	-09'	100°	8°31'	-10'	100°	8°20'	-11'	101°	8°09'	-12'	101°	7°58'	-13'	101°	7°46'	-14'	101°	7°35'	-15'	101°	9
10	8°33'	-09'	101°	8°21'	-10'	101°	8°09'	-11'	102°	7°57'	-12'	102°	7°45'	-13'	102°	7°32'	-14'	102°	7°20'	-15'	102°	10
11	8°23'	-09'	102°	8°11'	-10'	102°	7°58'	-11'	103°	7°45'	-12'	103°	7°31'	-13'	103°	7°18'	-14'	103°	7°04'	-15'	103°	11
12	8°14'	-09'	103°	8°00'	-10'	103°	7°46'	-11'	104°	7°32'	-12'	104°	7°18'	-13'	104°	7°04'	-14'	104°	6°49'	-15'	104°	12
13	8°05'	-10'	104°	7°50'	-11'	104°	7°35'	-12'	105°	7°20'	-13'	105°	7°04'	-14'	105°	6°49'	-15'	105°	6°34'	-16'	105°	13
14	7°55'	-10'	105°	7°39'	-11'	105°	7°23'	-12'	106°	7°07'	-13'	106°	6°51'	-14'	106°	6°35'	-15'	106°	6°18'	-16'	106°	14
15	7°45'	-10'	106°	7°28'	-11'	106°	7°11'	-12'	107°	6°54'	-13'	107°	6°37'	-14'	107°	6°20'	-15'	107°	6°02'	-16'	107°	15
16	7°35'	-10'	107°	7°18'	-11'	107°	7°00'	-12'	107°	6°41'	-13'	108°	6°23'	-14'	108°	6°05'	-15'	108°	5°47'	-16'	108°	16
17	7°25'	-10'	108°	7°07'	-11'	108°	6°48'	-12'	108°	6°28'	-13'	109°	6°09'	-14'	109°	5°50'	-15'	109°	5°31'	-16'	109°	17
18	7°15'	-10'	109°	6°55'	-11'	109°	6°35'	-12'	109°	6°15'	-13'	110°	5°55'	-14'	110°	5°35'	-15'	110°	5°15'	-16'	110°	18
19	7°05'	-10'	110°	6°44'	-11'	110°	6°23'	-12'	110°	6°02'	-13'	111°	5°41'	-14'	111°	5°20'	-15'	111°	4°59'	-16'	111°	19
20	6°54'	-11'	111°	6°33'	-12'	111°	6°11'	-12'	111°	5°49'	-13'	112°	5°27'	-14'	112°	5°05'	-15'	112°	4°42'	-16'	112°	20
21	6°44'	-11'	112°	6°21'	-12'	112°	5°58'	-13'	112°	5°35'	-14'	113°	5°12'	-14'	113°	4°49'	-15'	113°	4°26'	-16'	113°	21
22	6°33'	-11'	113°	6°10'	-12'	113°	5°46'	-13'	113°	5°22'	-14'	113°	4°58'	-15'	114°	4°34'	-15'	114°	4°10'	-16'	114°	22
23	6°22'	-11'	114°	5°58'	-12'	114°	5°33'	-13'	114°	5°08'	-14'	114°	4°43'	-15'	115°	4°18'	-16'	115°	3°53'	-16'	115°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

80° 280° LHA

**Latitude CONTRARY to 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

79° 281° LHA

**Latitude CONTRARY to Declination**

79° 281° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°55'	-08'	91°	10°53'	-09'	92°	10°52'	-10'	92°	10°50'	-11'	92°	10°48'	-12'	92°	10°45'	-13'	92°	10°43'	-14'	93°	0
1	10°47'	-08'	92°	10°45'	-09'	93°	10°42'	-10'	93°	10°39'	-11'	93°	10°36'	-12'	93°	10°33'	-13'	93°	10°29'	-14'	93°	1
2	10°40'	-08'	93°	10°36'	-09'	94°	10°32'	-10'	94°	10°28'	-11'	94°	10°24'	-12'	94°	10°20'	-13'	94°	10°15'	-14'	94°	2
3	10°32'	-08'	94°	10°27'	-09'	95°	10°22'	-10'	95°	10°17'	-11'	95°	10°12'	-12'	95°	10°06'	-13'	95°	10°01'	-14'	95°	3
4	10°24'	-08'	95°	10°18'	-09'	96°	10°12'	-10'	96°	10°06'	-11'	96°	10°00'	-12'	96°	9°53'	-14'	96°	9°46'	-15'	96°	4
5	10°15'	-09'	96°	10°09'	-10'	97°	10°02'	-11'	97°	9°54'	-12'	97°	9°47'	-13'	97°	9°40'	-14'	97°	9°32'	-15'	97°	5
6	10°07'	-09'	97°	9°59'	-10'	98°	9°51'	-11'	98°	9°43'	-12'	98°	9°34'	-13'	98°	9°26'	-14'	98°	9°17'	-15'	98°	6
7	9°58'	-09'	98°	9°49'	-10'	99°	9°40'	-11'	99°	9°31'	-12'	99°	9°22'	-13'	99°	9°12'	-14'	99°	9°02'	-15'	99°	7
8	9°49'	-09'	99°	9°39'	-10'	100°	9°29'	-11'	100°	9°19'	-12'	100°	9°09'	-13'	100°	8°58'	-14'	100°	8°47'	-15'	100°	8
9	9°40'	-09'	100°	9°29'	-10'	101°	9°18'	-11'	101°	9°07'	-12'	101°	8°56'	-13'	101°	8°44'	-14'	101°	8°32'	-15'	101°	9
10	9°31'	-09'	101°	9°19'	-10'	102°	9°07'	-11'	102°	8°55'	-12'	102°	8°42'	-13'	102°	8°30'	-14'	102°	8°17'	-15'	102°	10
11	9°22'	-10'	102°	9°09'	-11'	103°	8°56'	-12'	103°	8°42'	-13'	103°	8°29'	-14'	103°	8°15'	-15'	103°	8°01'	-16'	103°	11
12	9°12'	-10'	103°	8°58'	-11'	104°	8°44'	-12'	104°	8°30'	-13'	104°	8°15'	-14'	104°	8°01'	-15'	104°	7°46'	-16'	104°	12
13	9°02'	-10'	104°	8°47'	-11'	105°	8°32'	-12'	105°	8°17'	-13'	105°	8°01'	-14'	105°	7°46'	-15'	105°	7°30'	-16'	105°	13
14	8°52'	-10'	105°	8°36'	-11'	106°	8°20'	-12'	106°	8°04'	-13'	106°	7°48'	-14'	106°	7°31'	-15'	106°	7°14'	-16'	106°	14
15	8°42'	-10'	106°	8°25'	-11'	107°	8°08'	-12'	107°	7°51'	-13'	107°	7°34'	-14'	107°	7°16'	-15'	107°	6°58'	-16'	107°	15
16	8°32'	-10'	107°	8°14'	-11'	108°	7°56'	-12'	108°	7°38'	-13'	108°	7°19'	-14'	108°	7°01'	-15'	108°	6°42'	-16'	108°	16
17	8°22'	-10'	108°	8°03'	-11'	109°	7°44'	-12'	109°	7°24'	-13'	109°	7°05'	-14'	109°	6°46'	-15'	109°	6°26'	-16'	109°	17
18	8°11'	-11'	109°	7°51'	-12'	110°	7°31'	-13'	110°	7°11'	-14'	110°	6°51'	-15'	110°	6°30'	-15'	110°	6°10'	-16'	110°	18
19	8°01'	-11'	110°	7°40'	-12'	111°	7°19'	-13'	111°	6°57'	-14'	111°	6°36'	-15'	111°	6°15'	-16'	111°	5°53'	-17'	111°	19
20	7°50'	-11'	111°	7°28'	-12'	112°	7°06'	-13'	112°	6°44'	-14'	112°	6°22'	-15'	112°	5°59'	-16'	112°	5°37'	-17'	112°	20
21	7°39'	-11'	112°	7°16'	-12'	113°	6°53'	-13'	113°	6°30'	-14'	113°	6°07'	-15'	113°	5°43'	-16'	113°	5°20'	-17'	113°	21
22	7°28'	-11'	113°	7°04'	-12'	113°	6°40'	-13'	114°	6°16'	-14'	114°	5°52'	-15'	114°	5°28'	-16'	114°	5°03'	-17'	114°	22
23	7°17'	-11'	114°	6°52'	-12'	114°	6°27'	-13'	115°	6°02'	-14'	115°	5°37'	-15'	115°	5°12'	-16'	115°	4°47'	-17'	115°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

79° 281° LHA

**Latitude CONTRARY to 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

78° 282° LHA

**Latitude CONTRARY to Declination**

78° 282° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°55'	-08'	91°	11°53'	-09'	92°	11°51'	-10'	92°	11°49'	-11'	92°	11°47'	-12'	92°	11°44'	-13'	93°	11°41'	-14'	93°	0
1	11°47'	-08'	92°	11°44'	-09'	93°	11°41'	-10'	93°	11°38'	-11'	93°	11°35'	-12'	93°	11°31'	-13'	94°	11°27'	-14'	94°	1
2	11°39'	-08'	94°	11°35'	-09'	94°	11°31'	-10'	94°	11°27'	-11'	94°	11°23'	-12'	94°	11°18'	-13'	95°	11°13'	-14'	95°	2
3	11°31'	-08'	95°	11°26'	-09'	95°	11°21'	-10'	95°	11°16'	-11'	95°	11°11'	-12'	95°	11°05'	-13'	96°	10°59'	-14'	96°	3
4	11°23'	-08'	96°	11°17'	-09'	96°	11°11'	-11'	96°	11°05'	-12'	96°	10°58'	-13'	96°	10°51'	-14'	97°	10°45'	-15'	97°	4
5	11°15'	-09'	97°	11°08'	-10'	97°	11°00'	-11'	97°	10°53'	-12'	97°	10°46'	-13'	97°	10°38'	-14'	98°	10°30'	-15'	98°	5
6	11°06'	-09'	98°	10°58'	-10'	98°	10°50'	-11'	98°	10°41'	-12'	98°	10°33'	-13'	98°	10°24'	-14'	98°	10°15'	-15'	99°	6
7	10°57'	-09'	99°	10°48'	-10'	99°	10°39'	-11'	99°	10°29'	-12'	99°	10°20'	-13'	99°	10°10'	-14'	99°	10°00'	-15'	100°	7
8	10°48'	-09'	100°	10°38'	-10'	100°	10°28'	-11'	100°	10°17'	-12'	100°	10°07'	-13'	100°	9°56'	-14'	100°	9°45'	-15'	101°	8
9	10°39'	-09'	101°	10°28'	-10'	101°	10°16'	-11'	101°	10°05'	-12'	101°	9°53'	-14'	101°	9°41'	-15'	101°	9°29'	-16'	102°	9
10	10°29'	-10'	102°	10°17'	-11'	102°	10°05'	-12'	102°	9°52'	-13'	102°	9°40'	-14'	102°	9°27'	-15'	102°	9°14'	-16'	103°	10
11	10°20'	-10'	103°	10°07'	-11'	103°	9°53'	-12'	103°	9°40'	-13'	103°	9°26'	-14'	103°	9°12'	-15'	103°	8°58'	-16'	104°	11
12	10°10'	-10'	104°	9°56'	-11'	104°	9°41'	-12'	104°	9°27'	-13'	104°	9°12'	-14'	104°	8°57'	-15'	104°	8°42'	-16'	105°	12
13	10°00'	-10'	105°	9°45'	-11'	105°	9°29'	-12'	105°	9°14'	-13'	105°	8°58'	-14'	105°	8°42'	-15'	105°	8°26'	-16'	106°	13
14	9°50'	-10'	106°	9°34'	-11'	106°	9°17'	-12'	106°	9°01'	-13'	106°	8°44'	-14'	106°	8°27'	-15'	106°	8°10'	-16'	106°	14
15	9°40'	-11'	107°	9°22'	-11'	107°	9°05'	-12'	107°	8°47'	-13'	107°	8°30'	-14'	107°	8°12'	-15'	107°	7°54'	-16'	107°	15
16	9°29'	-11'	108°	9°11'	-12'	108°	8°52'	-13'	108°	8°34'	-14'	108°	8°15'	-15'	108°	7°57'	-16'	108°	7°38'	-17'	108°	16
17	9°18'	-11'	109°	8°59'	-12'	109°	8°40'	-13'	109°	8°20'	-14'	109°	8°01'	-15'	109°	7°41'	-16'	109°	7°21'	-17'	109°	17
18	9°08'	-11'	110°	8°47'	-12'	110°	8°27'	-13'	110°	8°07'	-14'	110°	7°46'	-15'	110°	7°25'	-16'	110°	7°04'	-17'	110°	18
19	8°57'	-11'	111°	8°35'	-12'	111°	8°14'	-13'	111°	7°53'	-14'	111°	7°31'	-15'	111°	7°09'	-16'	111°	6°48'	-17'	111°	19
20	8°45'	-11'	112°	8°23'	-12'	112°	8°01'	-13'	112°	7°39'	-14'	112°	7°16'	-15'	112°	6°54'	-16'	112°	6°31'	-17'	112°	20
21	8°34'	-11'	113°	8°11'	-12'	113°	7°48'	-13'	113°	7°24'	-14'	113°	7°01'	-15'	113°	6°37'	-16'	113°	6°14'	-17'	113°	21
22	8°23'	-12'	114°	7°59'	-13'	114°	7°34'	-14'	114°	7°10'	-14'	114°	6°46'	-15'	114°	6°21'	-16'	114°	5°57'	-17'	114°	22
23	8°11'	-12'	115°	7°46'	-13'	115°	7°21'	-14'	115°	6°56'	-15'	115°	6°30'	-15'	115°	6°05'	-16'	115°	5°39'	-17'	115°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

78° 282° LHA

**Latitude CONTRARY to 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

77° 283° LHA

**Latitude CONTRARY to Declination**

77° 283° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	12°54'	-08'	92°	12°52'	-09'	92°	12°50'	-10'	92°	12°48'	-11'	92°	12°45'	-12'	93°	12°43'	-13'	93°	12°40'	-14'	93°	0
1	12°46'	-08'	93°	12°44'	-09'	93°	12°40'	-10'	93°	12°37'	-11'	93°	12°34'	-12'	94°	12°30'	-13'	94°	12°26'	-14'	94°	1
2	12°39'	-08'	94°	12°35'	-09'	94°	12°31'	-10'	94°	12°26'	-11'	94°	12°21'	-12'	95°	12°17'	-13'	95°	12°12'	-14'	95°	2
3	12°31'	-08'	95°	12°26'	-09'	95°	12°20'	-10'	95°	12°15'	-11'	95°	12°09'	-13'	96°	12°03'	-14'	96°	11°57'	-15'	96°	3
4	12°22'	-09'	96°	12°16'	-10'	96°	12°10'	-11'	96°	12°03'	-12'	96°	11°57'	-13'	97°	11°50'	-14'	97°	11°43'	-15'	97°	4
5	12°14'	-09'	97°	12°07'	-10'	97°	11°59'	-11'	97°	11°52'	-12'	97°	11°44'	-13'	98°	11°36'	-14'	98°	11°28'	-15'	98°	5
6	12°05'	-09'	98°	11°57'	-10'	98°	11°48'	-11'	98°	11°40'	-12'	98°	11°31'	-13'	99°	11°22'	-14'	99°	11°13'	-15'	99°	6
7	11°56'	-09'	99°	11°47'	-10'	99°	11°37'	-11'	99°	11°28'	-12'	99°	11°18'	-13'	100°	11°08'	-14'	100°	10°58'	-15'	100°	7
8	11°47'	-09'	100°	11°37'	-10'	100°	11°26'	-11'	100°	11°15'	-13'	100°	11°05'	-14'	101°	10°54'	-15'	101°	10°42'	-16'	101°	8
9	11°37'	-10'	101°	11°26'	-11'	101°	11°15'	-12'	101°	11°03'	-13'	101°	10°51'	-14'	102°	10°39'	-15'	102°	10°27'	-16'	102°	9
10	11°28'	-10'	102°	11°15'	-11'	102°	11°03'	-12'	102°	10°50'	-13'	102°	10°37'	-14'	102°	10°24'	-15'	103°	10°11'	-16'	103°	10
11	11°18'	-10'	103°	11°05'	-11'	103°	10°51'	-12'	103°	10°37'	-13'	103°	10°23'	-14'	103°	10°09'	-15'	104°	9°55'	-16'	104°	11
12	11°08'	-10'	104°	10°54'	-11'	104°	10°39'	-12'	104°	10°24'	-13'	104°	10°09'	-14'	104°	9°54'	-15'	105°	9°39'	-16'	105°	12
13	10°58'	-10'	105°	10°42'	-11'	105°	10°27'	-12'	105°	10°11'	-13'	105°	9°55'	-14'	105°	9°39'	-15'	106°	9°23'	-16'	106°	13
14	10°47'	-11'	106°	10°31'	-12'	106°	10°14'	-13'	106°	9°58'	-14'	106°	9°41'	-15'	106°	9°24'	-16'	107°	9°06'	-17'	107°	14
15	10°37'	-11'	107°	10°19'	-12'	107°	10°02'	-13'	107°	9°44'	-14'	107°	9°26'	-15'	107°	9°08'	-16'	108°	8°50'	-17'	108°	15
16	10°26'	-11'	108°	10°07'	-12'	108°	9°49'	-13'	108°	9°30'	-14'	108°	9°11'	-15'	108°	8°52'	-16'	109°	8°33'	-17'	109°	16
17	10°15'	-11'	109°	9°55'	-12'	109°	9°36'	-13'	109°	9°16'	-14'	109°	8°56'	-15'	109°	8°36'	-16'	110°	8°16'	-17'	110°	17
18	10°04'	-11'	110°	9°43'	-12'	110°	9°23'	-13'	110°	9°02'	-14'	110°	8°41'	-15'	110°	8°20'	-16'	111°	7°59'	-17'	111°	18
19	9°52'	-12'	111°	9°31'	-13'	111°	9°09'	-13'	111°	8°48'	-14'	111°	8°26'	-15'	111°	8°04'	-16'	111°	7°42'	-17'	112°	19
20	9°41'	-12'	112°	9°18'	-13'	112°	8°56'	-14'	112°	8°33'	-15'	112°	8°11'	-16'	112°	7°48'	-16'	112°	7°25'	-17'	113°	20
21	9°29'	-12'	113°	9°06'	-13'	113°	8°42'	-14'	113°	8°19'	-15'	113°	7°55'	-16'	113°	7°31'	-17'	113°	7°07'	-18'	114°	21
22	9°17'	-12'	114°	8°53'	-13'	114°	8°29'	-14'	114°	8°04'	-15'	114°	7°39'	-16'	114°	7°15'	-17'	114°	6°50'	-18'	115°	22
23	9°05'	-12'	115°	8°40'	-13'	115°	8°15'	-14'	115°	7°49'	-15'	115°	7°24'	-16'	115°	6°58'	-17'	115°	6°32'	-18'	115°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

77° 283° LHA

**Latitude CONTRARY to 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

76° 284° LHA

**Latitude CONTRARY to Declination**

76° 284° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°54'	-08'	92°	13°52'	-09'	92°	13°49'	-10'	92°	13°47'	-11'	92°	13°44'	-12'	93°	13°41'	-13'	93°	13°38'	-14'	93°	0
1	13°46'	-08'	93°	13°43'	-09'	93°	13°40'	-10'	93°	13°36'	-11'	93°	13°32'	-12'	94°	13°28'	-13'	94°	13°24'	-14'	94°	1
2	13°38'	-08'	94°	13°34'	-09'	94°	13°30'	-10'	94°	13°25'	-11'	95°	13°20'	-12'	95°	13°15'	-13'	95°	13°10'	-14'	95°	2
3	13°30'	-08'	95°	13°25'	-09'	95°	13°19'	-11'	95°	13°14'	-12'	96°	13°08'	-13'	96°	13°02'	-14'	96°	12°55'	-15'	96°	3
4	13°21'	-09'	96°	13°15'	-10'	96°	13°09'	-11'	96°	13°02'	-12'	97°	12°55'	-13'	97°	12°48'	-14'	97°	12°41'	-15'	97°	4
5	13°13'	-09'	97°	13°06'	-10'	97°	12°58'	-11'	97°	12°50'	-12'	98°	12°42'	-13'	98°	12°34'	-14'	98°	12°26'	-15'	98°	5
6	13°04'	-09'	98°	12°56'	-10'	98°	12°47'	-11'	98°	12°38'	-12'	99°	12°29'	-13'	99°	12°20'	-14'	99°	12°11'	-15'	99°	6
7	12°55'	-09'	99°	12°45'	-10'	99°	12°36'	-11'	99°	12°26'	-12'	100°	12°16'	-14'	100°	12°06'	-15'	100°	11°55'	-16'	100°	7
8	12°45'	-10'	100°	12°35'	-11'	100°	12°24'	-12'	100°	12°14'	-13'	101°	12°02'	-14'	101°	11°51'	-15'	101°	11°40'	-16'	101°	8
9	12°36'	-10'	101°	12°24'	-11'	101°	12°13'	-12'	101°	12°01'	-13'	102°	11°49'	-14'	102°	11°36'	-15'	102°	11°24'	-16'	102°	9
10	12°26'	-10'	102°	12°14'	-11'	102°	12°01'	-12'	102°	11°48'	-13'	103°	11°35'	-14'	103°	11°21'	-15'	103°	11°08'	-16'	103°	10
11	12°16'	-10'	103°	12°02'	-11'	103°	11°49'	-12'	103°	11°35'	-13'	104°	11°21'	-14'	104°	11°06'	-15'	104°	10°52'	-16'	104°	11
12	12°06'	-10'	104°	11°51'	-12'	104°	11°36'	-13'	104°	11°21'	-14'	105°	11°06'	-15'	105°	10°51'	-16'	105°	10°35'	-17'	105°	12
13	11°55'	-11'	105°	11°40'	-12'	105°	11°24'	-13'	105°	11°08'	-14'	106°	10°52'	-15'	106°	10°35'	-16'	106°	10°19'	-17'	106°	13
14	11°45'	-11'	106°	11°28'	-12'	106°	11°11'	-13'	106°	10°54'	-14'	107°	10°37'	-15'	107°	10°20'	-16'	107°	10°02'	-17'	107°	14
15	11°34'	-11'	107°	11°16'	-12'	107°	10°58'	-13'	107°	10°40'	-14'	107°	10°22'	-15'	108°	10°04'	-16'	108°	9°45'	-17'	108°	15
16	11°22'	-11'	108°	11°04'	-12'	108°	10°45'	-13'	108°	10°26'	-14'	108°	10°07'	-15'	109°	9°48'	-16'	109°	9°28'	-17'	109°	16
17	11°11'	-12'	109°	10°52'	-13'	109°	10°32'	-13'	109°	10°12'	-14'	109°	9°52'	-15'	110°	9°32'	-16'	110°	9°11'	-17'	110°	17
18	11°00'	-12'	110°	10°39'	-13'	110°	10°18'	-14'	110°	9°57'	-15'	110°	9°36'	-16'	111°	9°15'	-17'	111°	8°54'	-17'	111°	18
19	10°48'	-12'	111°	10°26'	-13'	111°	10°05'	-14'	111°	9°43'	-15'	111°	9°21'	-16'	112°	8°59'	-17'	112°	8°36'	-18'	112°	19
20	10°36'	-12'	112°	10°14'	-13'	112°	9°51'	-14'	112°	9°28'	-15'	112°	9°05'	-16'	113°	8°42'	-17'	113°	8°19'	-18'	113°	20
21	10°24'	-12'	113°	10°00'	-13'	113°	9°37'	-14'	113°	9°13'	-15'	113°	8°49'	-16'	114°	8°25'	-17'	114°	8°01'	-18'	114°	21
22	10°12'	-12'	114°	9°47'	-13'	114°	9°23'	-14'	114°	8°58'	-15'	114°	8°33'	-16'	115°	8°08'	-17'	115°	7°43'	-18'	115°	22
23	9°59'	-13'	115°	9°34'	-14'	115°	9°08'	-15'	115°	8°43'	-15'	115°	8°17'	-16'	116°	7°51'	-17'	116°	7°25'	-18'	116°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

76° 284° LHA

**Latitude CONTRARY to 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

75° 285° LHA

**Latitude CONTRARY to Declination**

75° 285° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	14°53'	-08'	92°	14°51'	-09'	92°	14°49'	-10'	92°	14°46'	-11'	93°	14°43'	-12'	93°	14°40'	-13'	93°	14°36'	-14'	93°	0
1	14°45'	-08'	93°	14°42'	-09'	93°	14°39'	-10'	93°	14°35'	-11'	94°	14°31'	-12'	94°	14°27'	-13'	94°	14°22'	-14'	94°	1
2	14°37'	-08'	94°	14°33'	-09'	94°	14°29'	-10'	94°	14°24'	-11'	95°	14°19'	-12'	95°	14°14'	-14'	95°	14°08'	-15'	95°	2
3	14°29'	-09'	95°	14°24'	-10'	95°	14°18'	-11'	95°	14°13'	-12'	96°	14°06'	-13'	96°	14°00'	-14'	96°	13°53'	-15'	96°	3
4	14°21'	-09'	96°	14°14'	-10'	96°	14°08'	-11'	96°	14°01'	-12'	97°	13°54'	-13'	97°	13°46'	-14'	97°	13°39'	-15'	97°	4
5	14°12'	-09'	97°	14°05'	-10'	97°	13°57'	-11'	97°	13°49'	-12'	98°	13°41'	-13'	98°	13°32'	-14'	98°	13°24'	-15'	98°	5
6	14°03'	-09'	98°	13°54'	-10'	98°	13°46'	-11'	98°	13°37'	-12'	99°	13°27'	-13'	99°	13°18'	-14'	99°	13°08'	-16'	99°	6
7	13°54'	-10'	99°	13°44'	-11'	99°	13°34'	-12'	100°	13°24'	-13'	100°	13°14'	-14'	100°	13°03'	-15'	100°	12°53'	-16'	100°	7
8	13°44'	-10'	100°	13°34'	-11'	100°	13°23'	-12'	101°	13°12'	-13'	101°	13°00'	-14'	101°	12°49'	-15'	101°	12°37'	-16'	101°	8
9	13°34'	-10'	101°	13°23'	-11'	101°	13°11'	-12'	102°	12°59'	-13'	102°	12°46'	-14'	102°	12°34'	-15'	102°	12°21'	-16'	102°	9
10	13°24'	-10'	102°	13°12'	-11'	102°	12°59'	-12'	103°	12°46'	-13'	103°	12°32'	-14'	103°	12°19'	-15'	103°	12°05'	-16'	103°	10
11	13°14'	-11'	103°	13°00'	-12'	103°	12°46'	-13'	104°	12°32'	-14'	104°	12°18'	-15'	104°	12°03'	-16'	104°	11°48'	-17'	104°	11
12	13°03'	-11'	104°	12°49'	-12'	104°	12°34'	-13'	105°	12°19'	-14'	105°	12°03'	-15'	105°	11°48'	-16'	105°	11°32'	-17'	105°	12
13	12°53'	-11'	105°	12°37'	-12'	105°	12°21'	-13'	106°	12°05'	-14'	106°	11°48'	-15'	106°	11°32'	-16'	106°	11°15'	-17'	106°	13
14	12°42'	-11'	106°	12°25'	-12'	106°	12°08'	-13'	107°	11°51'	-14'	107°	11°33'	-15'	107°	11°16'	-16'	107°	10°58'	-17'	107°	14
15	12°31'	-11'	107°	12°13'	-12'	107°	11°55'	-13'	108°	11°37'	-14'	108°	11°18'	-15'	108°	11°00'	-16'	108°	10°41'	-17'	108°	15
16	12°19'	-12'	108°	12°00'	-13'	108°	11°41'	-14'	109°	11°22'	-15'	109°	11°03'	-16'	109°	10°43'	-17'	109°	10°24'	-18'	109°	16
17	12°07'	-12'	109°	11°48'	-13'	109°	11°28'	-14'	110°	11°08'	-15'	110°	10°47'	-16'	110°	10°27'	-17'	110°	10°06'	-18'	110°	17
18	11°56'	-12'	110°	11°35'	-13'	110°	11°14'	-14'	111°	10°53'	-15'	111°	10°32'	-16'	111°	10°10'	-17'	111°	9°48'	-18'	111°	18
19	11°44'	-12'	111°	11°22'	-13'	111°	11°00'	-14'	112°	10°38'	-15'	112°	10°16'	-16'	112°	9°53'	-17'	112°	9°31'	-18'	112°	19
20	11°31'	-12'	112°	11°09'	-13'	112°	10°46'	-14'	112°	10°23'	-15'	113°	9°59'	-16'	113°	9°36'	-17'	113°	9°13'	-18'	113°	20
21	11°19'	-13'	113°	10°55'	-14'	113°	10°31'	-15'	113°	10°07'	-16'	114°	9°43'	-16'	114°	9°19'	-17'	114°	8°54'	-18'	114°	21
22	11°06'	-13'	114°	10°41'	-14'	114°	10°17'	-15'	114°	9°52'	-16'	115°	9°27'	-17'	115°	9°01'	-18'	115°	8°36'	-18'	115°	22
23	10°53'	-13'	115°	10°28'	-14'	115°	10°02'	-15'	115°	9°36'	-16'	116°	9°10'	-17'	116°	8°44'	-18'	116°	8°18'	-19'	116°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

75° 285° LHA

**Latitude CONTRARY to 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

74° 286° LHA

**Latitude CONTRARY to Declination**

74° 286° LHA

Dec°	7			8			9			10			11			12			13			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	15°53'	-08'	92°	15°50'	-09'	92°	15°48'	-10'	93°	15°45'	-11'	93°	15°42'	-12'	93°	15°38'	-13'	93°	15°35'	-14'	94°	0			
1	15°45'	-08'	93°	15°42'	-09'	93°	15°38'	-10'	94°	15°34'	-11'	94°	15°30'	-12'	94°	15°25'	-13'	94°	15°21'	-14'	95°	1			
2	15°37'	-08'	94°	15°32'	-09'	94°	15°28'	-10'	95°	15°23'	-12'	95°	15°18'	-13'	95°	15°12'	-14'	95°	15°06'	-15'	96°	2			
3	15°29'	-09'	95°	15°23'	-10'	95°	15°17'	-11'	96°	15°11'	-12'	96°	15°05'	-13'	96°	14°58'	-14'	96°	14°52'	-15'	97°	3			
4	15°20'	-09'	96°	15°13'	-10'	96°	15°07'	-11'	97°	14°59'	-12'	97°	14°52'	-13'	97°	14°44'	-14'	97°	14°37'	-15'	98°	4			
5	15°11'	-09'	97°	15°03'	-10'	97°	14°56'	-11'	98°	14°47'	-12'	98°	14°39'	-13'	98°	14°30'	-14'	98°	14°21'	-15'	99°	5			
6	15°02'	-09'	98°	14°53'	-10'	98°	14°44'	-12'	99°	14°35'	-13'	99°	14°26'	-14'	99°	14°16'	-15'	99°	14°06'	-16'	100°	6			
7	14°52'	-10'	99°	14°43'	-11'	99°	14°33'	-12'	100°	14°22'	-13'	100°	14°12'	-14'	100°	14°01'	-15'	100°	13°50'	-16'	101°	7			
8	14°43'	-10'	100°	14°32'	-11'	100°	14°21'	-12'	101°	14°10'	-13'	101°	13°58'	-14'	101°	13°46'	-15'	101°	13°34'	-16'	102°	8			
9	14°33'	-10'	101°	14°21'	-11'	101°	14°09'	-12'	102°	13°57'	-13'	102°	13°44'	-14'	102°	13°31'	-15'	102°	13°18'	-16'	103°	9			
10	14°22'	-11'	102°	14°10'	-12'	102°	13°57'	-13'	103°	13°43'	-14'	103°	13°30'	-15'	103°	13°16'	-16'	103°	13°02'	-17'	104°	10			
11	14°12'	-11'	103°	13°58'	-12'	104°	13°44'	-13'	104°	13°30'	-14'	104°	13°15'	-15'	104°	13°00'	-16'	104°	12°45'	-17'	105°	11			
12	14°01'	-11'	104°	13°46'	-12'	105°	13°31'	-13'	105°	13°16'	-14'	105°	13°00'	-15'	105°	12°44'	-16'	105°	12°28'	-17'	106°	12			
13	13°50'	-11'	105°	13°34'	-12'	106°	13°18'	-13'	106°	13°02'	-14'	106°	12°45'	-15'	106°	12°28'	-16'	106°	12°11'	-17'	107°	13			
14	13°39'	-12'	106°	13°22'	-13'	107°	13°05'	-14'	107°	12°47'	-15'	107°	12°30'	-16'	107°	12°12'	-16'	107°	11°54'	-17'	108°	14			
15	13°27'	-12'	107°	13°09'	-13'	108°	12°51'	-14'	108°	12°33'	-15'	108°	12°14'	-16'	108°	11°55'	-17'	108°	11°36'	-18'	109°	15			
16	13°16'	-12'	108°	12°57'	-13'	109°	12°38'	-14'	109°	12°18'	-15'	109°	11°59'	-16'	109°	11°39'	-17'	109°	11°19'	-18'	110°	16			
17	13°04'	-12'	109°	12°44'	-13'	110°	12°24'	-14'	110°	12°03'	-15'	110°	11°43'	-16'	110°	11°22'	-17'	110°	11°01'	-18'	111°	17			
18	12°51'	-12'	110°	12°31'	-13'	111°	12°09'	-14'	111°	11°48'	-15'	111°	11°26'	-16'	111°	11°05'	-17'	111°	10°43'	-18'	111°	18			
19	12°39'	-13'	111°	12°17'	-14'	112°	11°55'	-15'	112°	11°33'	-16'	112°	11°10'	-17'	112°	10°47'	-17'	112°	10°25'	-18'	112°	19			
20	12°26'	-13'	112°	12°03'	-14'	113°	11°40'	-15'	113°	11°17'	-16'	113°	10°54'	-17'	113°	10°30'	-18'	113°	10°06'	-19'	113°	20			
21	12°13'	-13'	113°	11°50'	-14'	114°	11°26'	-15'	114°	11°01'	-16'	114°	10°37'	-17'	114°	10°12'	-18'	114°	9°48'	-19'	114°	21			
22	12°00'	-13'	114°	11°36'	-14'	115°	11°11'	-15'	115°	10°45'	-16'	115°	10°20'	-17'	115°	9°55'	-18'	115°	9°29'	-19'	115°	22			
23	11°47'	-14'	115°	11°21'	-14'	116°	10°55'	-15'	116°	10°29'	-16'	116°	10°03'	-17'	116°	9°37'	-18'	116°	9°10'	-19'	116°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13						

74° 286° LHA

**Latitude CONTRARY to 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

73° 287° LHA

**Latitude CONTRARY to Declination**

73° 287° LHA

Dec°	7			8			9			10			11			12			13			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	16°52'	-08'	92°	16°50'	-09'	92°	16°47'	-10'	93°	16°44'	-11'	93°	16°41'	-12'	93°	16°37'	-13'	94°	16°33'	-14'	94°	0			
1	16°44'	-08'	93°	16°41'	-09'	93°	16°37'	-10'	94°	16°33'	-11'	94°	16°29'	-12'	94°	16°24'	-13'	95°	16°19'	-15'	95°	1			
2	16°36'	-08'	94°	16°32'	-09'	95°	16°27'	-11'	95°	16°22'	-12'	95°	16°16'	-13'	95°	16°10'	-14'	96°	16°04'	-15'	96°	2			
3	16°28'	-09'	95°	16°22'	-10'	96°	16°16'	-11'	96°	16°10'	-12'	96°	16°04'	-13'	96°	15°57'	-14'	97°	15°50'	-15'	97°	3			
4	16°19'	-09'	96°	16°12'	-10'	97°	16°05'	-11'	97°	15°58'	-12'	97°	15°51'	-13'	97°	15°43'	-14'	98°	15°34'	-15'	98°	4			
5	16°10'	-09'	97°	16°02'	-10'	98°	15°54'	-11'	98°	15°46'	-12'	98°	15°37'	-14'	98°	15°28'	-15'	99°	15°19'	-16'	99°	5			
6	16°01'	-10'	98°	15°52'	-11'	99°	15°43'	-12'	99°	15°33'	-13'	99°	15°24'	-14'	99°	15°14'	-15'	100°	15°04'	-16'	100°	6			
7	15°51'	-10'	99°	15°41'	-11'	100°	15°31'	-12'	100°	15°21'	-13'	100°	15°10'	-14'	100°	14°59'	-15'	101°	14°48'	-16'	101°	7			
8	15°41'	-10'	100°	15°30'	-11'	101°	15°19'	-12'	101°	15°08'	-13'	101°	14°56'	-14'	101°	14°44'	-15'	102°	14°31'	-16'	102°	8			
9	15°31'	-10'	101°	15°19'	-12'	102°	15°07'	-13'	102°	14°54'	-14'	102°	14°42'	-15'	102°	14°28'	-16'	103°	14°15'	-17'	103°	9			
10	15°21'	-11'	102°	15°08'	-12'	103°	14°54'	-13'	103°	14°41'	-14'	103°	14°27'	-15'	103°	14°13'	-16'	104°	13°58'	-17'	104°	10			
11	15°10'	-11'	103°	14°56'	-12'	104°	14°42'	-13'	104°	14°27'	-14'	104°	14°12'	-15'	104°	13°57'	-16'	105°	13°42'	-17'	105°	11			
12	14°59'	-11'	104°	14°44'	-12'	105°	14°28'	-13'	105°	14°13'	-14'	105°	13°57'	-15'	105°	13°41'	-16'	106°	13°24'	-17'	106°	12			
13	14°48'	-12'	105°	14°31'	-13'	106°	14°15'	-14'	106°	13°58'	-15'	106°	13°42'	-16'	106°	13°24'	-17'	107°	13°07'	-18'	107°	13			
14	14°36'	-12'	106°	14°19'	-13'	107°	14°02'	-14'	107°	13°44'	-15'	107°	13°26'	-16'	107°	13°08'	-17'	108°	12°50'	-18'	108°	14			
15	14°24'	-12'	108°	14°06'	-13'	108°	13°48'	-14'	108°	13°29'	-15'	108°	13°10'	-16'	108°	12°51'	-17'	109°	12°32'	-18'	109°	15			
16	14°12'	-12'	109°	13°53'	-13'	109°	13°34'	-14'	109°	13°14'	-15'	109°	12°54'	-16'	109°	12°34'	-17'	110°	12°14'	-18'	110°	16			
17	14°00'	-13'	110°	13°40'	-14'	110°	13°19'	-15'	110°	12°59'	-16'	110°	12°38'	-16'	110°	12°17'	-17'	111°	11°56'	-18'	111°	17			
18	13°47'	-13'	111°	13°26'	-14'	111°	13°05'	-15'	111°	12°43'	-16'	111°	12°21'	-17'	111°	11°59'	-18'	112°	11°37'	-19'	112°	18			
19	13°34'	-13'	112°	13°12'	-14'	112°	12°50'	-15'	112°	12°27'	-16'	112°	12°05'	-17'	112°	11°42'	-18'	113°	11°19'	-19'	113°	19			
20	13°21'	-13'	113°	12°58'	-14'	113°	12°35'	-15'	113°	12°11'	-16'	113°	11°48'	-17'	113°	11°24'	-18'	114°	11°00'	-19'	114°	20			
21	13°08'	-14'	114°	12°44'	-14'	114°	12°20'	-15'	114°	11°55'	-16'	114°	11°31'	-17'	114°	11°06'	-18'	115°	10°41'	-19'	115°	21			
22	12°55'	-14'	115°	12°30'	-15'	115°	12°04'	-16'	115°	11°39'	-17'	115°	11°13'	-17'	115°	10°48'	-18'	115°	10°22'	-19'	116°	22			
23	12°41'	-14'	116°	12°15'	-15'	116°	11°49'	-16'	116°	11°22'	-17'	116°	10°56'	-18'	116°	10°29'	-19'	116°	10°02'	-19'	117°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13						

73° 287° LHA

**Latitude CONTRARY to 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

72° 288° LHA

**Latitude CONTRARY to Declination**

72° 288° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	17°52'	-08'	92°	17°49'	-09'	93°	17°46'	-10'	93°	17°43'	-11'	93°	17°39'	-12'	94°	17°36'	-13'	94°	17°31'	-14'	94°	0
1	17°44'	-08'	93°	17°40'	-09'	94°	17°36'	-10'	94°	17°32'	-11'	94°	17°27'	-12'	95°	17°22'	-14'	95°	17°17'	-15'	95°	1
2	17°36'	-09'	94°	17°31'	-10'	95°	17°26'	-11'	95°	17°21'	-12'	95°	17°15'	-13'	96°	17°09'	-14'	96°	17°02'	-15'	96°	2
3	17°27'	-09'	95°	17°21'	-10'	96°	17°15'	-11'	96°	17°09'	-12'	96°	17°02'	-13'	97°	16°55'	-14'	97°	16°48'	-15'	97°	3
4	17°18'	-09'	96°	17°11'	-10'	97°	17°04'	-11'	97°	16°57'	-12'	97°	16°49'	-13'	98°	16°41'	-14'	98°	16°32'	-16'	98°	4
5	17°09'	-09'	97°	17°01'	-11'	98°	16°53'	-12'	98°	16°44'	-13'	98°	16°36'	-14'	99°	16°26'	-15'	99°	16°17'	-16'	99°	5
6	17°00'	-10'	98°	16°51'	-11'	99°	16°41'	-12'	99°	16°32'	-13'	99°	16°22'	-14'	100°	16°12'	-15'	100°	16°01'	-16'	100°	6
7	16°50'	-10'	100°	16°40'	-11'	100°	16°29'	-12'	100°	16°19'	-13'	100°	16°08'	-14'	101°	15°57'	-15'	101°	15°45'	-16'	101°	7
8	16°40'	-10'	101°	16°29'	-11'	101°	16°17'	-12'	101°	16°06'	-14'	101°	15°54'	-15'	102°	15°41'	-16'	102°	15°29'	-17'	102°	8
9	16°29'	-11'	102°	16°17'	-12'	102°	16°05'	-13'	102°	15°52'	-14'	102°	15°39'	-15'	103°	15°26'	-16'	103°	15°12'	-17'	103°	9
10	16°19'	-11'	103°	16°06'	-12'	103°	15°52'	-13'	103°	15°38'	-14'	103°	15°24'	-15'	104°	15°10'	-16'	104°	14°55'	-17'	104°	10
11	16°08'	-11'	104°	15°54'	-12'	104°	15°39'	-13'	104°	15°24'	-14'	104°	15°09'	-15'	105°	14°54'	-16'	105°	14°38'	-17'	105°	11
12	15°57'	-12'	105°	15°41'	-13'	105°	15°26'	-14'	105°	15°10'	-15'	105°	14°54'	-16'	106°	14°37'	-17'	106°	14°21'	-18'	106°	12
13	15°45'	-12'	106°	15°29'	-13'	106°	15°12'	-14'	106°	14°55'	-15'	106°	14°38'	-16'	107°	14°21'	-17'	107°	14°03'	-18'	107°	13
14	15°33'	-12'	107°	15°16'	-13'	107°	14°58'	-14'	107°	14°40'	-15'	107°	14°22'	-16'	108°	14°04'	-17'	108°	13°45'	-18'	108°	14
15	15°21'	-12'	108°	15°03'	-13'	108°	14°44'	-14'	108°	14°25'	-15'	108°	14°06'	-16'	109°	13°47'	-17'	109°	13°27'	-18'	109°	15
16	15°09'	-13'	109°	14°49'	-14'	109°	14°30'	-15'	109°	14°10'	-16'	109°	13°50'	-17'	110°	13°29'	-18'	110°	13°09'	-19'	110°	16
17	14°56'	-13'	110°	14°36'	-14'	110°	14°15'	-15'	110°	13°54'	-16'	110°	13°33'	-17'	111°	13°12'	-18'	111°	12°50'	-19'	111°	17
18	14°43'	-13'	111°	14°22'	-14'	111°	14°00'	-15'	111°	13°38'	-16'	111°	13°16'	-17'	112°	12°54'	-18'	112°	12°31'	-19'	112°	18
19	14°30'	-13'	112°	14°07'	-14'	112°	13°45'	-15'	112°	13°22'	-16'	112°	12°59'	-17'	113°	12°36'	-18'	113°	12°12'	-19'	113°	19
20	14°16'	-14'	113°	13°53'	-15'	113°	13°29'	-16'	113°	13°06'	-17'	113°	12°42'	-18'	114°	12°18'	-18'	114°	11°53'	-19'	114°	20
21	14°03'	-14'	114°	13°38'	-15'	114°	13°14'	-16'	114°	12°49'	-17'	114°	12°24'	-18'	115°	11°59'	-19'	115°	11°34'	-20'	115°	21
22	13°49'	-14'	115°	13°23'	-15'	115°	12°58'	-16'	115°	12°32'	-17'	115°	12°07'	-18'	116°	11°41'	-19'	116°	11°14'	-20'	116°	22
23	13°34'	-14'	116°	13°08'	-15'	116°	12°42'	-16'	116°	12°15'	-17'	116°	11°49'	-18'	117°	11°22'	-19'	117°	10°55'	-20'	117°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

72° 288° LHA

**Latitude CONTRARY to 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

71° 289° LHA

**Latitude CONTRARY to Declination**

71° 289° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	18°51'	-08'	92°	18°48'	-09'	93°	18°45'	-10'	93°	18°42'	-11'	93°	18°38'	-12'	94°	18°34'	-13'	94°	18°30'	-14'	94°	0
1	18°43'	-08'	93°	18°39'	-09'	94°	18°35'	-10'	94°	18°31'	-12'	94°	18°26'	-13'	95°	18°21'	-14'	95°	18°15'	-15'	95°	1
2	18°35'	-09'	94°	18°30'	-10'	95°	18°25'	-11'	95°	18°19'	-12'	95°	18°13'	-13'	96°	18°07'	-14'	96°	18°01'	-15'	96°	2
3	18°26'	-09'	96°	18°20'	-10'	96°	18°14'	-11'	96°	18°08'	-12'	97°	18°01'	-13'	97°	17°53'	-14'	97°	17°46'	-15'	97°	3
4	18°17'	-09'	97°	18°10'	-10'	97°	18°03'	-11'	97°	17°55'	-12'	98°	17°47'	-14'	98°	17°39'	-15'	98°	17°30'	-16'	99°	4
5	18°08'	-10'	98°	18°00'	-11'	98°	17°52'	-12'	98°	17°43'	-13'	99°	17°34'	-14'	99°	17°24'	-15'	99°	17°15'	-16'	100°	5
6	17°59'	-10'	99°	17°49'	-11'	99°	17°40'	-12'	99°	17°30'	-13'	100°	17°20'	-14'	100°	17°09'	-15'	100°	16°59'	-16'	101°	6
7	17°49'	-10'	100°	17°38'	-11'	100°	17°28'	-12'	100°	17°17'	-13'	101°	17°06'	-14'	101°	16°54'	-16'	101°	16°42'	-17'	102°	7
8	17°38'	-11'	101°	17°27'	-12'	101°	17°15'	-13'	101°	17°03'	-14'	102°	16°51'	-15'	102°	16°39'	-16'	102°	16°26'	-17'	103°	8
9	17°28'	-11'	102°	17°15'	-12'	102°	17°03'	-13'	102°	16°50'	-14'	103°	16°36'	-15'	103°	16°23'	-16'	103°	16°09'	-17'	104°	9
10	17°17'	-11'	103°	17°03'	-12'	103°	16°50'	-13'	103°	16°36'	-14'	104°	16°21'	-15'	104°	16°07'	-16'	104°	15°52'	-17'	105°	10
11	17°06'	-12'	104°	16°51'	-13'	104°	16°36'	-14'	104°	16°21'	-15'	105°	16°06'	-16'	105°	15°50'	-17'	105°	15°34'	-18'	106°	11
12	16°54'	-12'	105°	16°39'	-13'	105°	16°23'	-14'	105°	16°07'	-15'	106°	15°50'	-16'	106°	15°34'	-17'	106°	15°17'	-18'	107°	12
13	16°42'	-12'	106°	16°26'	-13'	106°	16°09'	-14'	106°	15°52'	-15'	107°	15°34'	-16'	107°	15°17'	-17'	107°	14°59'	-18'	108°	13
14	16°30'	-12'	107°	16°13'	-13'	107°	15°55'	-14'	107°	15°37'	-15'	108°	15°18'	-16'	108°	15°00'	-17'	108°	14°41'	-18'	108°	14
15	16°18'	-13'	108°	15°59'	-14'	108°	15°40'	-15'	108°	15°21'	-16'	109°	15°02'	-17'	109°	14°42'	-18'	109°	14°22'	-19'	109°	15
16	16°05'	-13'	109°	15°45'	-14'	109°	15°26'	-15'	109°	15°05'	-16'	110°	14°45'	-17'	110°	14°24'	-18'	110°	14°04'	-19'	110°	16
17	15°52'	-13'	110°	15°31'	-14'	110°	15°11'	-15'	110°	14°49'	-16'	111°	14°28'	-17'	111°	14°06'	-18'	111°	13°45'	-19'	111°	17
18	15°39'	-14'	111°	15°17'	-15'	111°	14°55'	-16'	111°	14°33'	-17'	112°	14°11'	-17'	112°	13°48'	-18'	112°	13°26'	-19'	112°	18
19	15°25'	-14'	112°	15°03'	-15'	112°	14°40'	-16'	112°	14°17'	-17'	113°	13°53'	-18'	113°	13°30'	-19'	113°	13°06'	-20'	113°	19
20	15°11'	-14'	113°	14°48'	-15'	113°	14°24'	-16'	113°	14°00'	-17'	114°	13°36'	-18'	114°	13°11'	-19'	114°	12°47'	-20'	114°	20
21	14°57'	-14'	114°	14°33'	-15'	114°	14°08'	-16'	114°	13°43'	-17'	115°	13°18'	-18'	115°	12°52'	-19'	115°	12°27'	-20'	115°	21
22	14°43'	-15'	115°	14°17'	-16'	115°	13°52'	-17'	115°	13°26'	-17'	116°	13°00'	-18'	116°	12°33'	-19'	116°	12°07'	-20'	116°	22
23	14°28'	-15'	116°	14°02'	-16'	116°	13°35'	-17'	116°	13°08'	-18'	117°	12°41'	-19'	117°	12°14'	-19'	117°	11°47'	-20'	117°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

71° 289° LHA

**Latitude CONTRARY to 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

70° 290° LHA

**Latitude CONTRARY to Declination**

70° 290° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	19°51'	-08'	93°	19°48'	-09'	93°	19°45'	-10'	93°	19°41'	-11'	94°	19°37'	-12'	94°	19°33'	-13'	94°	19°28'	-14'	95°	0
1	19°43'	-08'	94°	19°39'	-09'	94°	19°34'	-11'	94°	19°30'	-12'	95°	19°25'	-13'	95°	19°19'	-14'	95°	19°13'	-15'	96°	1
2	19°34'	-09'	95°	19°29'	-10'	95°	19°24'	-11'	95°	19°18'	-12'	96°	19°12'	-13'	96°	19°06'	-14'	96°	18°59'	-15'	97°	2
3	19°26'	-09'	96°	19°20'	-10'	96°	19°13'	-11'	96°	19°06'	-12'	97°	18°59'	-13'	97°	18°51'	-14'	97°	18°43'	-16'	98°	3
4	19°17'	-09'	97°	19°09'	-10'	97°	19°02'	-12'	97°	18°54'	-13'	98°	18°46'	-14'	98°	18°37'	-15'	98°	18°28'	-16'	99°	4
5	19°07'	-10'	98°	18°59'	-11'	98°	18°50'	-12'	98°	18°41'	-13'	99°	18°32'	-14'	99°	18°22'	-15'	99°	18°12'	-16'	100°	5
6	18°57'	-10'	99°	18°48'	-11'	99°	18°38'	-12'	100°	18°28'	-13'	100°	18°18'	-14'	100°	18°07'	-15'	100°	17°56'	-16'	101°	6
7	18°47'	-10'	100°	18°37'	-12'	100°	18°26'	-13'	101°	18°15'	-14'	101°	18°03'	-15'	101°	17°52'	-16'	102°	17°40'	-17'	102°	7
8	18°37'	-11'	101°	18°25'	-12'	101°	18°14'	-13'	102°	18°01'	-14'	102°	17°49'	-15'	102°	17°36'	-16'	103°	17°23'	-17'	103°	8
9	18°26'	-11'	102°	18°14'	-12'	102°	18°01'	-13'	103°	17°47'	-14'	103°	17°34'	-15'	103°	17°20'	-16'	104°	17°06'	-17'	104°	9
10	18°15'	-11'	103°	18°01'	-13'	103°	17°47'	-14'	104°	17°33'	-15'	104°	17°18'	-16'	104°	17°04'	-17'	105°	16°48'	-18'	105°	10
11	18°03'	-12'	104°	17°49'	-13'	104°	17°34'	-14'	105°	17°18'	-15'	105°	17°03'	-16'	105°	16°47'	-17'	106°	16°31'	-18'	106°	11
12	17°52'	-12'	105°	17°36'	-13'	105°	17°20'	-14'	106°	17°04'	-15'	106°	16°47'	-16'	106°	16°30'	-17'	107°	16°13'	-18'	107°	12
13	17°40'	-12'	106°	17°23'	-13'	106°	17°06'	-14'	107°	16°48'	-16'	107°	16°31'	-17'	107°	16°13'	-17'	108°	15°55'	-18'	108°	13
14	17°27'	-13'	107°	17°09'	-14'	107°	16°51'	-15'	108°	16°33'	-16'	108°	16°14'	-17'	108°	15°55'	-18'	109°	15°36'	-19'	109°	14
15	17°14'	-13'	108°	16°56'	-14'	108°	16°36'	-15'	109°	16°17'	-16'	109°	15°57'	-17'	109°	15°37'	-18'	110°	15°17'	-19'	110°	15
16	17°01'	-13'	109°	16°41'	-14'	109°	16°21'	-15'	110°	16°01'	-16'	110°	15°40'	-17'	110°	15°19'	-18'	111°	14°58'	-19'	111°	16
17	16°48'	-14'	110°	16°27'	-15'	110°	16°06'	-16'	111°	15°45'	-17'	111°	15°23'	-18'	111°	15°01'	-19'	112°	14°39'	-20'	112°	17
18	16°34'	-14'	111°	16°12'	-15'	111°	15°50'	-16'	112°	15°28'	-17'	112°	15°05'	-18'	112°	14°43'	-19'	112°	14°20'	-20'	113°	18
19	16°20'	-14'	112°	15°57'	-15'	112°	15°34'	-16'	113°	15°11'	-17'	113°	14°48'	-18'	113°	14°24'	-19'	113°	14°00'	-20'	114°	19
20	16°06'	-15'	113°	15°42'	-16'	113°	15°18'	-16'	114°	14°54'	-17'	114°	14°29'	-18'	114°	14°05'	-19'	114°	13°40'	-20'	115°	20
21	15°51'	-15'	114°	15°27'	-16'	114°	15°02'	-17'	115°	14°37'	-18'	115°	14°11'	-19'	115°	13°45'	-20'	115°	13°20'	-20'	116°	21
22	15°37'	-15'	115°	15°11'	-16'	115°	14°45'	-17'	116°	14°19'	-18'	116°	13°53'	-19'	116°	13°26'	-20'	116°	12°59'	-21'	117°	22
23	15°22'	-15'	116°	14°55'	-16'	116°	14°28'	-17'	117°	14°01'	-18'	117°	13°34'	-19'	117°	13°06'	-20'	117°	12°39'	-21'	118°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

70° 290° LHA

**Latitude CONTRARY to 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

69° 291° LHA

**Latitude CONTRARY to Declination**

69° 291° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	20°50'	-08'	93°	20°47'	-09'	93°	20°44'	-10'	93°	20°40'	-11'	94°	20°36'	-12'	94°	20°31'	-14'	95°	20°26'	-15'	95°	0
1	20°42'	-08'	94°	20°38'	-10'	94°	20°34'	-11'	94°	20°29'	-12'	95°	20°23'	-13'	95°	20°18'	-14'	96°	20°12'	-15'	96°	1
2	20°34'	-09'	95°	20°29'	-10'	95°	20°23'	-11'	96°	20°17'	-12'	96°	20°11'	-13'	96°	20°04'	-14'	97°	19°57'	-15'	97°	2
3	20°25'	-09'	96°	20°19'	-10'	96°	20°12'	-11'	97°	20°05'	-12'	97°	19°57'	-14'	97°	19°50'	-15'	98°	19°41'	-16'	98°	3
4	20°16'	-10'	97°	20°08'	-11'	97°	20°01'	-12'	98°	19°52'	-13'	98°	19°44'	-14'	98°	19°35'	-15'	99°	19°26'	-16'	99°	4
5	20°06'	-10'	98°	19°58'	-11'	98°	19°49'	-12'	99°	19°40'	-13'	99°	19°30'	-14'	99°	19°20'	-15'	100°	19°10'	-16'	100°	5
6	19°56'	-10'	99°	19°47'	-11'	99°	19°37'	-12'	100°	19°26'	-14'	100°	19°16'	-15'	100°	19°05'	-16'	101°	18°53'	-17'	101°	6
7	19°46'	-11'	100°	19°35'	-12'	100°	19°24'	-13'	101°	19°13'	-14'	101°	19°01'	-15'	101°	18°49'	-16'	102°	18°37'	-17'	102°	7
8	19°35'	-11'	101°	19°24'	-12'	101°	19°12'	-13'	102°	18°59'	-14'	102°	18°46'	-15'	102°	18°33'	-16'	103°	18°20'	-17'	103°	8
9	19°24'	-11'	102°	19°12'	-12'	102°	18°58'	-13'	103°	18°45'	-15'	103°	18°31'	-16'	103°	18°17'	-17'	104°	18°02'	-18'	104°	9
10	19°13'	-12'	103°	18°59'	-13'	104°	18°45'	-14'	104°	18°30'	-15'	104°	18°16'	-16'	105°	18°00'	-17'	105°	17°45'	-18'	105°	10
11	19°01'	-12'	104°	18°46'	-13'	105°	18°31'	-14'	105°	18°16'	-15'	105°	18°00'	-16'	106°	17°43'	-17'	106°	17°27'	-18'	106°	11
12	18°49'	-12'	105°	18°33'	-13'	106°	18°17'	-14'	106°	18°00'	-16'	106°	17°43'	-17'	107°	17°26'	-18'	107°	17°09'	-19'	107°	12
13	18°37'	-13'	106°	18°20'	-14'	107°	18°02'	-15'	107°	17°45'	-16'	107°	17°27'	-17'	108°	17°09'	-18'	108°	16°50'	-19'	108°	13
14	18°24'	-13'	107°	18°06'	-14'	108°	17°48'	-15'	108°	17°29'	-16'	108°	17°10'	-17'	109°	16°51'	-18'	109°	16°31'	-19'	109°	14
15	18°11'	-13'	108°	17°52'	-14'	109°	17°33'	-15'	109°	17°13'	-16'	109°	16°53'	-17'	110°	16°33'	-18'	110°	16°12'	-19'	110°	15
16	17°58'	-14'	109°	17°37'	-15'	110°	17°17'	-16'	110°	16°56'	-17'	110°	16°36'	-18'	111°	16°14'	-19'	111°	15°53'	-20'	111°	16
17	17°44'	-14'	110°	17°23'	-15'	111°	17°01'	-16'	111°	16°40'	-17'	111°	16°18'	-18'	112°	15°56'	-19'	112°	15°33'	-20'	112°	17
18	17°30'	-14'	111°	17°08'	-15'	112°	16°45'	-16'	112°	16°23'	-17'	112°	16°00'	-18'	113°	15°37'	-19'	113°	15°13'	-20'	113°	18
19	17°15'	-15'	112°	16°52'	-16'	113°	16°29'	-17'	113°	16°05'	-18'	113°	15°42'	-19'	114°	15°18'	-19'	114°	14°53'	-20'	114°	19
20	17°01'	-15'	113°	16°37'	-16'	114°	16°12'	-17'	114°	15°48'	-18'	114°	15°23'	-19'	115°	14°58'	-20'	115°	14°33'	-21'	115°	20
21	16°46'	-15'	114°	16°21'	-16'	115°	15°56'	-17'	115°	15°30'	-18'	115°	15°04'	-19'	115°	14°38'	-20'	116°	14°12'	-21'	116°	21
22	16°30'	-16'	115°	16°05'	-16'	116°	15°38'	-17'	116°	15°12'	-18'	116°	14°45'	-19'	116°	14°18'	-20'	117°	13°51'	-21'	117°	22
23	16°15'	-16'	116°	15°48'	-17'	117°	15°21'	-18'	117°	14°54'	-19'	117°	14°26'	-20'	117°	13°58'	-20'	118°	13°30'	-21'	118°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

69° 291° LHA

**Latitude CONTRARY to 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

68° 292° LHA

**Latitude CONTRARY to Declination**

68° 292° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°50'	-08'	93°	21°46'	-09'	93°	21°43'	-10'	94°	21°39'	-11'	94°	21°35'	-13'	94°	21°30'	-14'	95°	21°24'	-15'	95°	0
1	21°42'	-08'	94°	21°37'	-10'	94°	21°33'	-11'	95°	21°28'	-12'	95°	21°22'	-13'	95°	21°16'	-14'	96°	21°10'	-15'	96°	1
2	21°33'	-09'	95°	21°28'	-10'	95°	21°22'	-11'	96°	21°16'	-12'	96°	21°09'	-13'	97°	21°02'	-14'	97°	20°55'	-15'	97°	2
3	21°24'	-09'	96°	21°18'	-10'	96°	21°11'	-11'	97°	21°04'	-13'	97°	20°56'	-14'	98°	20°48'	-15'	98°	20°39'	-16'	98°	3
4	21°15'	-10'	97°	21°07'	-11'	97°	20°59'	-12'	98°	20°51'	-13'	98°	20°42'	-14'	99°	20°33'	-15'	99°	20°23'	-16'	99°	4
5	21°05'	-10'	98°	20°57'	-11'	99°	20°47'	-12'	99°	20°38'	-13'	99°	20°28'	-14'	100°	20°18'	-15'	100°	20°07'	-17'	100°	5
6	20°55'	-10'	99°	20°45'	-12'	100°	20°35'	-13'	100°	20°25'	-14'	100°	20°14'	-15'	101°	20°02'	-16'	101°	19°51'	-17'	101°	6
7	20°45'	-11'	100°	20°34'	-12'	101°	20°23'	-13'	101°	20°11'	-14'	101°	19°59'	-15'	102°	19°47'	-16'	102°	19°34'	-17'	102°	7
8	20°34'	-11'	101°	20°22'	-12'	102°	20°10'	-13'	102°	19°57'	-14'	102°	19°44'	-15'	103°	19°30'	-17'	103°	19°17'	-18'	103°	8
9	20°23'	-12'	102°	20°10'	-13'	103°	19°56'	-14'	103°	19°42'	-15'	103°	19°28'	-16'	104°	19°14'	-17'	104°	18°59'	-18'	104°	9
10	20°11'	-12'	103°	19°57'	-13'	104°	19°42'	-14'	104°	19°28'	-15'	104°	19°12'	-16'	105°	18°57'	-17'	105°	18°41'	-18'	105°	10
11	19°59'	-12'	104°	19°44'	-13'	105°	19°28'	-14'	105°	19°12'	-15'	105°	18°56'	-16'	106°	18°40'	-18'	106°	18°23'	-19'	106°	11
12	19°47'	-13'	105°	19°30'	-14'	106°	19°14'	-15'	106°	18°57'	-16'	106°	18°40'	-17'	107°	18°22'	-18'	107°	18°04'	-19'	107°	12
13	19°34'	-13'	107°	19°17'	-14'	107°	18°59'	-15'	107°	18°41'	-16'	108°	18°23'	-17'	108°	18°04'	-18'	108°	17°46'	-19'	108°	13
14	19°21'	-13'	108°	19°03'	-14'	108°	18°44'	-15'	108°	18°25'	-16'	109°	18°06'	-17'	109°	17°46'	-18'	109°	17°27'	-19'	109°	14
15	19°07'	-14'	109°	18°48'	-15'	109°	18°29'	-16'	109°	18°09'	-17'	110°	17°48'	-18'	110°	17°28'	-19'	110°	17°07'	-20'	110°	15
16	18°54'	-14'	110°	18°33'	-15'	110°	18°13'	-16'	110°	17°52'	-17'	111°	17°31'	-18'	111°	17°09'	-19'	111°	16°47'	-20'	111°	16
17	18°40'	-14'	111°	18°18'	-15'	111°	17°57'	-16'	111°	17°35'	-17'	112°	17°13'	-18'	112°	16°50'	-19'	112°	16°27'	-20'	112°	17
18	18°25'	-15'	112°	18°03'	-16'	112°	17°40'	-17'	112°	17°17'	-18'	113°	16°54'	-19'	113°	16°31'	-20'	113°	16°07'	-21'	113°	18
19	18°10'	-15'	113°	17°47'	-16'	113°	17°24'	-17'	113°	17°00'	-18'	114°	16°36'	-19'	114°	16°11'	-20'	114°	15°47'	-21'	114°	19
20	17°55'	-15'	114°	17°31'	-16'	114°	17°06'	-17'	114°	16°42'	-18'	115°	16°17'	-19'	115°	15°51'	-20'	115°	15°26'	-21'	115°	20
21	17°40'	-16'	115°	17°15'	-17'	115°	16°49'	-18'	115°	16°23'	-19'	116°	15°57'	-19'	116°	15°31'	-20'	116°	15°05'	-21'	116°	21
22	17°24'	-16'	116°	16°58'	-17'	116°	16°32'	-18'	116°	16°05'	-19'	117°	15°38'	-20'	117°	15°11'	-21'	117°	14°43'	-22'	117°	22
23	17°08'	-16'	117°	16°41'	-17'	117°	16°14'	-18'	117°	15°46'	-19'	118°	15°18'	-20'	118°	14°50'	-21'	118°	14°22'	-22'	118°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

68° 292° LHA

**Latitude CONTRARY to 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

67° 293° LHA

**Latitude CONTRARY to Declination**

67° 293° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	22°49'	-08'	93°	22°46'	-09'	93°	22°42'	-10'	94°	22°38'	-11'	94°	22°33'	-13'	95°	22°28'	-14'	95°	22°23'	-15'	95°	0
1	22°41'	-09'	94°	22°37'	-10'	94°	22°32'	-11'	95°	22°26'	-12'	95°	22°21'	-13'	96°	22°14'	-14'	96°	22°08'	-15'	97°	1
2	22°32'	-09'	95°	22°27'	-10'	96°	22°21'	-11'	96°	22°14'	-12'	96°	22°08'	-13'	97°	22°00'	-15'	97°	21°53'	-16'	98°	2
3	22°23'	-09'	96°	22°17'	-11'	97°	22°10'	-12'	97°	22°02'	-13'	97°	21°54'	-14'	98°	21°46'	-15'	98°	21°37'	-16'	99°	3
4	22°14'	-10'	97°	22°06'	-11'	98°	21°58'	-12'	98°	21°49'	-13'	98°	21°40'	-14'	99°	21°31'	-15'	99°	21°21'	-16'	100°	4
5	22°04'	-10'	98°	21°55'	-11'	99°	21°46'	-12'	99°	21°36'	-14'	99°	21°26'	-15'	100°	21°16'	-16'	100°	21°05'	-17'	101°	5
6	21°54'	-11'	99°	21°44'	-12'	100°	21°34'	-13'	100°	21°23'	-14'	101°	21°12'	-15'	101°	21°00'	-16'	101°	20°48'	-17'	102°	6
7	21°43'	-11'	100°	21°32'	-12'	101°	21°21'	-13'	101°	21°09'	-14'	102°	20°57'	-15'	102°	20°44'	-16'	102°	20°31'	-17'	103°	7
8	21°32'	-11'	101°	21°20'	-13'	102°	21°07'	-14'	102°	20°55'	-15'	103°	20°41'	-16'	103°	20°28'	-17'	103°	20°13'	-18'	104°	8
9	21°21'	-12'	103°	21°07'	-13'	103°	20°54'	-14'	103°	20°40'	-15'	104°	20°26'	-16'	104°	20°11'	-17'	104°	19°56'	-18'	105°	9
10	21°09'	-12'	104°	20°55'	-13'	104°	20°40'	-14'	104°	20°25'	-15'	105°	20°09'	-16'	105°	19°54'	-17'	105°	19°38'	-18'	106°	10
11	20°57'	-13'	105°	20°41'	-14'	105°	20°26'	-15'	105°	20°09'	-16'	106°	19°53'	-17'	106°	19°36'	-18'	106°	19°19'	-19'	107°	11
12	20°44'	-13'	106°	20°28'	-14'	106°	20°11'	-15'	106°	19°54'	-16'	107°	19°36'	-17'	107°	19°18'	-18'	107°	19°00'	-19'	108°	12
13	20°31'	-13'	107°	20°13'	-14'	107°	19°56'	-15'	107°	19°38'	-16'	108°	19°19'	-17'	108°	19°00'	-18'	108°	18°41'	-19'	109°	13
14	20°18'	-14'	108°	19°59'	-15'	108°	19°40'	-16'	108°	19°21'	-17'	109°	19°02'	-18'	109°	18°42'	-19'	109°	18°22'	-20'	110°	14
15	20°04'	-14'	109°	19°44'	-15'	109°	19°24'	-16'	109°	19°04'	-17'	110°	18°44'	-18'	110°	18°23'	-19'	110°	18°02'	-20'	111°	15
16	19°50'	-14'	110°	19°29'	-15'	110°	19°08'	-16'	111°	18°47'	-17'	111°	18°26'	-18'	111°	18°04'	-19'	111°	17°42'	-20'	112°	16
17	19°35'	-15'	111°	19°14'	-16'	111°	18°52'	-17'	112°	18°30'	-18'	112°	18°07'	-19'	112°	17°44'	-20'	112°	17°21'	-21'	113°	17
18	19°20'	-15'	112°	18°58'	-16'	112°	18°35'	-17'	113°	18°12'	-18'	113°	17°48'	-19'	113°	17°25'	-20'	113°	17°01'	-21'	114°	18
19	19°05'	-16'	113°	18°42'	-16'	113°	18°18'	-17'	114°	17°54'	-18'	114°	17°29'	-19'	114°	17°05'	-20'	114°	16°40'	-21'	115°	19
20	18°50'	-16'	114°	18°25'	-17'	114°	18°00'	-18'	115°	17°35'	-19'	115°	17°10'	-20'	115°	16°44'	-21'	115°	16°19'	-21'	116°	20
21	18°34'	-16'	115°	18°08'	-17'	115°	17°43'	-18'	116°	17°17'	-19'	116°	16°50'	-20'	116°	16°24'	-21'	116°	15°57'	-22'	117°	21
22	18°18'	-16'	116°	17°51'	-17'	116°	17°25'	-18'	117°	16°58'	-19'	117°	16°30'	-20'	117°	16°03'	-21'	117°	15°35'	-22'	118°	22
23	18°01'	-17'	117°	17°34'	-18'	117°	17°06'	-19'	118°	16°38'	-20'	118°	16°10'	-20'	118°	15°42'	-21'	118°	15°13'	-22'	119°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

67° 293° LHA

**Latitude CONTRARY to 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

66° 294° LHA

**Latitude CONTRARY to Declination**

66° 294° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	23°49'	-08'	93°	23°45'	-09'	94°	23°41'	-10'	94°	23°37'	-12'	94°	23°32'	-13'	95°	23°27'	-14'	95°	23°21'	-15'	96°	0
1	23°40'	-09'	94°	23°36'	-10'	95°	23°31'	-11'	95°	23°25'	-12'	95°	23°19'	-13'	96°	23°13'	-14'	96°	23°06'	-15'	97°	1
2	23°32'	-09'	95°	23°26'	-10'	96°	23°20'	-11'	96°	23°13'	-12'	97°	23°06'	-14'	97°	22°59'	-15'	97°	22°51'	-16'	98°	2
3	23°23'	-10'	96°	23°16'	-11'	97°	23°08'	-12'	97°	23°01'	-13'	98°	22°53'	-14'	98°	22°44'	-15'	98°	22°35'	-16'	99°	3
4	23°13'	-10'	97°	23°05'	-11'	98°	22°57'	-12'	98°	22°48'	-13'	99°	22°39'	-14'	99°	22°29'	-15'	100°	22°19'	-17'	100°	4
5	23°03'	-10'	98°	22°54'	-12'	99°	22°44'	-13'	99°	22°35'	-14'	100°	22°24'	-15'	100°	22°13'	-16'	101°	22°02'	-17'	101°	5
6	22°53'	-11'	100°	22°42'	-12'	100°	22°32'	-13'	100°	22°21'	-14'	101°	22°09'	-15'	101°	21°58'	-16'	102°	21°45'	-17'	102°	6
7	22°42'	-11'	101°	22°30'	-12'	101°	22°19'	-13'	101°	22°07'	-15'	102°	21°54'	-16'	102°	21°41'	-17'	103°	21°28'	-18'	103°	7
8	22°30'	-12'	102°	22°18'	-13'	102°	22°05'	-14'	102°	21°52'	-15'	103°	21°39'	-16'	103°	21°25'	-17'	104°	21°10'	-18'	104°	8
9	22°19'	-12'	103°	22°05'	-13'	103°	21°51'	-14'	104°	21°37'	-15'	104°	21°23'	-16'	104°	21°08'	-17'	105°	20°52'	-18'	105°	9
10	22°07'	-13'	104°	21°52'	-14'	104°	21°37'	-15'	105°	21°22'	-16'	105°	21°06'	-17'	105°	20°50'	-18'	106°	20°34'	-19'	106°	10
11	21°54'	-13'	105°	21°39'	-14'	105°	21°23'	-15'	106°	21°06'	-16'	106°	20°50'	-17'	106°	20°32'	-18'	107°	20°15'	-19'	107°	11
12	21°41'	-13'	106°	21°25'	-14'	106°	21°08'	-15'	107°	20°50'	-16'	107°	20°32'	-17'	107°	20°14'	-18'	108°	19°56'	-19'	108°	12
13	21°28'	-14'	107°	21°10'	-15'	107°	20°52'	-16'	108°	20°34'	-17'	108°	20°15'	-18'	108°	19°56'	-19'	109°	19°36'	-20'	109°	13
14	21°14'	-14'	108°	20°55'	-15'	108°	20°36'	-16'	109°	20°17'	-17'	109°	19°57'	-18'	109°	19°37'	-19'	110°	19°17'	-20'	110°	14
15	21°00'	-14'	109°	20°40'	-15'	109°	20°20'	-17'	110°	20°00'	-18'	110°	19°39'	-18'	110°	19°18'	-19'	111°	18°56'	-20'	111°	15
16	20°46'	-15'	110°	20°25'	-16'	110°	20°04'	-17'	111°	19°42'	-18'	111°	19°21'	-19'	111°	18°58'	-20'	112°	18°36'	-21'	112°	16
17	20°31'	-15'	111°	20°09'	-16'	111°	19°47'	-17'	112°	19°24'	-18'	112°	19°02'	-19'	112°	18°39'	-20'	113°	18°15'	-21'	113°	17
18	20°16'	-16'	112°	19°53'	-17'	112°	19°30'	-18'	113°	19°06'	-19'	113°	18°43'	-19'	113°	18°18'	-20'	114°	17°54'	-21'	114°	18
19	20°00'	-16'	113°	19°36'	-17'	114°	19°12'	-18'	114°	18°48'	-19'	114°	18°23'	-20'	114°	17°58'	-21'	115°	17°33'	-22'	115°	19
20	19°44'	-16'	114°	19°19'	-17'	115°	18°54'	-18'	115°	18°29'	-19'	115°	18°03'	-20'	115°	17°37'	-21'	116°	17°11'	-22'	116°	20
21	19°28'	-17'	115°	19°02'	-18'	116°	18°36'	-19'	116°	18°10'	-19'	116°	17°43'	-20'	116°	17°16'	-21'	117°	16°49'	-22'	117°	21
22	19°11'	-17'	116°	18°45'	-18'	117°	18°18'	-19'	117°	17°50'	-20'	117°	17°23'	-21'	117°	16°55'	-22'	118°	16°27'	-22'	118°	22
23	18°54'	-17'	117°	18°27'	-18'	118°	17°59'	-19'	118°	17°31'	-20'	118°	17°02'	-21'	118°	16°33'	-22'	119°	16°05'	-23'	119°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

66° 294° LHA

**Latitude CONTRARY to 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

65° 295° LHA

**Latitude CONTRARY to Declination**

65° 295° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°48'	-08'	93°	24°44'	-09'	94°	24°40'	-11'	94°	24°36'	-12'	95°	24°31'	-13'	95°	24°25'	-14'	96°	24°19'	-15'	96°	0
1	24°40'	-09'	94°	24°35'	-10'	95°	24°30'	-11'	95°	24°24'	-12'	96°	24°18'	-13'	96°	24°11'	-14'	97°	24°04'	-15'	97°	1
2	24°31'	-09'	95°	24°25'	-10'	96°	24°19'	-11'	96°	24°12'	-13'	97°	24°05'	-14'	97°	23°57'	-15'	98°	23°49'	-16'	98°	2
3	24°22'	-10'	97°	24°15'	-11'	97°	24°07'	-12'	97°	23°59'	-13'	98°	23°51'	-14'	98°	23°42'	-15'	99°	23°33'	-16'	99°	3
4	24°12'	-10'	98°	24°04'	-11'	98°	23°55'	-12'	98°	23°46'	-13'	99°	23°37'	-15'	99°	23°27'	-16'	100°	23°16'	-17'	100°	4
5	24°02'	-11'	99°	23°53'	-12'	99°	23°43'	-13'	100°	23°33'	-14'	100°	23°22'	-15'	100°	23°11'	-16'	101°	23°00'	-17'	101°	5
6	23°51'	-11'	100°	23°41'	-12'	100°	23°30'	-13'	101°	23°19'	-14'	101°	23°07'	-15'	101°	22°55'	-16'	102°	22°42'	-18'	102°	6
7	23°40'	-11'	101°	23°29'	-13'	101°	23°17'	-14'	102°	23°04'	-15'	102°	22°52'	-16'	103°	22°38'	-17'	103°	22°25'	-18'	103°	7
8	23°29'	-12'	102°	23°16'	-13'	102°	23°03'	-14'	103°	22°50'	-15'	103°	22°36'	-16'	104°	22°22'	-17'	104°	22°07'	-18'	104°	8
9	23°17'	-12'	103°	23°03'	-13'	103°	22°49'	-15'	104°	22°35'	-16'	104°	22°20'	-17'	105°	22°04'	-18'	105°	21°49'	-19'	105°	9
10	23°04'	-13'	104°	22°50'	-14'	104°	22°35'	-15'	105°	22°19'	-16'	105°	22°03'	-17'	106°	21°47'	-18'	106°	21°30'	-19'	106°	10
11	22°52'	-13'	105°	22°36'	-14'	105°	22°20'	-15'	106°	22°03'	-16'	106°	21°46'	-17'	107°	21°29'	-18'	107°	21°11'	-19'	107°	11
12	22°38'	-14'	106°	22°22'	-15'	107°	22°04'	-16'	107°	21°47'	-17'	107°	21°29'	-18'	108°	21°10'	-19'	108°	20°51'	-20'	108°	12
13	22°25'	-14'	107°	22°07'	-15'	108°	21°49'	-16'	108°	21°30'	-17'	108°	21°11'	-18'	109°	20°51'	-19'	109°	20°32'	-20'	109°	13
14	22°11'	-14'	108°	21°52'	-15'	109°	21°32'	-16'	109°	21°13'	-18'	109°	20°53'	-19'	110°	20°32'	-20'	110°	20°11'	-20'	110°	14
15	21°56'	-15'	109°	21°36'	-16'	110°	21°16'	-17'	110°	20°55'	-18'	110°	20°34'	-19'	111°	20°13'	-20'	111°	19°51'	-21'	111°	15
16	21°42'	-15'	110°	21°21'	-16'	111°	20°59'	-17'	111°	20°37'	-18'	111°	20°15'	-19'	112°	19°53'	-20'	112°	19°30'	-21'	112°	16
17	21°26'	-16'	111°	21°04'	-17'	112°	20°42'	-18'	112°	20°19'	-19'	112°	19°56'	-20'	113°	19°33'	-21'	113°	19°09'	-21'	113°	17
18	21°11'	-16'	112°	20°48'	-17'	113°	20°24'	-18'	113°	20°01'	-19'	113°	19°36'	-20'	114°	19°12'	-21'	114°	18°47'	-22'	114°	18
19	20°55'	-16'	113°	20°31'	-17'	114°	20°06'	-18'	114°	19°42'	-19'	114°	19°17'	-20'	115°	18°51'	-21'	115°	18°26'	-22'	115°	19
20	20°38'	-17'	114°	20°13'	-18'	115°	19°48'	-19'	115°	19°22'	-20'	115°	18°56'	-21'	116°	18°30'	-21'	116°	18°04'	-22'	116°	20
21	20°22'	-17'	116°	19°56'	-18'	116°	19°29'	-19'	116°	19°03'	-20'	116°	18°36'	-21'	117°	18°09'	-22'	117°	17°41'	-23'	117°	21
22	20°05'	-17'	118°	19°38'	-18'	117°	19°10'	-19'	117°	18°43'	-20'	117°	18°15'	-21'	118°	17°47'	-22'	118°	17°19'	-23'	118°	22
23	19°47'	-18'	118°	19°19'	-19'	118°	18°51'	-20'	118°	18°23'	-21'	118°	17°54'	-21'	119°	17°25'	-22'	119°	16°56'	-23'	119°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

65° 295° LHA

**Latitude CONTRARY to 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

64° 296° LHA

**Latitude CONTRARY to Declination**

64° 296° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°48'	-08'	93°	25°44'	-10'	94°	25°39'	-11'	94°	25°35'	-12'	95°	25°29'	-13'	95°	25°23'	-14'	96°	25°17'	-15'	96°	0
1	25°39'	-09'	95°	25°34'	-10'	95°	25°29'	-11'	95°	25°23'	-12'	96°	25°16'	-13'	96°	25°09'	-15'	97°	25°02'	-16'	97°	1
2	25°30'	-09'	96°	25°24'	-10'	96°	25°18'	-12'	97°	25°11'	-13'	97°	25°03'	-14'	97°	24°55'	-15'	98°	24°46'	-16'	98°	2
3	25°21'	-10'	97°	25°14'	-11'	97°	25°06'	-12'	98°	24°58'	-13'	98°	24°49'	-14'	99°	24°40'	-15'	99°	24°30'	-17'	99°	3
4	25°11'	-10'	98°	25°03'	-11'	98°	24°54'	-13'	99°	24°45'	-14'	99°	24°35'	-15'	100°	24°25'	-16'	100°	24°14'	-17'	101°	4
5	25°01'	-11'	99°	24°51'	-12'	99°	24°41'	-13'	100°	24°31'	-14'	100°	24°20'	-15'	101°	24°09'	-16'	101°	23°57'	-17'	102°	5
6	24°50'	-11'	100°	24°39'	-12'	100°	24°28'	-13'	101°	24°17'	-15'	101°	24°05'	-16'	102°	23°52'	-17'	102°	23°40'	-18'	103°	6
7	24°39'	-12'	101°	24°27'	-13'	101°	24°15'	-14'	102°	24°02'	-15'	102°	23°49'	-16'	103°	23°36'	-17'	103°	23°22'	-18'	104°	7
8	24°27'	-12'	102°	24°14'	-13'	103°	24°01'	-14'	103°	23°47'	-15'	103°	23°33'	-16'	104°	23°19'	-18'	104°	23°04'	-19'	105°	8
9	24°15'	-13'	103°	24°01'	-14'	104°	23°47'	-15'	104°	23°32'	-16'	104°	23°17'	-17'	105°	23°01'	-18'	105°	22°45'	-19'	106°	9
10	24°02'	-13'	104°	23°47'	-14'	105°	23°32'	-15'	105°	23°16'	-16'	106°	23°00'	-17'	106°	22°43'	-18'	106°	22°26'	-19'	107°	10
11	23°49'	-14'	105°	23°33'	-15'	106°	23°17'	-16'	106°	23°00'	-17'	107°	22°42'	-18'	107°	22°25'	-19'	107°	22°07'	-20'	108°	11
12	23°36'	-14'	106°	23°19'	-15'	107°	23°01'	-16'	107°	22°43'	-17'	108°	22°25'	-18'	108°	22°06'	-19'	108°	21°47'	-20'	109°	12
13	23°22'	-14'	107°	23°04'	-15'	108°	22°45'	-16'	108°	22°26'	-17'	109°	22°07'	-19'	109°	21°47'	-20'	109°	21°27'	-21'	110°	13
14	23°07'	-15'	109°	22°48'	-16'	109°	22°28'	-17'	109°	22°08'	-18'	110°	21°48'	-19'	110°	21°27'	-20'	110°	21°06'	-21'	111°	14
15	22°53'	-15'	110°	22°32'	-16'	110°	22°12'	-17'	110°	21°51'	-18'	111°	21°29'	-19'	111°	21°07'	-20'	111°	20°45'	-21'	112°	15
16	22°37'	-16'	111°	22°16'	-17'	111°	21°54'	-18'	111°	21°32'	-19'	112°	21°10'	-20'	112°	20°47'	-21'	112°	20°24'	-22'	113°	16
17	22°22'	-16'	112°	21°59'	-17'	112°	21°37'	-18'	112°	21°14'	-19'	113°	20°50'	-20'	113°	20°27'	-21'	113°	20°02'	-22'	114°	17
18	22°06'	-16'	113°	21°42'	-17'	113°	21°19'	-18'	113°	20°55'	-19'	114°	20°30'	-20'	114°	20°06'	-21'	114°	19°41'	-22'	115°	18
19	21°49'	-17'	114°	21°25'	-18'	114°	21°00'	-19'	114°	20°35'	-20'	115°	20°10'	-21'	115°	19°44'	-22'	115°	19°18'	-23'	116°	19
20	21°33'	-17'	115°	21°07'	-18'	115°	20°42'	-19'	115°	20°16'	-20'	116°	19°49'	-21'	116°	19°23'	-22'	116°	18°56'	-23'	117°	20
21	21°15'	-18'	116°	20°49'	-19'	116°	20°22'	-19'	116°	19°56'	-20'	117°	19°28'	-21'	117°	19°01'	-22'	117°	18°33'	-23'	118°	21
22	20°58'	-18'	117°	20°31'	-19'	117°	20°03'	-20'	117°	19°35'	-21'	118°	19°07'	-22'	118°	18°39'	-23'	118°	18°10'	-23'	119°	22
23	20°40'	-18'	118°	20°12'	-19'	118°	19°43'	-20'	118°	19°14'	-21'	119°	18°45'	-22'	119°	18°16'	-23'	119°	17°47'	-24'	120°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

64° 296° LHA

**Latitude CONTRARY to 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

63° 297° LHA

**Latitude CONTRARY to Declination**

63° 297° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°47'	-08'	94°	26°43'	-10'	94°	26°38'	-11'	95°	26°33'	-12'	95°	26°28'	-13'	96°	26°22'	-14'	96°	26°15'	-15'	97°	0
1	26°39'	-09'	95°	26°33'	-10'	95°	26°28'	-11'	96°	26°22'	-12'	96°	26°15'	-14'	97°	26°08'	-15'	97°	26°00'	-16'	98°	1
2	26°30'	-09'	96°	26°23'	-11'	96°	26°16'	-12'	97°	26°09'	-13'	97°	26°01'	-14'	98°	25°53'	-15'	98°	25°44'	-16'	99°	2
3	26°20'	-10'	97°	26°13'	-11'	97°	26°05'	-12'	98°	25°56'	-13'	98°	25°47'	-14'	99°	25°38'	-16'	99°	25°28'	-17'	100°	3
4	26°10'	-10'	98°	26°02'	-12'	98°	25°52'	-13'	99°	25°43'	-14'	99°	25°33'	-15'	100°	25°22'	-16'	100°	25°11'	-17'	101°	4
5	26°00'	-11'	99°	25°50'	-12'	100°	25°40'	-13'	100°	25°29'	-14'	100°	25°18'	-15'	101°	25°06'	-17'	101°	24°54'	-18'	102°	5
6	25°49'	-11'	100°	25°38'	-13'	101°	25°27'	-14'	101°	25°15'	-15'	102°	25°02'	-16'	102°	24°50'	-17'	102°	24°37'	-18'	103°	6
7	25°37'	-12'	101°	25°25'	-13'	102°	25°13'	-14'	102°	25°00'	-15'	103°	24°47'	-16'	103°	24°33'	-17'	104°	24°18'	-18'	104°	7
8	25°25'	-12'	102°	25°12'	-14'	103°	24°59'	-15'	103°	24°45'	-16'	104°	24°30'	-17'	104°	24°15'	-18'	105°	24°00'	-19'	105°	8
9	25°13'	-13'	103°	24°59'	-14'	104°	24°44'	-15'	104°	24°29'	-16'	105°	24°13'	-17'	105°	23°58'	-18'	106°	23°41'	-19'	106°	9
10	25°00'	-13'	104°	24°45'	-14'	105°	24°29'	-16'	105°	24°13'	-17'	106°	23°56'	-18'	106°	23°39'	-19'	107°	23°22'	-20'	107°	10
11	24°47'	-14'	106°	24°30'	-15'	106°	24°13'	-16'	106°	23°56'	-17'	107°	23°39'	-18'	107°	23°21'	-19'	108°	23°02'	-20'	108°	11
12	24°33'	-14'	107°	24°15'	-15'	107°	23°58'	-16'	108°	23°39'	-17'	108°	23°21'	-18'	108°	23°02'	-19'	109°	22°42'	-20'	109°	12
13	24°18'	-15'	108°	24°00'	-16'	108°	23°41'	-17'	109°	23°22'	-18'	109°	23°02'	-19'	109°	22°42'	-20'	110°	22°22'	-21'	110°	13
14	24°04'	-15'	109°	23°44'	-16'	109°	23°24'	-17'	110°	23°04'	-18'	110°	22°43'	-19'	110°	22°22'	-20'	111°	22°01'	-21'	111°	14
15	23°49'	-16'	110°	23°28'	-17'	110°	23°07'	-18'	111°	22°46'	-19'	111°	22°24'	-20'	111°	22°02'	-21'	112°	21°39'	-22'	112°	15
16	23°33'	-16'	111°	23°11'	-17'	111°	22°49'	-18'	112°	22°27'	-19'	112°	22°04'	-20'	112°	21°41'	-21'	113°	21°18'	-22'	113°	16
17	23°17'	-16'	112°	22°54'	-17'	112°	22°31'	-18'	113°	22°08'	-19'	113°	21°44'	-20'	113°	21°20'	-21'	114°	20°56'	-22'	114°	17
18	23°01'	-17'	113°	22°37'	-18'	113°	22°13'	-19'	114°	21°49'	-20'	114°	21°24'	-21'	114°	20°59'	-22'	115°	20°34'	-23'	115°	18
19	22°44'	-17'	114°	22°19'	-18'	114°	21°54'	-19'	115°	21°29'	-20'	115°	21°03'	-21'	115°	20°37'	-22'	116°	20°11'	-23'	116°	19
20	22°27'	-18'	115°	22°01'	-19'	115°	21°35'	-20'	116°	21°09'	-21'	116°	20°42'	-21'	116°	20°15'	-22'	117°	19°48'	-23'	117°	20
21	22°09'	-18'	116°	21°42'	-19'	116°	21°15'	-20'	117°	20°48'	-21'	117°	20°21'	-22'	117°	19°53'	-23'	118°	19°25'	-24'	118°	21
22	21°51'	-18'	117°	21°23'	-19'	117°	20°56'	-20'	118°	20°27'	-21'	118°	19°59'	-22'	118°	19°30'	-23'	119°	19°01'	-24'	119°	22
23	21°32'	-19'	118°	21°04'	-20'	118°	20°35'	-21'	119°	20°06'	-22'	119°	19°37'	-22'	119°	19°07'	-23'	120°	18°37'	-24'	120°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

63° 297° LHA

**Latitude CONTRARY to 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

62° 298° LHA

Latitude CONTRARY to Declination

62° 298° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	27°46'	-09'	94°	27°42'	-10'	94°	27°38'	-11'	95°	27°32'	-12'	95°	27°27'	-13'	96°	27°20'	-14'	96°	27°13'	-15'	97°	0
1	27°38'	-09'	95°	27°33'	-10'	95°	27°27'	-11'	96°	27°20'	-13'	96°	27°13'	-14'	97°	27°06'	-15'	97°	26°58'	-16'	98°	1
2	27°29'	-10'	96°	27°22'	-11'	96°	27°15'	-12'	97°	27°08'	-13'	97°	27°00'	-14'	98°	26°51'	-15'	98°	26°42'	-16'	99°	2
3	27°19'	-10'	97°	27°12'	-11'	98°	27°03'	-12'	98°	26°55'	-14'	99°	26°45'	-15'	99°	26°36'	-16'	100°	26°26'	-17'	100°	3
4	27°09'	-11'	98°	27°00'	-12'	99°	26°51'	-13'	99°	26°41'	-14'	100°	26°31'	-15'	100°	26°20'	-16'	101°	26°09'	-17'	101°	4
5	26°58'	-11'	99°	26°48'	-12'	100°	26°38'	-13'	100°	26°27'	-15'	101°	26°16'	-16'	101°	26°04'	-17'	102°	25°51'	-18'	102°	5
6	26°47'	-12'	100°	26°36'	-13'	101°	26°25'	-14'	101°	26°13'	-15'	102°	26°00'	-16'	102°	25°47'	-17'	103°	25°33'	-18'	103°	6
7	26°36'	-12'	101°	26°23'	-13'	102°	26°11'	-14'	102°	25°58'	-15'	103°	25°44'	-17'	103°	25°30'	-18'	104°	25°15'	-19'	104°	7
8	26°23'	-13'	103°	26°10'	-14'	103°	25°56'	-15'	104°	25°42'	-16'	104°	25°27'	-17'	104°	25°12'	-18'	105°	24°56'	-19'	105°	8
9	26°11'	-13'	104°	25°56'	-14'	104°	25°41'	-15'	105°	25°26'	-16'	105°	25°10'	-17'	106°	24°54'	-19'	106°	24°37'	-20'	106°	9
10	25°58'	-14'	105°	25°42'	-15'	105°	25°26'	-16'	106°	25°10'	-17'	106°	24°53'	-18'	107°	24°35'	-19'	107°	24°18'	-20'	107°	10
11	25°44'	-14'	106°	25°27'	-15'	106°	25°10'	-16'	107°	24°53'	-17'	107°	24°35'	-18'	108°	24°16'	-19'	108°	23°58'	-20'	108°	11
12	25°30'	-15'	107°	25°12'	-16'	107°	24°54'	-17'	108°	24°35'	-18'	108°	24°16'	-19'	109°	23°57'	-20'	109°	23°37'	-21'	110°	12
13	25°15'	-15'	108°	24°56'	-16'	108°	24°37'	-17'	109°	24°18'	-18'	109°	23°58'	-19'	110°	23°37'	-20'	110°	23°16'	-21'	111°	13
14	25°00'	-16'	109°	24°40'	-17'	109°	24°20'	-18'	110°	23°59'	-19'	110°	23°38'	-20'	111°	23°17'	-21'	111°	22°55'	-22'	112°	14
15	24°45'	-16'	110°	24°24'	-17'	111°	24°03'	-18'	111°	23°41'	-19'	111°	23°19'	-20'	112°	22°56'	-21'	112°	22°34'	-22'	113°	15
16	24°29'	-16'	111°	24°07'	-17'	112°	23°44'	-18'	112°	23°22'	-19'	112°	22°59'	-20'	113°	22°35'	-21'	113°	22°12'	-22'	114°	16
17	24°12'	-17'	112°	23°49'	-18'	113°	23°26'	-19'	113°	23°02'	-20'	113°	22°38'	-21'	114°	22°14'	-22'	114°	21°49'	-23'	115°	17
18	23°55'	-17'	113°	23°31'	-18'	114°	23°07'	-19'	114°	22°43'	-20'	114°	22°18'	-21'	115°	21°52'	-22'	115°	21°26'	-23'	116°	18
19	23°38'	-18'	114°	23°13'	-19'	115°	22°48'	-20'	115°	22°22'	-21'	115°	21°56'	-22'	116°	21°30'	-22'	116°	21°03'	-23'	117°	19
20	23°20'	-18'	115°	22°55'	-19'	116°	22°28'	-20'	116°	22°02'	-21'	116°	21°35'	-22'	117°	21°08'	-23'	117°	20°40'	-24'	118°	20
21	23°02'	-19'	116°	22°35'	-19'	117°	22°08'	-20'	117°	21°41'	-21'	117°	21°13'	-22'	118°	20°45'	-23'	118°	20°16'	-24'	119°	21
22	22°44'	-19'	117°	22°16'	-20'	118°	21°48'	-21'	118°	21°19'	-22'	119°	20°51'	-23'	119°	20°21'	-24'	119°	19°52'	-24'	119°	22
23	22°25'	-19'	118°	21°56'	-20'	119°	21°27'	-21'	119°	20°58'	-22'	120°	20°28'	-23'	120°	19°58'	-24'	120°	19°28'	-25'	120°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

62° 298° LHA

Latitude CONTRARY to 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

61° 299° LHA

Latitude CONTRARY to Declination

61° 299° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	28°46'	-09'	94°	28°41'	-10'	94°	28°37'	-11'	95°	28°31'	-12'	95°	28°25'	-13'	96°	28°18'	-14'	97°	28°11'	-16'	97°	0
1	28°37'	-09'	95°	28°32'	-10'	96°	28°26'	-12'	96°	28°19'	-13'	97°	28°12'	-14'	97°	28°04'	-15'	98°	27°56'	-16'	98°	1
2	28°28'	-10'	96°	28°21'	-11'	97°	28°14'	-12'	97°	28°06'	-13'	98°	27°58'	-14'	98°	27°49'	-15'	99°	27°40'	-17'	99°	2
3	28°18'	-10'	97°	28°10'	-11'	98°	28°02'	-13'	98°	27°53'	-14'	99°	27°44'	-15'	99°	27°34'	-16'	100°	27°23'	-17'	100°	3
4	28°08'	-11'	98°	27°59'	-12'	99°	27°49'	-13'	99°	27°39'	-14'	100°	27°29'	-15'	100°	27°18'	-16'	101°	27°06'	-18'	101°	4
5	27°57'	-11'	99°	27°47'	-13'	100°	27°36'	-14'	101°	27°25'	-15'	101°	27°13'	-16'	102°	27°01'	-17'	102°	26°48'	-18'	103°	5
6	27°46'	-12'	101°	27°35'	-13'	101°	27°23'	-14'	102°	27°10'	-15'	102°	26°58'	-16'	103°	26°44'	-17'	103°	26°30'	-19'	104°	6
7	27°34'	-12'	102°	27°21'	-14'	102°	27°09'	-15'	103°	26°55'	-16'	103°	26°41'	-17'	104°	26°27'	-18'	104°	26°12'	-19'	105°	7
8	27°21'	-13'	103°	27°08'	-14'	103°	26°54'	-15'	104°	26°39'	-16'	104°	26°24'	-17'	105°	26°09'	-18'	105°	25°53'	-19'	106°	8
9	27°09'	-13'	104°	26°54'	-15'	104°	26°39'	-16'	105°	26°23'	-17'	105°	26°07'	-18'	106°	25°50'	-19'	106°	25°33'	-20'	107°	9
10	26°55'	-14'	105°	26°39'	-15'	105°	26°23'	-16'	106°	26°06'	-17'	106°	25°49'	-18'	107°	25°32'	-19'	107°	25°13'	-20'	108°	10
11	26°41'	-14'	106°	26°24'	-16'	107°	26°07'	-17'	107°	25°49'	-18'	107°	25°31'	-19'	108°	25°12'	-20'	108°	24°53'	-21'	109°	11
12	26°27'	-15'	107°	26°09'	-16'	108°	25°50'	-17'	108°	25°32'	-18'	109°	25°12'	-19'	109°	24°52'	-20'	109°	24°32'	-21'	110°	12
13	26°12'	-15'	108°	25°53'	-16'	109°	25°33'	-18'	109°	25°13'	-19'	110°	24°53'	-20'	110°	24°32'	-21'	110°	24°11'	-22'	111°	13
14	25°56'	-16'	109°	25°36'	-17'	110°	25°16'	-18'	110°	24°55'	-19'	111°	24°33'	-20'	111°	24°12'	-21'	112°	23°49'	-22'	112°	14
15	25°40'	-16'	110°	25°19'	-17'	111°	24°58'	-18'	111°	24°36'	-19'	112°	24°13'	-20'	112°	23°51'	-21'	113°	23°27'	-22'	113°	15
16	25°24'	-17'	111°	25°02'	-18'	112°	24°39'	-19'	112°	24°16'	-20'	113°	23°53'	-21'	113°	23°29'	-22'	114°	23°05'	-23'	114°	16
17	25°07'	-17'	113°	24°44'	-18'	113°	24°21'	-19'	113°	23°57'	-20'	114°	23°32'	-21'	114°	23°07'	-22'	115°	22°42'	-23'	115°	17
18	24°50'	-18'	114°	24°26'	-19'	114°	24°01'	-20'	114°	23°36'	-21'	115°	23°11'	-22'	115°	22°45'	-23'	116°	22°19'	-24'	116°	18
19	24°32'	-18'	115°	24°07'	-19'	115°	23°42'	-20'	115°	23°16'	-21'	116°	22°49'	-22'	116°	22°23'	-23'	117°	21°56'	-24'	117°	19
20	24°14'	-19'	116°	23°48'	-20'	116°	23°21'	-21'	116°	22°55'	-21'	117°	22°27'	-22'	117°	22°00'	-23'	118°	21°32'	-24'	118°	20
21	23°56'	-19'	117°	23°28'	-20'	117°	23°01'	-21'	117°	22°33'	-22'	118°	22°05'	-23'	118°	21°36'	-24'	119°	21°07'	-25'	119°	21
22	23°37'	-19'	118°	23°08'	-20'	118°	22°40'	-21'	119°	22°11'	-22'	119°	21°42'	-23'	119°	21°13'	-24'	120°	20°43'	-25'	120°	22
23	23°17'	-20'	119°	22°48'	-21'	119°	22°19'	-22'	120°	21°49'	-23'	120°	21°19'	-23'	120°	20°49'	-24'	121°	20°18'	-25'	121°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

61° 299° LHA

Latitude CONTRARY to 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

60° 300° LHA

Latitude CONTRARY to Declination

60° 300° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	29°45'	-09'	94°	29°41'	-10'	95°	29°36'	-11'	95°	29°30'	-12'	96°	29°24'	-13'	96°	29°17'	-15'	97°	29°09'	-16'	97°	0
1	29°37'	-09'	95°	29°31'	-10'	96°	29°25'	-12'	96°	29°18'	-13'	97°	29°10'	-14'	97°	29°02'	-15'	98°	28°54'	-16'	99°	1
2	29°27'	-10'	96°	29°20'	-11'	97°	29°13'	-12'	97°	29°05'	-13'	98°	28°56'	-15'	99°	28°47'	-16'	99°	28°37'	-17'	100°	2
3	29°17'	-10'	97°	29°09'	-12'	98°	29°01'	-13'	99°	28°51'	-14'	99°	28°42'	-15'	100°	28°31'	-16'	100°	28°21'	-17'	101°	3
4	29°07'	-11'	99°	28°58'	-12'	99°	28°48'	-13'	100°	28°38'	-14'	100°	28°27'	-16'	101°	28°15'	-17'	101°	28°03'	-18'	102°	4
5	28°56'	-12'	100°	28°46'	-13'	100°	28°35'	-14'	101°	28°23'	-15'	101°	28°11'	-16'	102°	27°59'	-17'	102°	27°45'	-18'	103°	5
6	28°44'	-12'	101°	28°33'	-13'	101°	28°21'	-14'	102°	28°08'	-16'	102°	27°55'	-17'	103°	27°41'	-18'	103°	27°27'	-19'	104°	6
7	28°32'	-13'	102°	28°20'	-14'	102°	28°06'	-15'	103°	27°53'	-16'	103°	27°38'	-17'	104°	27°24'	-18'	105°	27°08'	-19'	105°	7
8	28°20'	-13'	103°	28°06'	-14'	104°	27°51'	-15'	104°	27°37'	-17'	105°	27°21'	-18'	105°	27°05'	-19'	106°	26°49'	-20'	106°	8
9	28°06'	-14'	104°	27°51'	-15'	105°	27°36'	-16'	105°	27°20'	-17'	106°	27°04'	-18'	106°	26°47'	-19'	107°	26°29'	-20'	107°	9
10	27°53'	-14'	105°	27°37'	-15'	106°	27°20'	-16'	106°	27°03'	-18'	107°	26°45'	-19'	107°	26°27'	-20'	108°	26°09'	-21'	108°	10
11	27°38'	-15'	106°	27°21'	-16'	107°	27°04'	-17'	107°	26°45'	-18'	108°	26°27'	-19'	108°	26°08'	-20'	109°	25°48'	-21'	109°	11
12	27°24'	-15'	107°	27°05'	-16'	108°	26°47'	-17'	108°	26°27'	-18'	109°	26°08'	-20'	109°	25°48'	-21'	110°	25°27'	-22'	110°	12
13	27°08'	-16'	109°	26°49'	-17'	109°	26°29'	-18'	109°	26°09'	-19'	110°	25°48'	-20'	110°	25°27'	-21'	111°	25°06'	-22'	111°	13
14	26°53'	-16'	110°	26°32'	-17'	110°	26°11'	-18'	111°	25°50'	-19'	111°	25°28'	-20'	111°	25°06'	-21'	112°	24°44'	-22'	112°	14
15	26°36'	-17'	111°	26°15'	-18'	111°	25°53'	-19'	112°	25°31'	-20'	112°	25°08'	-21'	112°	24°45'	-22'	113°	24°21'	-23'	113°	15
16	26°19'	-17'	112°	25°57'	-18'	112°	25°34'	-19'	113°	25°11'	-20'	113°	24°47'	-21'	114°	24°23'	-22'	114°	23°58'	-23'	114°	16
17	26°02'	-18'	113°	25°39'	-19'	113°	25°15'	-20'	114°	24°51'	-21'	114°	24°26'	-22'	115°	24°01'	-23'	115°	23°35'	-24'	115°	17
18	25°45'	-18'	114°	25°20'	-19'	114°	24°55'	-20'	115°	24°30'	-21'	115°	24°04'	-22'	116°	23°38'	-23'	116°	23°12'	-24'	116°	18
19	25°26'	-19'	115°	25°01'	-20'	115°	24°35'	-21'	116°	24°09'	-22'	116°	23°42'	-22'	117°	23°15'	-23'	117°	22°48'	-24'	117°	19
20	25°08'	-19'	116°	24°41'	-20'	116°	24°14'	-21'	117°	23°47'	-22'	117°	23°20'	-23'	118°	22°52'	-24'	118°	22°23'	-25'	118°	20
21	24°49'	-19'	117°	24°21'	-20'	117°	23°53'	-21'	118°	23°25'	-22'	118°	22°57'	-23'	119°	22°28'	-24'	119°	21°59'	-25'	119°	21
22	24°29'	-20'	118°	24°01'	-21'	118°	23°32'	-22'	119°	23°03'	-23'	119°	22°33'	-24'	120°	22°04'	-25'	120°	21°33'	-25'	120°	22
23	24°09'	-20'	119°	23°40'	-21'	119°	23°10'	-22'	120°	22°40'	-23'	120°	22°10'	-24'	121°	21°39'	-25'	121°	21°08'	-26'	121°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

60° 300° LHA

Latitude CONTRARY to 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

59° 301° LHA

Latitude CONTRARY to Declination

59° 301° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	30°45'	-09'	94°	30°40'	-10'	95°	30°35'	-11'	95°	30°29'	-12'	96°	30°22'	-14'	97°	30°15'	-15'	97°	30°07'	-16'	98°	0
1	30°36'	-09'	95°	30°30'	-11'	96°	30°23'	-12'	97°	30°16'	-13'	97°	30°09'	-14'	98°	30°00'	-15'	98°	29°51'	-16'	99°	1
2	30°26'	-10'	96°	30°19'	-11'	97°	30°12'	-12'	98°	30°03'	-14'	98°	29°54'	-15'	99°	29°45'	-16'	99°	29°35'	-17'	100°	2
3	30°16'	-11'	98°	30°08'	-12'	98°	29°59'	-13'	99°	29°50'	-14'	99°	29°40'	-15'	100°	29°29'	-16'	100°	29°18'	-18'	101°	3
4	30°06'	-11'	99°	29°56'	-12'	99°	29°46'	-14'	100°	29°36'	-15'	100°	29°25'	-16'	101°	29°13'	-17'	102°	29°00'	-18'	102°	4
5	29°55'	-12'	100°	29°44'	-13'	100°	29°33'	-14'	101°	29°21'	-15'	102°	29°09'	-16'	102°	28°56'	-17'	103°	28°42'	-19'	103°	5
6	29°43'	-12'	101°	29°31'	-13'	102°	29°19'	-15'	102°	29°06'	-16'	103°	28°52'	-17'	103°	28°38'	-18'	104°	28°24'	-19'	104°	6
7	29°30'	-13'	102°	29°18'	-14'	103°	29°04'	-15'	103°	28°50'	-16'	104°	28°35'	-17'	104°	28°20'	-19'	105°	28°05'	-20'	105°	7
8	29°18'	-13'	103°	29°03'	-15'	104°	28°49'	-16'	104°	28°34'	-17'	105°	28°18'	-18'	105°	28°02'	-19'	106°	27°45'	-20'	106°	8
9	29°04'	-14'	104°	28°49'	-15'	105°	28°33'	-16'	105°	28°17'	-17'	106°	28°00'	-18'	106°	27°43'	-20'	107°	27°25'	-21'	107°	9
10	28°50'	-15'	106°	28°34'	-16'	106°	28°17'	-17'	107°	28°00'	-18'	107°	27°42'	-19'	108°	27°23'	-20'	108°	27°04'	-21'	109°	10
11	28°35'	-15'	107°	28°18'	-16'	107°	28°00'	-17'	108°	27°42'	-18'	108°	27°23'	-19'	109°	27°03'	-20'	109°	26°43'	-21'	110°	11
12	28°20'	-16'	108°	28°02'	-17'	108°	27°43'	-18'	109°	27°23'	-19'	109°	27°03'	-20'	110°	26°43'	-21'	110°	26°22'	-22'	111°	12
13	28°05'	-16'	109°	27°45'	-17'	109°	27°25'	-18'	110°	27°04'	-19'	110°	26°43'	-20'	111°	26°22'	-21'	111°	26°00'	-22'	112°	13
14	27°49'	-17'	110°	27°28'	-18'	110°	27°07'	-19'	111°	26°45'	-20'	111°	26°23'	-21'	112°	26°01'	-22'	112°	25°38'	-23'	113°	14
15	27°32'	-17'	111°	27°10'	-18'	111°	26°48'	-19'	112°	26°25'	-20'	112°	26°02'	-21'	113°	25°39'	-22'	113°	25°15'	-23'	114°	15
16	27°15'	-18'	112°	26°52'	-19'	113°	26°29'	-20'	113°	26°05'	-21'	113°	25°41'	-22'	114°	25°16'	-23'	114°	24°52'	-24'	115°	16
17	26°57'	-18'	113°	26°33'	-19'	114°	26°09'	-20'	114°	25°44'	-21'	114°	25°19'	-22'	115°	24°54'	-23'	115°	24°28'	-24'	116°	17
18	26°39'	-19'	114°	26°14'	-20'	115°	25°49'	-21'	115°	25°23'	-22'	116°	24°57'	-23'	116°	24°31'	-24'	116°	24°04'	-24'	117°	18
19	26°20'	-19'	115°	25°54'	-20'	116°	25°28'	-21'	116°	25°02'	-22'	117°	24°35'	-23'	117°	24°07'	-24'	117°	23°39'	-25'	118°	19
20	26°01'	-20'	116°	25°34'	-21'	117°	25°07'	-21'	117°	24°40'	-22'	118°	24°12'	-23'	118°	23°43'	-24'	118°	23°15'	-25'	119°	20
21	25°42'	-20'	117°	25°14'	-21'	118°	24°46'	-22'	118°	24°17'	-23'	119°	23°48'	-24'	119°	23°19'	-25'	119°	22°49'	-26'	120°	21
22	25°22'	-20'	118°	24°53'	-21'	119°	24°24'	-22'	119°	23°54'	-23'	120°	23°25'	-24'	120°	22°54'	-25'	120°	22°24'	-26'	121°	22
23	25°01'	-21'	119°	24°32'	-22'	120°	24°01'	-23'	120°	23°31'	-24'	121°	23°00'	-25'	121°	22°29'	-25'	121°	21°58'	-26'	122°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

59° 301° LHA

Latitude CONTRARY to 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

58° 302° LHA

Latitude CONTRARY to Declination

58° 302° LHA

Dec°	7			8			9			10			11			12			13			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	31°44'	-09'	94°	31°39'	-10'	95°	31°34'	-11'	96°	31°27'	-13'	96°	31°21'	-14'	97°	31°13'	-15'	97°	31°05'	-16'	98°	0			
1	31°35'	-10'	96°	31°29'	-11'	96°	31°22'	-12'	97°	31°15'	-13'	97°	31°07'	-14'	98°	30°58'	-15'	99°	30°49'	-17'	99°	1			
2	31°26'	-10'	97°	31°18'	-11'	97°	31°10'	-13'	98°	31°02'	-14'	98°	30°53'	-15'	99°	30°43'	-16'	100°	30°33'	-17'	100°	2			
3	31°15'	-11'	98°	31°07'	-12'	98°	30°58'	-13'	99°	30°48'	-14'	100°	30°38'	-15'	100°	30°27'	-17'	101°	30°15'	-18'	101°	3			
4	31°05'	-11'	99°	30°55'	-13'	100°	30°45'	-14'	100°	30°34'	-15'	101°	30°22'	-16'	101°	30°10'	-17'	102°	29°58'	-18'	102°	4			
5	30°53'	-12'	100°	30°42'	-13'	101°	30°31'	-14'	101°	30°19'	-15'	102°	30°06'	-17'	102°	29°53'	-18'	103°	29°39'	-19'	104°	5			
6	30°41'	-13'	101°	30°29'	-14'	102°	30°17'	-15'	102°	30°03'	-16'	103°	29°50'	-17'	104°	29°35'	-18'	104°	29°20'	-19'	105°	6			
7	30°29'	-13'	102°	30°15'	-14'	103°	30°02'	-15'	104°	29°47'	-17'	104°	29°32'	-18'	105°	29°17'	-19'	105°	29°01'	-20'	106°	7			
8	30°15'	-14'	104°	30°01'	-15'	104°	29°46'	-16'	105°	29°31'	-17'	105°	29°15'	-18'	106°	28°58'	-19'	106°	28°41'	-20'	107°	8			
9	30°02'	-14'	105°	29°46'	-15'	105°	29°30'	-17'	106°	29°14'	-18'	106°	28°57'	-19'	107°	28°39'	-20'	107°	28°21'	-21'	108°	9			
10	29°47'	-15'	106°	29°31'	-16'	106°	29°14'	-17'	107°	28°56'	-18'	107°	28°38'	-19'	108°	28°19'	-20'	108°	28°00'	-21'	109°	10			
11	29°32'	-15'	107°	29°15'	-17'	107°	28°57'	-18'	108°	28°38'	-19'	108°	28°19'	-20'	109°	27°59'	-21'	109°	27°38'	-22'	110°	11			
12	29°17'	-16'	108°	28°58'	-17'	109°	28°39'	-18'	109°	28°19'	-19'	110°	27°59'	-20'	110°	27°38'	-21'	111°	27°17'	-22'	111°	12			
13	29°01'	-17'	109°	28°41'	-18'	110°	28°21'	-19'	110°	28°00'	-20'	111°	27°38'	-21'	111°	27°17'	-22'	112°	26°54'	-23'	112°	13			
14	28°45'	-17'	110°	28°24'	-18'	111°	28°02'	-19'	111°	27°40'	-20'	112°	27°18'	-21'	112°	26°55'	-22'	113°	26°31'	-23'	113°	14			
15	28°27'	-18'	111°	28°05'	-19'	112°	27°43'	-20'	112°	27°20'	-21'	113°	26°56'	-22'	113°	26°33'	-23'	114°	26°08'	-24'	114°	15			
16	28°10'	-18'	112°	27°47'	-19'	113°	27°23'	-20'	113°	26°59'	-21'	114°	26°35'	-22'	114°	26°10'	-23'	115°	25°45'	-24'	115°	16			
17	27°52'	-19'	113°	27°28'	-20'	114°	27°03'	-21'	114°	26°38'	-22'	115°	26°13'	-23'	115°	25°47'	-24'	116°	25°20'	-25'	116°	17			
18	27°33'	-19'	115°	27°08'	-20'	115°	26°42'	-21'	115°	26°16'	-22'	116°	25°50'	-23'	116°	25°23'	-24'	117°	24°56'	-25'	117°	18			
19	27°14'	-20'	116°	26°48'	-21'	116°	26°21'	-22'	117°	25°54'	-23'	117°	25°27'	-23'	117°	24°59'	-24'	118°	24°31'	-25'	118°	19			
20	26°55'	-20'	117°	26°27'	-21'	117°	26°00'	-22'	118°	25°32'	-23'	118°	25°04'	-24'	118°	24°35'	-25'	119°	24°06'	-26'	119°	20			
21	26°34'	-21'	118°	26°06'	-21'	118°	25°38'	-22'	119°	25°09'	-23'	119°	24°40'	-24'	119°	24°10'	-25'	120°	23°40'	-26'	120°	21			
22	26°14'	-21'	119°	25°45'	-22'	119°	25°15'	-23'	120°	24°46'	-24'	120°	24°15'	-25'	120°	23°45'	-26'	121°	23°14'	-26'	121°	22			
23	25°53'	-21'	120°	25°23'	-22'	120°	24°53'	-23'	121°	24°22'	-24'	121°	23°51'	-25'	121°	23°19'	-26'	122°	22°48'	-27'	122°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13						

58° 302° LHA

Latitude CONTRARY to 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

57° 303° LHA

Latitude CONTRARY to Declination

57° 303° LHA

Dec°	7			8			9			10			11			12			13			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	32°43'	-09'	95°	32°38'	-10'	95°	32°33'	-11'	96°	32°26'	-13'	96°	32°19'	-14'	97°	32°11'	-15'	98°	32°03'	-16'	98°	0			
1	1°14'	-10'	96°	1°12'	-11'	96°	1°11'	-12'	97°	1°09'	-13'	98°	1°07'	-14'	98°	1°05'	-16'	99°	1°04'	-17'	99°	1			
2	32°25'	-10'	97°	32°17'	-12'	97°	32°09'	-13'	98°	32°00'	-14'	99°	31°51'	-15'	99°	31°41'	-16'	100°	31°30'	-17'	101°	2			
3	32°14'	-11'	98°	32°06'	-12'	99°	31°56'	-13'	99°	31°46'	-15'	100°	31°36'	-16'	100°	31°24'	-17'	101°	31°13'	-18'	102°	3			
4	32°03'	-12'	99°	31°54'	-13'	100°	31°43'	-14'	100°	31°32'	-15'	101°	31°20'	-16'	102°	31°08'	-17'	102°	30°55'	-19'	103°	4			
5	31°52'	-12'	100°	31°41'	-13'	101°	31°29'	-15'	102°	31°17'	-16'	102°	31°04'	-17'	103°	30°50'	-18'	103°	30°36'	-19'	104°	5			
6	31°40'	-13'	102°	31°27'	-14'	102°	31°14'	-15'	103°	31°01'	-16'	103°	30°47'	-17'	104°	30°32'	-19'	104°	30°17'	-20'	105°	6			
7	31°27'	-13'	103°	31°13'	-15'	103°	30°59'	-16'	104°	30°45'	-17'	104°	30°29'	-18'	105°	30°14'	-19'	106°	29°57'	-20'	106°	7			
8	31°13'	-14'	104°	30°59'	-15'	104°	30°44'	-16'	105°	30°28'	-17'	106°	30°11'	-19'	106°	29°55'	-20'	107°	29°37'	-21'	107°	8			
9	30°59'	-15'	105°	30°44'	-16'	106°	30°27'	-17'	106°	30°10'	-18'	107°	29°53'	-19'	107°	29°35'	-20'	108°	29°16'	-21'	108°	9			
10	30°45'	-15'	106°	30°28'	-16'	107°	30°10'	-17'	107°	29°52'	-19'	108°	29°34'	-20'	108°	29°15'	-21'	109°	28°55'	-22'	109°	10			
11	30°29'	-16'	107°	30°11'	-17'	108°	29°53'	-18'	108°	29°34'	-19'	109°	29°14'	-20'	109°	28°54'	-21'	110°	28°33'	-22'	110°	11			
12	30°14'	-16'	108°	29°55'	-17'	109°	29°35'	-19'	109°	29°15'	-20'	110°	28°54'	-21'	110°	28°33'	-22'	111°	28°11'	-23'	111°	12			
13	29°57'	-17'	109°	29°37'	-18'	110°	29°16'	-19'	110°	28°55'	-20'	111°	28°33'	-21'	112°	28°11'	-22'	112°	27°48'	-23'	113°	13			
14	29°40'	-17'	111°	29°19'	-19'	111°	28°57'	-20'	112°	28°35'	-21'	112°	28°12'	-22'	113°	27°49'	-23'	113°	27°25'	-24'	114°	14			
15	29°23'	-18'	112°	29°01'	-19'	112°	28°38'	-20'	113°	28°14'	-21'	113°	27°51'	-22'	114°	27°26'	-23'	114°	27°01'	-24'	115°	15			
16	29°05'	-19'	113°	28°41'	-20'	113°	28°18'	-21'	114°	27°53'	-22'	114°	27°28'	-23'	115°	27°03'	-24'	115°	26°37'	-25'	116°	16			
17	28°46'	-19'	114°	28°22'	-20'	114°	27°57'	-21'	115°	27°32'	-22'	115°	27°06'	-23'	116°	26°40'	-24'	116°	26°13'	-25'	117°	17			
18	28°27'	-20'	115°	28°02'	-21'	115°	27°36'	-22'	116°	27°10'	-23'	116°	26°43'	-24'	117°	26°15'	-24'	117°	25°48'	-25'	118°	18			
19	28°08'	-20'	116°	27°41'	-21'	116°	27°14'	-22'	117°	26°47'	-23'	117°	26°19'	-24'	118°	25°51'	-25'	118°	25°22'	-26'	119°	19			
20	27°48'	-21'	117°	27°20'	-22'	117°	26°52'	-22'	118°	26°24'	-23'	118°	25°55'	-24'	119°	25°26'	-25'	119°	24°57'	-26'	120°	20			
21	27°27'	-21'	118°	26°59'	-22'	119°	26°30'	-23'	119°	26°01'	-24'	119°	25°31'	-25'	120°	25°01'	-26'	120°	24°30'	-27'	121°	21			
22	27°06'	-21'	119°	26°37'	-22'	120°	26°07'	-23'	120°	25°37'	-24'	120°	25°06'	-25'	121°	24°35'	-26'	121°	24°04'	-27'	122°	22			
23	26°45'	-22'	120°	26°14'	-23'	121°	25°43'	-24'	121°	25°12'	-25'	121°	24°41'	-26'	122°	24°09'	-26'	122°	23°37'	-27'	123°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13						

57° 303° LHA

Latitude CONTRARY to 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

56° 304° LHA

Latitude CONTRARY to Declination

56° 304° LHA

Table with 13 columns (Dec, 7, 8, 9, 10, 11, 12, 13, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is bordered and includes a header row for column labels.

56° 304° LHA

Latitude CONTRARY to 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

55° 305° LHA

Latitude CONTRARY to Declination

55° 305° LHA

Table with 13 columns (Dec, 7, 8, 9, 10, 11, 12, 13, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is bordered and includes a header row for column labels.

55° 305° LHA

Latitude CONTRARY to 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

**54° 306° LHA**

**Latitude CONTRARY to Declination**

**54° 306° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	35°41'	-09'	95°	35°36'	-11'	96°	35°29'	-12'	96°	35°22'	-13'	97°	35°14'	-14'	98°	35°06'	-16'	99°	34°56'	-17'	99°	0
1	35°32'	-10'	96°	35°25'	-11'	97°	35°17'	-13'	98°	35°09'	-14'	98°	35°00'	-15'	99°	34°50'	-16'	100°	34°40'	-17'	100°	1
2	35°22'	-11'	97°	35°14'	-12'	98°	35°05'	-13'	99°	34°55'	-15'	100°	34°45'	-16'	100°	34°34'	-17'	101°	34°22'	-18'	102°	2
3	35°11'	-12'	99°	35°02'	-13'	99°	34°52'	-14'	100°	34°41'	-15'	101°	34°29'	-16'	101°	34°17'	-18'	102°	34°04'	-19'	103°	3
4	35°00'	-12'	100°	34°49'	-13'	101°	34°38'	-15'	101°	34°26'	-16'	102°	34°13'	-17'	103°	33°59'	-18'	103°	33°45'	-19'	104°	4
5	34°47'	-13'	101°	34°35'	-14'	102°	34°23'	-15'	102°	34°10'	-17'	103°	33°56'	-18'	104°	33°41'	-19'	104°	33°26'	-20'	105°	5
6	34°34'	-14'	102°	34°21'	-15'	103°	34°08'	-16'	104°	33°53'	-17'	104°	33°38'	-18'	105°	33°22'	-19'	106°	33°06'	-21'	106°	6
7	34°21'	-14'	103°	34°07'	-15'	104°	33°52'	-17'	105°	33°36'	-18'	105°	33°20'	-19'	106°	33°03'	-20'	107°	32°45'	-21'	107°	7
8	34°07'	-15'	105°	33°51'	-16'	105°	33°35'	-17'	106°	33°18'	-18'	107°	33°01'	-20'	107°	32°43'	-21'	108°	32°24'	-22'	108°	8
9	33°52'	-16'	106°	33°35'	-17'	106°	33°18'	-18'	107°	33°00'	-19'	108°	32°41'	-20'	108°	32°22'	-21'	109°	32°02'	-22'	110°	9
10	33°36'	-16'	107°	33°18'	-17'	108°	33°00'	-19'	108°	32°41'	-20'	109°	32°21'	-21'	109°	32°01'	-22'	110°	31°40'	-23'	111°	10
11	33°20'	-17'	108°	33°01'	-18'	109°	32°41'	-19'	109°	32°21'	-20'	110°	32°00'	-21'	111°	31°39'	-22'	111°	31°17'	-23'	112°	11
12	33°03'	-18'	109°	32°43'	-19'	110°	32°22'	-20'	110°	32°01'	-21'	111°	31°39'	-22'	112°	31°17'	-23'	112°	30°54'	-24'	113°	12
13	32°45'	-18'	110°	32°24'	-19'	111°	32°02'	-20'	112°	31°40'	-21'	112°	31°17'	-22'	113°	30°54'	-23'	113°	30°30'	-24'	114°	13
14	32°27'	-19'	112°	32°05'	-20'	112°	31°42'	-21'	113°	31°19'	-22'	113°	30°55'	-23'	114°	30°30'	-24'	114°	30°05'	-25'	115°	14
15	32°08'	-19'	113°	31°45'	-20'	113°	31°21'	-21'	114°	30°57'	-22'	114°	30°32'	-24'	115°	30°06'	-25'	115°	29°40'	-25'	116°	15
16	31°49'	-20'	114°	31°25'	-21'	114°	31°00'	-22'	115°	30°34'	-23'	115°	30°08'	-24'	116°	29°42'	-25'	116°	29°15'	-26'	117°	16
17	31°29'	-20'	115°	31°04'	-22'	115°	30°38'	-23'	116°	30°11'	-24'	116°	29°44'	-25'	117°	29°17'	-25'	118°	28°49'	-26'	118°	17
18	31°09'	-21'	116°	30°42'	-22'	117°	30°15'	-23'	117°	29°48'	-24'	118°	29°20'	-25'	118°	28°51'	-26'	119°	28°22'	-27'	119°	18
19	30°48'	-22'	117°	30°20'	-23'	118°	29°52'	-24'	118°	29°24'	-25'	119°	28°55'	-25'	119°	28°25'	-26'	120°	27°55'	-27'	120°	19
20	30°26'	-22'	118°	29°57'	-23'	119°	29°28'	-24'	119°	28°59'	-25'	120°	28°29'	-26'	120°	27°59'	-27'	121°	27°28'	-28'	121°	20
21	30°04'	-23'	119°	29°34'	-24'	120°	29°04'	-25'	120°	28°34'	-25'	121°	28°03'	-26'	121°	27°32'	-27'	122°	27°00'	-28'	122°	21
22	29°41'	-23'	120°	29°11'	-24'	121°	28°40'	-25'	121°	28°09'	-26'	122°	27°37'	-27'	122°	27°05'	-28'	123°	26°32'	-29'	123°	22
23	29°18'	-24'	121°	28°47'	-25'	122°	28°15'	-25'	122°	27°43'	-26'	123°	27°10'	-27'	123°	26°37'	-28'	124°	26°04'	-29'	124°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**54° 306° LHA**

**Latitude CONTRARY to 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

**53° 307° LHA**

**Latitude CONTRARY to Declination**

**53° 307° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	36°41'	-09'	95°	36°35'	-11'	96°	36°28'	-12'	97°	36°21'	-13'	97°	36°13'	-15'	98°	36°04'	-16'	99°	35°54'	-17'	100°	0
1	36°31'	-10'	96°	36°24'	-12'	97°	36°16'	-13'	98°	36°08'	-14'	99°	35°58'	-15'	99°	35°48'	-16'	100°	35°37'	-18'	101°	1
2	36°21'	-11'	98°	36°13'	-12'	98°	36°03'	-14'	99°	35°53'	-15'	100°	35°43'	-16'	101°	35°31'	-17'	101°	35°19'	-18'	102°	2
3	36°10'	-12'	99°	36°00'	-13'	100°	35°50'	-14'	100°	35°39'	-15'	101°	35°27'	-17'	102°	35°14'	-18'	102°	35°01'	-19'	103°	3
4	35°58'	-12'	100°	35°47'	-14'	101°	35°36'	-15'	102°	35°23'	-16'	102°	35°10'	-17'	103°	34°56'	-19'	104°	34°42'	-20'	104°	4
5	35°46'	-13'	101°	35°34'	-14'	102°	35°21'	-16'	103°	35°07'	-17'	103°	34°53'	-18'	104°	34°38'	-19'	105°	34°22'	-20'	105°	5
6	35°33'	-14'	103°	35°19'	-15'	103°	35°05'	-16'	104°	34°50'	-17'	105°	34°35'	-19'	105°	34°19'	-20'	106°	34°02'	-21'	107°	6
7	35°19'	-15'	104°	35°04'	-16'	104°	34°49'	-17'	105°	34°33'	-18'	106°	34°16'	-19'	106°	33°59'	-20'	107°	33°41'	-22'	108°	7
8	35°04'	-15'	105°	34°48'	-16'	106°	34°32'	-18'	106°	34°15'	-19'	107°	33°57'	-20'	108°	33°39'	-21'	108°	33°19'	-22'	109°	8
9	34°49'	-16'	106°	34°32'	-17'	107°	34°14'	-18'	107°	33°56'	-19'	108°	33°37'	-21'	109°	33°17'	-22'	109°	32°57'	-23'	110°	9
10	34°33'	-17'	107°	34°15'	-18'	108°	33°56'	-19'	109°	33°37'	-20'	109°	33°16'	-21'	110°	32°56'	-22'	110°	32°35'	-23'	111°	10
11	34°16'	-17'	108°	33°57'	-18'	109°	33°37'	-20'	110°	33°16'	-21'	110°	32°55'	-22'	111°	32°34'	-23'	112°	32°11'	-24'	112°	11
12	33°59'	-18'	110°	33°39'	-19'	110°	33°17'	-20'	111°	32°56'	-21'	111°	32°34'	-22'	112°	32°11'	-23'	113°	31°47'	-24'	113°	12
13	33°41'	-19'	111°	33°19'	-20'	111°	32°57'	-21'	112°	32°35'	-22'	113°	32°11'	-23'	113°	31°47'	-24'	114°	31°23'	-25'	114°	13
14	33°22'	-19'	112°	33°00'	-20'	112°	32°37'	-21'	113°	32°13'	-22'	114°	31°48'	-23'	114°	31°23'	-24'	115°	30°58'	-25'	115°	14
15	33°03'	-20'	113°	32°40'	-21'	114°	32°15'	-22'	114°	31°50'	-23'	115°	31°25'	-24'	115°	30°59'	-25'	116°	30°33'	-26'	116°	15
16	32°43'	-20'	114°	32°19'	-21'	115°	31°53'	-22'	115°	31°27'	-24'	116°	31°01'	-25'	116°	30°34'	-25'	117°	30°07'	-26'	117°	16
17	32°23'	-21'	115°	31°57'	-22'	116°	31°31'	-23'	116°	31°04'	-24'	117°	30°36'	-25'	117°	30°09'	-26'	118°	29°40'	-27'	118°	17
18	32°02'	-22'	116°	31°35'	-23'	117°	31°08'	-24'	117°	30°40'	-25'	118°	30°11'	-26'	119°	29°43'	-26'	119°	29°13'	-27'	120°	18
19	31°41'	-22'	117°	31°13'	-23'	118°	30°44'	-24'	119°	30°15'	-25'	119°	29°46'	-26'	120°	29°16'	-27'	120°	28°46'	-28'	121°	19
20	31°18'	-23'	119°	30°49'	-24'	119°	30°20'	-25'	120°	29°50'	-26'	120°	29°20'	-26'	121°	28°49'	-27'	121°	28°18'	-28'	122°	20
21	30°56'	-23'	120°	30°26'	-24'	120°	29°55'	-25'	121°	29°25'	-26'	121°	28°53'	-27'	122°	28°22'	-28'	122°	27°50'	-29'	123°	21
22	30°33'	-24'	121°	30°02'	-25'	121°	29°30'	-26'	122°	28°59'	-27'	122°	28°26'	-27'	123°	27°54'	-28'	123°	27°21'	-29'	124°	22
23	30°09'	-24'	122°	29°37'	-25'	122°	29°05'	-26'	123°	28°32'	-27'	123°	27°59'	-28'	124°	27°26'	-29'	124°	26°52'	-30'	125°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**53° 307° LHA**

**Latitude CONTRARY to 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

52° 308° LHA

Latitude CONTRARY to Declination

52° 308° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	37°40'	-10'	95°	37°34'	-11'	96°	37°27'	-12'	97°	37°19'	-13'	98°	37°11'	-15'	98°	37°02'	-16'	99°	36°52'	-17'	100°	0
1	37°30'	-10'	97°	37°23'	-12'	97°	37°15'	-13'	98°	37°06'	-14'	99°	36°56'	-15'	100°	36°46'	-17'	100°	36°34'	-18'	101°	1
2	37°20'	-11'	98°	37°11'	-12'	99°	37°02'	-14'	99°	36°52'	-15'	100°	36°41'	-16'	101°	36°29'	-17'	102°	36°17'	-19'	102°	2
3	37°09'	-12'	99°	36°59'	-13'	100°	36°48'	-14'	101°	36°37'	-16'	101°	36°24'	-17'	102°	36°12'	-18'	103°	35°58'	-19'	104°	3
4	36°57'	-13'	100°	36°46'	-14'	101°	36°34'	-15'	102°	36°21'	-16'	103°	36°08'	-18'	103°	35°53'	-19'	104°	35°39'	-20'	105°	4
5	36°44'	-13'	102°	36°32'	-15'	102°	36°19'	-16'	103°	36°05'	-17'	104°	35°50'	-18'	104°	35°35'	-19'	105°	35°19'	-21'	106°	5
6	36°31'	-14'	103°	36°17'	-15'	104°	36°03'	-17'	104°	35°47'	-18'	105°	35°32'	-19'	106°	35°15'	-20'	106°	34°58'	-21'	107°	6
7	36°17'	-15'	104°	36°02'	-16'	105°	35°46'	-17'	105°	35°30'	-18'	106°	35°13'	-20'	107°	34°55'	-21'	107°	34°37'	-22'	108°	7
8	36°02'	-16'	105°	35°45'	-17'	106°	35°29'	-18'	107°	35°11'	-19'	107°	34°53'	-20'	108°	34°34'	-21'	109°	34°15'	-23'	109°	8
9	35°46'	-16'	106°	35°29'	-17'	107°	35°11'	-19'	108°	34°52'	-20'	108°	34°33'	-21'	109°	34°13'	-22'	110°	33°52'	-23'	110°	9
10	35°30'	-17'	108°	35°11'	-18'	108°	34°52'	-19'	109°	34°32'	-20'	110°	34°12'	-22'	110°	33°51'	-23'	111°	33°29'	-24'	111°	10
11	35°13'	-18'	109°	34°53'	-19'	109°	34°33'	-20'	110°	34°12'	-21'	111°	33°50'	-22'	111°	33°28'	-23'	112°	33°05'	-24'	113°	11
12	34°55'	-18'	110°	34°34'	-19'	111°	34°13'	-21'	111°	33°51'	-22'	112°	33°28'	-23'	112°	33°05'	-24'	113°	32°41'	-25'	114°	12
13	34°37'	-19'	111°	34°15'	-20'	112°	33°52'	-21'	112°	33°29'	-22'	113°	33°05'	-23'	114°	32°41'	-24'	114°	32°16'	-25'	115°	13
14	34°18'	-20'	112°	33°55'	-21'	113°	33°31'	-22'	113°	33°07'	-23'	114°	32°42'	-24'	115°	32°17'	-25'	115°	31°51'	-26'	116°	14
15	33°58'	-20'	113°	33°34'	-21'	114°	33°09'	-22'	115°	32°44'	-23'	115°	32°18'	-24'	116°	31°52'	-25'	116°	31°25'	-26'	117°	15
16	33°38'	-21'	115°	33°13'	-22'	115°	32°47'	-23'	116°	32°20'	-24'	116°	31°54'	-25'	117°	31°26'	-26'	117°	30°58'	-27'	118°	16
17	33°17'	-21'	116°	32°51'	-23'	116°	32°24'	-24'	117°	31°56'	-25'	117°	31°29'	-26'	118°	31°00'	-26'	118°	30°31'	-27'	119°	17
18	32°55'	-22'	117°	32°28'	-23'	117°	32°00'	-24'	118°	31°32'	-25'	118°	31°03'	-26'	119°	30°34'	-27'	119°	30°04'	-28'	120°	18
19	32°33'	-23'	118°	32°05'	-24'	118°	31°36'	-25'	119°	31°07'	-26'	120°	30°37'	-27'	120°	30°07'	-27'	121°	29°36'	-28'	121°	19
20	32°11'	-23'	119°	31°41'	-24'	120°	31°12'	-25'	120°	30°41'	-26'	121°	30°10'	-27'	121°	29°39'	-28'	122°	29°08'	-29'	122°	20
21	31°47'	-24'	120°	31°17'	-25'	121°	30°46'	-26'	121°	30°15'	-27'	122°	29°43'	-28'	122°	29°11'	-28'	123°	28°39'	-29'	123°	21
22	31°24'	-24'	121°	30°52'	-25'	122°	30°21'	-26'	122°	29°49'	-27'	123°	29°16'	-28'	123°	28°43'	-29'	124°	28°10'	-30'	124°	22
23	30°59'	-25'	122°	30°27'	-26'	123°	29°55'	-27'	123°	29°21'	-28'	124°	28°48'	-28'	124°	28°14'	-29'	125°	27°40'	-30'	125°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

52° 308° LHA

Latitude CONTRARY to 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

51° 309° LHA

Latitude CONTRARY to Declination

51° 309° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	38°39'	-10'	96°	38°33'	-11'	96°	38°26'	-12'	97°	38°18'	-14'	98°	38°09'	-15'	99°	38°00'	-16'	100°	37°49'	-17'	100°	0
1	38°30'	-11'	97°	38°22'	-12'	98°	38°13'	-13'	98°	38°04'	-14'	99°	37°54'	-16'	100°	37°43'	-17'	101°	37°32'	-18'	102°	1
2	38°19'	-11'	98°	38°10'	-13'	99°	38°00'	-14'	100°	37°50'	-15'	100°	37°39'	-16'	101°	37°26'	-18'	102°	37°14'	-19'	103°	2
3	38°08'	-12'	99°	37°57'	-13'	100°	37°46'	-15'	101°	37°35'	-16'	102°	37°22'	-17'	102°	37°09'	-18'	103°	36°55'	-20'	104°	3
4	37°55'	-13'	101°	37°44'	-14'	101°	37°32'	-15'	102°	37°19'	-17'	103°	37°05'	-18'	104°	36°50'	-19'	104°	36°35'	-20'	105°	4
5	37°42'	-14'	102°	37°30'	-15'	103°	37°16'	-16'	103°	37°02'	-17'	104°	36°47'	-19'	105°	36°31'	-20'	106°	36°15'	-21'	106°	5
6	37°29'	-14'	103°	37°15'	-16'	104°	37°00'	-17'	105°	36°45'	-18'	105°	36°28'	-19'	106°	36°11'	-20'	107°	35°54'	-22'	107°	6
7	37°14'	-15'	104°	36°59'	-16'	105°	36°43'	-18'	106°	36°26'	-19'	106°	36°09'	-20'	107°	35°51'	-21'	108°	35°32'	-22'	109°	7
8	36°59'	-16'	106°	36°43'	-17'	106°	36°25'	-18'	107°	36°08'	-20'	108°	35°49'	-21'	108°	35°30'	-22'	109°	35°10'	-23'	110°	8
9	36°43'	-17'	107°	36°25'	-18'	107°	36°07'	-19'	108°	35°48'	-20'	109°	35°28'	-21'	110°	35°08'	-22'	110°	34°47'	-24'	111°	9
10	36°26'	-17'	108°	36°08'	-19'	109°	35°48'	-20'	109°	35°28'	-21'	110°	35°07'	-22'	111°	34°45'	-23'	111°	34°23'	-24'	112°	10
11	36°09'	-18'	109°	35°49'	-19'	110°	35°28'	-20'	110°	35°07'	-21'	111°	34°45'	-23'	112°	34°22'	-24'	112°	33°59'	-25'	113°	11
12	35°51'	-19'	110°	35°30'	-20'	111°	35°08'	-21'	112°	34°45'	-22'	112°	34°22'	-23'	113°	33°59'	-24'	114°	33°34'	-25'	114°	12
13	35°32'	-19'	111°	35°10'	-21'	112°	34°47'	-22'	113°	34°23'	-23'	113°	33°59'	-24'	114°	33°34'	-25'	115°	33°09'	-26'	115°	13
14	35°13'	-20'	113°	34°49'	-21'	113°	34°25'	-22'	114°	34°01'	-23'	115°	33°35'	-24'	115°	33°10'	-25'	116°	32°43'	-26'	116°	14
15	34°53'	-21'	114°	34°28'	-22'	114°	34°03'	-23'	115°	33°37'	-24'	116°	33°11'	-25'	116°	32°44'	-26'	117°	32°17'	-27'	117°	15
16	34°32'	-21'	115°	34°06'	-22'	116°	33°40'	-23'	116°	33°13'	-25'	117°	32°46'	-26'	117°	32°18'	-26'	118°	31°50'	-27'	118°	16
17	34°10'	-22'	116°	33°44'	-23'	117°	33°17'	-24'	117°	32°49'	-25'	118°	32°21'	-26'	118°	31°52'	-27'	119°	31°22'	-28'	119°	17
18	33°48'	-23'	117°	33°21'	-24'	118°	32°53'	-25'	118°	32°24'	-26'	119°	31°54'	-27'	119°	31°25'	-28'	120°	30°54'	-28'	121°	18
19	33°26'	-23'	118°	32°57'	-24'	119°	32°28'	-25'	119°	31°58'	-26'	120°	31°28'	-27'	121°	30°57'	-28'	121°	30°26'	-29'	122°	19
20	33°03'	-24'	119°	32°33'	-25'	120°	32°03'	-26'	121°	31°32'	-27'	121°	31°01'	-28'	122°	30°29'	-28'	122°	29°57'	-29'	123°	20
21	32°39'	-24'	120°	32°08'	-25'	121°	31°37'	-26'	122°	31°05'	-27'	122°	30°33'	-28'	123°	30°01'	-29'	123°	29°28'	-30'	124°	21
22	32°15'	-25'	122°	31°43'	-26'	122°	31°11'	-27'	123°	30°38'	-28'	123°	30°05'	-29'	124°	29°32'	-29'	124°	28°58'	-30'	125°	22
23	31°50'	-25'	123°	31°17'	-26'	123°	30°44'	-27'	124°	30°10'	-28'	124°	29°37'	-29'	125°	29°02'	-30'	125°	28°28'	-31'	126°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

51° 309° LHA

Latitude CONTRARY to 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

50° 310° LHA

**Latitude CONTRARY to Declination**

50° 310° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	39°39'	-10'	96°	39°32'	-11'	97°	39°25'	-13'	97°	39°16'	-14'	98°	39°07'	-15'	99°	38°57'	-16'	100°	38°47'	-18'	101°	0
1	39°29'	-11'	97°	39°21'	-12'	98°	39°12'	-13'	99°	39°03'	-15'	100°	38°52'	-16'	100°	38°41'	-17'	101°	38°29'	-18'	102°	1
2	39°18'	-12'	98°	39°09'	-13'	99°	38°59'	-14'	100°	38°48'	-15'	101°	38°36'	-17'	102°	38°24'	-18'	102°	38°11'	-19'	103°	2
3	39°06'	-12'	100°	38°56'	-14'	100°	38°45'	-15'	101°	38°32'	-16'	102°	38°20'	-17'	103°	38°06'	-19'	104°	37°51'	-20'	104°	3
4	38°54'	-13'	101°	38°42'	-14'	102°	38°30'	-16'	102°	38°16'	-17'	103°	38°02'	-18'	104°	37°47'	-19'	105°	37°31'	-21'	106°	4
5	38°41'	-14'	102°	38°28'	-15'	103°	38°14'	-17'	104°	37°59'	-18'	104°	37°44'	-19'	105°	37°28'	-20'	106°	37°11'	-21'	107°	5
6	38°27'	-15'	103°	38°12'	-16'	104°	37°57'	-17'	105°	37°41'	-18'	106°	37°25'	-20'	106°	37°08'	-21'	107°	36°49'	-22'	108°	6
7	38°12'	-16'	105°	37°56'	-17'	105°	37°40'	-18'	106°	37°23'	-19'	107°	37°05'	-20'	108°	36°47'	-22'	108°	36°27'	-23'	109°	7
8	37°56'	-16'	106°	37°40'	-18'	107°	37°22'	-19'	107°	37°04'	-20'	108°	36°45'	-21'	109°	36°25'	-22'	109°	36°05'	-23'	110°	8
9	37°40'	-17'	107°	37°22'	-18'	108°	37°03'	-19'	109°	36°44'	-21'	109°	36°24'	-22'	110°	36°03'	-23'	111°	35°41'	-24'	111°	9
10	37°23'	-18'	108°	37°04'	-19'	109°	36°44'	-20'	110°	36°23'	-21'	110°	36°02'	-22'	111°	35°40'	-24'	112°	35°17'	-25'	112°	10
11	37°05'	-19'	109°	36°45'	-20'	110°	36°24'	-21'	111°	36°02'	-22'	112°	35°40'	-23'	112°	35°17'	-24'	113°	34°53'	-25'	114°	11
12	36°47'	-19'	111°	36°25'	-20'	111°	36°03'	-21'	112°	35°40'	-23'	113°	35°17'	-24'	113°	34°52'	-25'	114°	34°28'	-26'	115°	12
13	36°27'	-20'	112°	36°05'	-21'	113°	35°41'	-22'	113°	35°17'	-23'	114°	34°53'	-24'	115°	34°28'	-25'	115°	34°02'	-26'	116°	13
14	36°08'	-21'	113°	35°44'	-22'	114°	35°19'	-23'	114°	34°54'	-24'	115°	34°29'	-25'	116°	34°02'	-26'	116°	33°36'	-27'	117°	14
15	35°47'	-21'	114°	35°22'	-22'	115°	34°57'	-23'	115°	34°30'	-24'	116°	34°04'	-25'	117°	33°36'	-26'	117°	33°09'	-27'	118°	15
16	35°26'	-22'	115°	35°00'	-23'	116°	34°33'	-24'	117°	34°06'	-25'	117°	33°38'	-26'	118°	33°10'	-27'	118°	32°41'	-28'	119°	16
17	35°04'	-23'	116°	34°37'	-24'	117°	34°09'	-25'	118°	33°41'	-26'	118°	33°12'	-27'	119°	32°43'	-28'	119°	32°13'	-28'	120°	17
18	34°41'	-23'	118°	34°13'	-24'	118°	33°45'	-25'	119°	33°15'	-26'	119°	32°46'	-27'	120°	32°15'	-28'	121°	31°45'	-29'	121°	18
19	34°18'	-24'	119°	33°49'	-25'	119°	33°19'	-26'	120°	32°49'	-27'	120°	32°19'	-28'	121°	31°47'	-29'	122°	31°16'	-29'	122°	19
20	33°54'	-24'	120°	33°24'	-25'	120°	32°54'	-26'	121°	32°22'	-27'	122°	31°51'	-28'	122°	31°19'	-29'	123°	30°46'	-30'	123°	20
21	33°30'	-25'	121°	32°59'	-26'	122°	32°27'	-27'	122°	31°55'	-28'	123°	31°23'	-29'	123°	30°50'	-30'	124°	30°16'	-30'	124°	21
22	33°05'	-25'	122°	32°33'	-26'	123°	32°01'	-27'	123°	31°27'	-28'	124°	30°54'	-29'	124°	30°20'	-30'	125°	29°46'	-31'	125°	22
23	32°40'	-26'	123°	32°07'	-27'	124°	31°33'	-28'	124°	30°59'	-29'	125°	30°25'	-30'	125°	29°50'	-30'	126°	29°15'	-31'	126°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

50° 310° LHA

**Latitude CONTRARY to 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

49° 311° LHA

**Latitude CONTRARY to Declination**

49° 311° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	40°38'	-10'	96°	40°31'	-11'	97°	40°23'	-13'	98°	40°15'	-14'	99°	40°05'	-15'	99°	39°55'	-17'	100°	39°44'	-18'	101°	0
1	40°28'	-11'	97°	40°20'	-12'	98°	40°11'	-14'	99°	40°01'	-15'	100°	39°50'	-16'	101°	39°39'	-17'	101°	39°26'	-19'	102°	1
2	40°17'	-12'	99°	40°07'	-13'	99°	39°57'	-14'	100°	39°46'	-16'	101°	39°34'	-17'	102°	39°21'	-18'	103°	39°07'	-19'	104°	2
3	40°05'	-13'	100°	39°54'	-14'	101°	39°43'	-15'	102°	39°30'	-17'	102°	39°17'	-18'	103°	39°03'	-19'	104°	38°48'	-20'	105°	3
4	39°52'	-13'	101°	39°40'	-15'	102°	39°27'	-16'	103°	39°14'	-17'	104°	38°59'	-19'	104°	38°44'	-20'	105°	38°28'	-21'	106°	4
5	39°39'	-14'	102°	39°26'	-16'	103°	39°11'	-17'	104°	38°56'	-18'	105°	38°41'	-19'	106°	38°24'	-21'	106°	38°07'	-22'	107°	5
6	39°25'	-15'	104°	39°10'	-16'	105°	38°55'	-18'	105°	38°38'	-19'	106°	38°21'	-20'	107°	38°04'	-21'	108°	37°45'	-22'	108°	6
7	39°09'	-16'	105°	38°54'	-17'	106°	38°37'	-18'	107°	38°19'	-20'	107°	38°01'	-21'	108°	37°42'	-22'	109°	37°23'	-23'	109°	7
8	38°54'	-17'	106°	38°36'	-18'	107°	38°19'	-19'	108°	38°00'	-20'	108°	37°41'	-21'	109°	37°20'	-23'	110°	37°00'	-24'	111°	8
9	38°37'	-17'	107°	38°19'	-19'	108°	37°59'	-20'	109°	37°40'	-21'	110°	37°19'	-22'	110°	36°58'	-23'	111°	36°36'	-24'	112°	9
10	38°19'	-18'	109°	38°00'	-19'	109°	37°40'	-21'	110°	37°19'	-22'	111°	36°57'	-23'	112°	36°34'	-24'	112°	36°11'	-25'	113°	10
11	38°01'	-19'	110°	37°41'	-20'	111°	37°19'	-21'	111°	36°57'	-22'	112°	36°34'	-24'	113°	36°11'	-25'	113°	35°46'	-26'	114°	11
12	37°42'	-20'	111°	37°20'	-21'	112°	36°58'	-22'	112°	36°34'	-23'	113°	36°11'	-24'	114°	35°46'	-25'	115°	35°21'	-26'	115°	12
13	37°23'	-20'	112°	37°00'	-22'	113°	36°36'	-23'	114°	36°11'	-24'	114°	35°46'	-25'	115°	35°21'	-26'	116°	34°54'	-27'	116°	13
14	37°02'	-21'	113°	36°38'	-22'	114°	36°13'	-23'	115°	35°48'	-24'	115°	35°22'	-25'	116°	34°55'	-26'	117°	34°28'	-27'	117°	14
15	36°41'	-22'	115°	36°16'	-23'	115°	35°50'	-24'	116°	35°23'	-25'	117°	34°56'	-26'	117°	34°28'	-27'	118°	34°00'	-28'	118°	15
16	36°19'	-22'	116°	35°53'	-23'	116°	35°26'	-25'	117°	34°58'	-26'	118°	34°30'	-27'	118°	34°02'	-28'	119°	33°32'	-29'	119°	16
17	35°57'	-23'	117°	35°30'	-24'	118°	35°01'	-25'	118°	34°33'	-26'	119°	34°04'	-27'	119°	33°34'	-28'	120°	33°04'	-29'	121°	17
18	35°34'	-24'	118°	35°05'	-25'	119°	34°36'	-26'	119°	34°07'	-27'	120°	33°37'	-28'	120°	33°06'	-29'	121°	32°35'	-30'	122°	18
19	35°10'	-24'	119°	34°41'	-25'	120°	34°11'	-26'	120°	33°40'	-27'	121°	33°09'	-28'	122°	32°37'	-29'	122°	32°05'	-30'	123°	19
20	34°46'	-25'	120°	34°15'	-26'	121°	33°44'	-27'	121°	33°13'	-28'	122°	32°41'	-29'	123°	32°08'	-30'	123°	31°35'	-31'	124°	20
21	34°21'	-26'	121°	33°49'	-26'	122°	33°17'	-27'	123°	32°45'	-28'	123°	32°12'	-29'	124°	31°38'	-30'	124°	31°05'	-31'	125°	21
22	33°55'	-26'	123°	33°23'	-27'	123°	32°50'	-28'	124°	32°17'	-29'	124°	31°43'	-30'	125°	31°08'	-31'	125°	30°34'	-31'	126°	22
23	33°29'	-27'	124°	32°56'	-28'	124°	32°22'	-28'	125°	31°48'	-29'	125°	31°13'	-30'	126°	30°38'	-31'	126°	30°02'	-32'	127°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

49° 311° LHA

**Latitude CONTRARY to 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

48° 312° LHA

**Latitude CONTRARY to Declination**

48° 312° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	41°37'	-10'	96°	41°30'	-12'	97°	41°22'	-13'	98°	41°13'	-14'	99°	41°04'	-16'	100°	40°53'	-17'	101°	40°41'	-18'	101°	0
1	41°27'	-11'	98°	41°18'	-12'	98°	41°09'	-14'	99°	40°59'	-15'	100°	40°48'	-16'	101°	40°36'	-18'	102°	40°23'	-19'	103°	1
2	41°16'	-12'	99°	41°06'	-13'	100°	40°55'	-15'	101°	40°44'	-16'	101°	40°31'	-17'	102°	40°18'	-19'	103°	40°04'	-20'	104°	2
3	41°04'	-13'	100°	40°53'	-14'	101°	40°41'	-16'	102°	40°28'	-17'	103°	40°14'	-18'	104°	40°00'	-19'	104°	39°44'	-21'	105°	3
4	40°51'	-14'	101°	40°38'	-15'	102°	40°25'	-16'	103°	40°11'	-18'	104°	39°56'	-19'	105°	39°40'	-20'	106°	39°24'	-21'	106°	4
5	40°37'	-15'	103°	40°23'	-16'	104°	40°09'	-17'	104°	39°53'	-18'	105°	39°37'	-20'	106°	39°20'	-21'	107°	39°03'	-22'	108°	5
6	40°22'	-15'	104°	40°07'	-17'	105°	39°52'	-18'	106°	39°35'	-19'	106°	39°18'	-20'	107°	38°59'	-22'	108°	38°40'	-23'	109°	6
7	40°07'	-16'	105°	39°51'	-18'	106°	39°34'	-19'	107°	39°16'	-20'	108°	38°57'	-21'	108°	38°38'	-22'	109°	38°18'	-23'	110°	7
8	39°51'	-17'	107°	39°33'	-18'	107°	39°15'	-20'	108°	38°56'	-21'	109°	38°36'	-22'	110°	38°15'	-23'	110°	37°54'	-24'	111°	8
9	39°34'	-18'	108°	39°15'	-19'	109°	38°55'	-20'	109°	38°35'	-21'	110°	38°14'	-23'	111°	37°52'	-24'	112°	37°30'	-25'	112°	9
10	39°16'	-19'	109°	38°56'	-20'	110°	38°35'	-21'	111°	38°14'	-22'	111°	37°52'	-23'	112°	37°29'	-24'	113°	37°05'	-26'	113°	10
11	38°57'	-19'	110°	38°36'	-21'	111°	38°14'	-22'	112°	37°52'	-23'	112°	37°28'	-24'	113°	37°04'	-25'	114°	36°40'	-26'	115°	11
12	38°38'	-20'	111°	38°15'	-21'	112°	37°52'	-22'	113°	37°29'	-24'	114°	37°04'	-25'	114°	36°39'	-26'	115°	36°14'	-27'	116°	12
13	38°18'	-21'	113°	37°54'	-22'	113°	37°30'	-23'	114°	37°05'	-24'	115°	36°40'	-25'	115°	36°14'	-26'	116°	35°47'	-27'	117°	13
14	37°57'	-22'	114°	37°32'	-23'	115°	37°07'	-24'	115°	36°41'	-25'	116°	36°14'	-26'	117°	35°47'	-27'	117°	35°19'	-28'	118°	14
15	37°35'	-22'	115°	37°10'	-23'	116°	36°43'	-24'	116°	36°16'	-25'	117°	35°48'	-27'	118°	35°20'	-28'	118°	34°51'	-29'	119°	15
16	37°13'	-23'	116°	36°46'	-24'	117°	36°19'	-25'	118°	35°51'	-26'	118°	35°22'	-27'	119°	34°53'	-28'	119°	34°23'	-29'	120°	16
17	36°50'	-24'	117°	36°22'	-25'	118°	35°54'	-26'	119°	35°25'	-27'	119°	34°55'	-28'	120°	34°25'	-29'	121°	33°54'	-30'	121°	17
18	36°26'	-24'	119°	35°57'	-25'	119°	35°28'	-26'	120°	34°58'	-27'	120°	34°27'	-28'	121°	33°56'	-29'	122°	33°24'	-30'	122°	18
19	36°02'	-25'	120°	35°32'	-26'	120°	35°02'	-27'	121°	34°31'	-28'	121°	33°59'	-29'	122°	33°27'	-30'	123°	32°54'	-31'	123°	19
20	35°37'	-26'	121°	35°06'	-27'	121°	34°35'	-27'	122°	34°03'	-28'	123°	33°30'	-29'	123°	32°57'	-30'	124°	32°24'	-31'	124°	20
21	35°12'	-26'	122°	34°40'	-27'	122°	34°07'	-28'	123°	33°34'	-29'	124°	33°01'	-30'	124°	32°27'	-31'	125°	31°52'	-32'	125°	21
22	34°46'	-27'	123°	34°13'	-28'	124°	33°39'	-29'	124°	33°05'	-29'	125°	32°31'	-30'	125°	31°56'	-31'	126°	31°21'	-32'	126°	22
23	34°19'	-27'	124°	33°45'	-28'	125°	33°11'	-29'	125°	32°36'	-30'	126°	32°01'	-31'	126°	31°25'	-32'	127°	30°49'	-32'	127°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

48° 312° LHA

**Latitude CONTRARY to 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

47° 313° LHA

**Latitude CONTRARY to Declination**

47° 313° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	42°36'	-10'	96°	42°29'	-12'	97°	42°21'	-13'	98°	42°12'	-15'	99°	42°02'	-16'	100°	41°51'	-17'	101°	41°39'	-18'	102°	0
1	42°26'	-11'	98°	42°17'	-13'	99°	42°08'	-14'	100°	41°57'	-15'	101°	41°46'	-17'	101°	41°33'	-18'	102°	41°20'	-19'	103°	1
2	42°14'	-12'	99°	42°04'	-14'	100°	41°54'	-15'	101°	41°42'	-16'	102°	41°29'	-18'	103°	41°15'	-19'	104°	41°01'	-20'	104°	2
3	42°02'	-13'	100°	41°51'	-14'	101°	41°39'	-16'	102°	41°25'	-17'	103°	41°11'	-18'	104°	40°57'	-20'	105°	40°41'	-21'	106°	3
4	41°49'	-14'	102°	41°36'	-15'	103°	41°23'	-17'	104°	41°08'	-18'	104°	40°53'	-19'	105°	40°37'	-20'	106°	40°20'	-22'	107°	4
5	41°35'	-15'	103°	41°21'	-16'	104°	41°06'	-18'	105°	40°50'	-19'	106°	40°34'	-20'	106°	40°16'	-21'	107°	39°58'	-22'	108°	5
6	41°20'	-16'	104°	41°05'	-17'	105°	40°49'	-18'	106°	40°32'	-20'	107°	40°14'	-21'	108°	39°55'	-22'	108°	39°36'	-23'	109°	6
7	41°04'	-17'	106°	40°48'	-18'	106°	40°30'	-19'	107°	40°12'	-20'	108°	39°53'	-22'	109°	39°33'	-23'	110°	39°13'	-24'	110°	7
8	40°48'	-17'	107°	40°30'	-19'	108°	40°11'	-20'	109°	39°52'	-21'	109°	39°31'	-22'	110°	39°10'	-23'	111°	38°49'	-25'	112°	8
9	40°30'	-18'	108°	40°11'	-19'	109°	39°51'	-21'	110°	39°31'	-22'	111°	39°09'	-23'	111°	38°47'	-24'	112°	38°24'	-25'	113°	9
10	40°12'	-19'	109°	39°52'	-20'	110°	39°31'	-21'	111°	39°09'	-23'	112°	38°46'	-24'	113°	38°23'	-25'	113°	37°59'	-26'	114°	10
11	39°53'	-20'	111°	39°31'	-21'	111°	39°09'	-22'	112°	38°46'	-23'	113°	38°22'	-24'	114°	37°58'	-26'	114°	37°33'	-27'	115°	11
12	39°33'	-21'	112°	39°10'	-22'	113°	38°47'	-23'	113°	38°23'	-24'	114°	37°58'	-25'	115°	37°32'	-26'	116°	37°06'	-27'	116°	12
13	39°13'	-21'	113°	38°49'	-23'	114°	38°24'	-24'	115°	37°59'	-25'	115°	37°33'	-26'	116°	37°06'	-27'	117°	36°39'	-28'	117°	13
14	38°51'	-22'	114°	38°26'	-23'	115°	38°00'	-24'	116°	37°34'	-25'	116°	37°07'	-26'	117°	36°39'	-27'	118°	36°11'	-28'	118°	14
15	38°29'	-23'	116°	38°03'	-24'	116°	37°36'	-25'	117°	37°09'	-26'	118°	36°40'	-27'	118°	36°12'	-28'	119°	35°42'	-29'	120°	15
16	38°06'	-24'	117°	37°39'	-25'	117°	37°11'	-26'	118°	36°43'	-27'	119°	36°13'	-28'	119°	35°44'	-29'	120°	35°13'	-30'	121°	16
17	37°43'	-24'	118°	37°14'	-25'	119°	36°45'	-26'	119°	36°16'	-27'	120°	35°46'	-28'	120°	35°15'	-29'	121°	34°44'	-30'	122°	17
18	37°19'	-25'	119°	36°49'	-26'	120°	36°19'	-27'	120°	35°49'	-28'	121°	35°17'	-29'	122°	34°46'	-30'	122°	34°14'	-31'	123°	18
19	36°54'	-26'	120°	36°23'	-27'	121°	35°52'	-27'	121°	35°21'	-28'	122°	34°49'	-29'	123°	34°16'	-30'	123°	33°43'	-31'	124°	19
20	36°28'	-26'	121°	35°57'	-27'	122°	35°25'	-28'	123°	34°52'	-29'	123°	34°19'	-30'	124°	33°46'	-31'	124°	33°12'	-32'	125°	20
21	36°02'	-27'	122°	35°30'	-28'	123°	34°57'	-29'	124°	34°23'	-30'	124°	33°49'	-30'	125°	33°15'	-31'	125°	32°40'	-32'	126°	21
22	35°35'	-27'	124°	35°02'	-28'	124°	34°28'	-29'	125°	33°54'	-30'	125°	33°19'	-31'	126°	32°44'	-32'	126°	32°08'	-33'	127°	22
23	35°08'	-28'	125°	34°34'	-29'	125°	33°59'	-30'	126°	33°24'	-31'	126°	32°48'	-31'	127°	32°12'	-32'	127°	31°35'	-33'	128°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

47° 313° LHA

**Latitude CONTRARY to 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

46° 314° LHA

**Latitude CONTRARY to Declination**

46° 314° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	43°35'	-11'	97°	43°28'	-12'	98°	43°19'	-13'	99°	43°10'	-15'	100°	43°00'	-16'	100°	42°48'	-17'	101°	42°36'	-19'	102°	0
1	43°25'	-12'	98°	43°16'	-13'	99°	43°06'	-14'	100°	42°55'	-16'	101°	42°43'	-17'	102°	42°31'	-18'	103°	42°17'	-20'	104°	1
2	43°13'	-12'	99°	43°03'	-14'	100°	42°52'	-15'	101°	42°40'	-17'	102°	42°26'	-18'	103°	42°12'	-19'	104°	41°58'	-20'	105°	2
3	43°01'	-13'	101°	42°49'	-15'	102°	42°36'	-16'	103°	42°23'	-17'	103°	42°09'	-19'	104°	41°53'	-20'	105°	41°37'	-21'	106°	3
4	42°47'	-14'	102°	42°34'	-16'	103°	42°20'	-17'	104°	42°06'	-18'	105°	41°50'	-20'	106°	41°33'	-21'	106°	41°16'	-22'	107°	4
5	42°33'	-15'	103°	42°19'	-17'	104°	42°03'	-18'	105°	41°47'	-19'	106°	41°30'	-20'	107°	41°12'	-22'	108°	40°54'	-23'	109°	5
6	42°18'	-16'	105°	42°02'	-17'	106°	41°46'	-19'	106°	41°28'	-20'	107°	41°10'	-21'	108°	40°51'	-22'	109°	40°31'	-24'	110°	6
7	42°02'	-17'	106°	41°45'	-18'	107°	41°27'	-20'	108°	41°08'	-21'	109°	40°49'	-22'	109°	40°28'	-23'	110°	40°07'	-24'	111°	7
8	41°45'	-18'	107°	41°26'	-19'	108°	41°07'	-20'	109°	40°47'	-21'	110°	40°27'	-23'	111°	40°05'	-24'	111°	39°43'	-25'	112°	8
9	41°27'	-19'	109°	41°07'	-20'	109°	40°47'	-21'	110°	40°26'	-22'	111°	40°04'	-24'	112°	39°41'	-25'	113°	39°18'	-26'	113°	9
10	41°08'	-20'	110°	40°47'	-21'	111°	40°26'	-22'	111°	40°03'	-23'	112°	39°40'	-24'	113°	39°17'	-25'	114°	38°52'	-26'	115°	10
11	40°49'	-20'	111°	40°27'	-22'	112°	40°04'	-23'	113°	39°40'	-24'	113°	39°16'	-25'	114°	38°51'	-26'	115°	38°26'	-27'	116°	11
12	40°28'	-21'	112°	40°05'	-22'	113°	39°41'	-23'	114°	39°17'	-25'	115°	38°51'	-26'	115°	38°25'	-27'	116°	37°58'	-28'	117°	12
13	40°07'	-22'	114°	39°43'	-23'	114°	39°18'	-24'	115°	38°52'	-25'	116°	38°26'	-26'	117°	37°58'	-27'	117°	37°31'	-28'	118°	13
14	39°45'	-23'	115°	39°20'	-24'	116°	38°54'	-25'	116°	38°27'	-26'	117°	37°59'	-27'	118°	37°31'	-28'	118°	37°02'	-29'	119°	14
15	39°23'	-23'	116°	38°56'	-24'	117°	38°29'	-26'	117°	38°01'	-27'	118°	37°32'	-28'	119°	37°03'	-29'	119°	36°33'	-30'	120°	15
16	38°59'	-24'	117°	38°32'	-25'	118°	38°03'	-26'	119°	37°34'	-27'	119°	37°05'	-28'	120°	36°34'	-29'	121°	36°04'	-30'	121°	16
17	38°35'	-25'	118°	38°06'	-26'	119°	37°37'	-27'	120°	37°07'	-28'	120°	36°36'	-29'	121°	36°05'	-30'	122°	35°33'	-31'	122°	17
18	38°11'	-25'	120°	37°41'	-26'	120°	37°10'	-27'	121°	36°39'	-28'	121°	36°08'	-29'	122°	35°35'	-30'	123°	35°03'	-31'	123°	18
19	37°45'	-26'	121°	37°14'	-27'	121°	36°43'	-28'	122°	36°11'	-29'	123°	35°38'	-30'	123°	35°05'	-31'	124°	34°31'	-32'	124°	19
20	37°19'	-27'	122°	36°47'	-28'	122°	36°15'	-29'	123°	35°42'	-30'	124°	35°08'	-31'	124°	34°34'	-31'	125°	34°00'	-32'	125°	20
21	36°52'	-27'	123°	36°19'	-28'	124°	35°46'	-29'	124°	35°12'	-30'	125°	34°38'	-31'	125°	34°03'	-32'	126°	33°27'	-33'	126°	21
22	36°25'	-28'	124°	35°51'	-29'	125°	35°17'	-30'	125°	34°42'	-31'	126°	34°07'	-32'	126°	33°31'	-32'	127°	32°55'	-33'	127°	22
23	35°57'	-29'	125°	35°22'	-29'	126°	34°47'	-30'	126°	34°11'	-31'	127°	33°35'	-32'	127°	32°58'	-33'	128°	32°21'	-34'	128°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

46° 314° LHA

**Latitude CONTRARY to 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

45° 315° LHA

**Latitude CONTRARY to Declination**

45° 315° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	44°34'	-11'	97°	44°27'	-12'	98°	44°18'	-14'	99°	44°08'	-15'	100°	43°57'	-16'	101°	43°46'	-18'	102°	43°33'	-19'	103°	0
1	44°24'	-12'	98°	44°15'	-13'	99°	44°04'	-15'	100°	43°53'	-16'	101°	43°41'	-17'	102°	43°28'	-19'	103°	43°14'	-20'	104°	1
2	44°12'	-13'	100°	44°01'	-14'	101°	43°50'	-15'	102°	43°37'	-17'	103°	43°24'	-18'	103°	43°09'	-20'	104°	42°54'	-21'	105°	2
3	43°59'	-14'	101°	43°47'	-15'	102°	43°34'	-16'	103°	43°20'	-18'	104°	43°06'	-19'	105°	42°50'	-20'	106°	42°33'	-22'	107°	3
4	43°46'	-15'	102°	43°32'	-16'	103°	43°18'	-17'	104°	43°03'	-19'	105°	42°46'	-20'	106°	42°29'	-21'	107°	42°12'	-22'	108°	4
5	43°31'	-16'	104°	43°16'	-17'	105°	43°01'	-18'	106°	42°44'	-20'	106°	42°27'	-21'	107°	42°08'	-22'	108°	41°49'	-23'	109°	5
6	43°15'	-16'	105°	42°59'	-18'	106°	42°42'	-19'	107°	42°24'	-20'	108°	42°06'	-22'	109°	41°46'	-23'	109°	41°26'	-24'	110°	6
7	42°59'	-17'	106°	42°41'	-19'	107°	42°23'	-20'	108°	42°04'	-21'	109°	41°44'	-22'	110°	41°23'	-24'	111°	41°02'	-25'	112°	7
8	42°41'	-18'	108°	42°23'	-20'	109°	42°03'	-21'	109°	41°43'	-22'	110°	41°22'	-23'	111°	41°00'	-24'	112°	40°37'	-26'	113°	8
9	42°23'	-19'	109°	42°03'	-20'	110°	41°42'	-22'	111°	41°21'	-23'	112°	40°58'	-24'	112°	40°35'	-25'	113°	40°11'	-26'	114°	9
10	42°04'	-20'	110°	41°43'	-21'	111°	41°21'	-22'	112°	40°58'	-24'	113°	40°34'	-25'	114°	40°10'	-26'	114°	39°45'	-27'	115°	10
11	41°44'	-21'	112°	41°22'	-22'	112°	40°58'	-23'	113°	40°34'	-24'	114°	40°10'	-25'	115°	39°44'	-27'	115°	39°18'	-28'	116°	11
12	41°23'	-22'	113°	41°00'	-23'	114°	40°35'	-24'	114°	40°10'	-25'	115°	39°44'	-26'	116°	39°18'	-27'	117°	38°50'	-28'	117°	12
13	41°02'	-22'	114°	40°37'	-24'	115°	40°11'	-25'	116°	39°45'	-26'	116°	39°18'	-27'	117°	38°50'	-28'	118°	38°22'	-29'	119°	13
14	40°39'	-23'	115°	40°13'	-24'	116°	39°47'	-25'	117°	39°19'	-26'	118°	38°51'	-28'	118°	38°23'	-29'	119°	37°53'	-30'	120°	14
15	40°16'	-24'	116°	39°49'	-25'	117°	39°21'	-26'	118°	38°53'	-27'	119°	38°24'	-28'	119°	37°54'	-29'	120°	37°24'	-30'	121°	15
16	39°52'	-25'	118°	39°24'	-26'	118°	38°55'	-27'	119°	38°26'	-28'	120°	37°56'	-29'	120°	37°25'	-30'	121°	36°53'	-31'	122°	16
17	39°28'	-25'	119°	38°58'	-26'	120°	38°28'	-27'	120°	37°58'	-28'	121°	37°27'	-29'	122°	36°55'	-30'	122°	36°23'	-31'	123°	17
18	39°02'	-26'	120°	38°32'	-27'	121°	38°01'	-28'	121°	37°29'	-29'	122°	36°57'	-30'	123°	36°25'	-31'	123°	35°51'	-32'	124°	18
19	38°36'	-27'	121°	38°05'	-28'	122°	37°33'	-29'	123°	37°00'	-30'	123°	36°27'	-31'	124°	35°54'	-32'	124°	35°19'	-32'	125°	19
20	38°09'	-27'	122°	37°37'	-28'	123°	37°04'	-29'	124°	36°31'	-30'	124°	35°57'	-31'	125°	35°22'	-32'	125°	34°47'	-33'	126°	20
21	37°42'	-28'	123°	37°09'	-29'	124°	36°35'	-30'	125°	36°00'	-31'	125°	35°25'	-32'	126°	34°50'	-33'	126°	34°14'	-33'	127°	21
22	37°14'	-29'	125°	36°40'	-30'	125°	36°05'	-30'	126°	35°30'	-31'	126°	34°54'	-32'	127°	34°18'	-33'	127°	33°41'	-34'	128°	22
23	36°45'	-29'	126°	36°10'	-30'	126°	35°34'	-31'	127°	34°58'	-32'	127°	34°22'	-33'	128°	33°44'	-34'	128°	33°07'	-34'	129°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

45° 315° LHA

**Latitude CONTRARY to 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

44° 316° LHA

**Latitude CONTRARY to Declination**

44° 316° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	45°34'	-11'	97°	45°26'	-12'	98°	45°16'	-14'	99°	45°06'	-15'	100°	44°55'	-17'	101°	44°43'	-18'	102°	44°30'	-19'	103°	0
1	45°23'	-12'	99°	45°13'	-13'	100°	45°03'	-15'	101°	44°51'	-16'	102°	44°39'	-18'	103°	44°25'	-19'	103°	44°11'	-20'	104°	1
2	45°11'	-13'	100°	45°00'	-14'	101°	44°48'	-16'	102°	44°35'	-17'	103°	44°21'	-19'	104°	44°06'	-20'	105°	43°50'	-21'	106°	2
3	44°58'	-14'	101°	44°45'	-15'	102°	44°32'	-17'	103°	44°18'	-18'	104°	44°02'	-19'	105°	43°46'	-21'	106°	43°29'	-22'	107°	3
4	44°44'	-15'	103°	44°30'	-16'	104°	44°15'	-18'	105°	44°00'	-19'	106°	43°43'	-20'	107°	43°25'	-22'	107°	43°07'	-23'	108°	4
5	44°29'	-16'	104°	44°14'	-17'	105°	43°58'	-19'	106°	43°41'	-20'	107°	43°23'	-21'	108°	43°04'	-22'	109°	42°44'	-24'	110°	5
6	44°13'	-17'	105°	43°56'	-18'	106°	43°39'	-20'	107°	43°21'	-21'	108°	43°01'	-22'	109°	42°41'	-23'	110°	42°20'	-25'	111°	6
7	43°56'	-18'	107°	43°38'	-19'	108°	43°19'	-20'	109°	43°00'	-22'	109°	42°39'	-23'	110°	42°18'	-24'	111°	41°56'	-25'	112°	7
8	43°38'	-19'	108°	43°19'	-20'	109°	42°59'	-21'	110°	42°38'	-22'	111°	42°17'	-24'	112°	41°54'	-25'	112°	41°31'	-26'	113°	8
9	43°19'	-20'	109°	42°59'	-21'	110°	42°38'	-22'	111°	42°16'	-23'	112°	41°53'	-24'	113°	41°29'	-26'	114°	41°05'	-27'	114°	9
10	43°00'	-20'	111°	42°38'	-22'	112°	42°16'	-23'	112°	41°52'	-24'	113°	41°28'	-25'	114°	41°04'	-26'	115°	40°38'	-27'	116°	10
11	42°39'	-21'	112°	42°17'	-23'	113°	41°53'	-24'	114°	41°28'	-25'	114°	41°03'	-26'	115°	40°37'	-27'	116°	40°10'	-28'	117°	11
12	42°18'	-22'	113°	41°54'	-23'	114°	41°29'	-24'	115°	41°04'	-26'	116°	40°37'	-27'	116°	40°10'	-28'	117°	39°42'	-29'	118°	12
13	41°56'	-23'	115°	41°31'	-24'	115°	41°05'	-25'	116°	40°38'	-26'	117°	40°10'	-27'	118°	39°42'	-28'	118°	39°13'	-30'	119°	13
14	41°33'	-24'	116°	41°07'	-25'	117°	40°39'	-26'	117°	40°12'	-27'	118°	39°43'	-28'	119°	39°14'	-29'	120°	38°44'	-30'	120°	14
15	41°09'	-24'	117°	40°42'	-26'	118°	40°13'	-27'	119°	39°45'	-28'	119°	39°15'	-29'	120°	38°45'	-30'	121°	38°14'	-31'	121°	15
16	40°45'	-25'	118°	40°16'	-26'	119°	39°47'	-27'	120°	39°17'	-28'	120°	38°46'	-29'	121°	38°15'	-30'	122°	37°43'	-31'	122°	16
17	40°20'	-26'	119°	39°50'	-27'	120°	39°19'	-28'	121°	38°48'	-29'	122°	38°17'	-30'	122°	37°44'	-31'	123°	37°12'	-32'	123°	17
18	39°54'	-27'	121°	39°23'	-28'	121°	38°51'	-29'	122°	38°19'	-30'	123°	37°47'	-31'	123°	37°13'	-32'	124°	36°40'	-32'	125°	18
19	39°27'	-27'	122°	38°55'	-28'	122°	38°23'	-29'	123°	37°50'	-30'	124°	37°16'	-31'	124°	36°42'	-32'	125°	36°07'	-33'	126°	19
20	39°00'	-28'	123°	38°27'	-29'	124°	37°53'	-30'	124°	37°19'	-31'	125°	36°45'	-32'	125°	36°10'	-33'	126°	35°34'	-34'	127°	20
21	38°32'	-29'	124°	37°58'	-30'	125°	37°23'	-31'	125°	36°48'	-31'	126°	36°13'	-32'	127°	35°37'	-33'	127°	35°01'	-34'	128°	21
22	38°03'	-29'	125°	37°28'	-30'	126°	36°53'	-31'	126°	36°17'	-32'	127°	35°41'	-33'	128°	35°04'	-34'	128°	34°27'	-35'	129°	22
23	<u>37°34'</u>	<u>-30'</u>	<u>126°</u>	<u>36°58'</u>	<u>-31'</u>	<u>127°</u>	<u>36°22'</u>	<u>-32'</u>	<u>127°</u>	<u>35°45'</u>	<u>-33'</u>	<u>128°</u>	<u>35°08'</u>	<u>-33'</u>	<u>129°</u>	<u>34°30'</u>	<u>-34'</u>	<u>129°</u>	<u>33°52'</u>	<u>-35'</u>	<u>130°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

44° 316° LHA

**Latitude CONTRARY to 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

43° 317° LHA

**Latitude CONTRARY to Declination**

43° 317° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	46°33'	-11'	97°	46°24'	-13'	98°	46°15'	-14'	100°	46°04'	-16'	101°	45°53'	-17'	102°	45°40'	-18'	103°	45°27'	-20'	104°	0
1	46°21'	-12'	99°	46°12'	-14'	100°	46°01'	-15'	101°	45°49'	-17'	102°	45°36'	-18'	103°	45°22'	-19'	104°	45°07'	-21'	105°	1
2	46°09'	-13'	100°	45°58'	-15'	101°	45°46'	-16'	102°	45°32'	-18'	103°	45°18'	-19'	104°	45°03'	-20'	105°	44°46'	-22'	106°	2
3	45°56'	-14'	102°	45°43'	-16'	103°	45°30'	-17'	104°	45°15'	-18'	105°	44°59'	-20'	106°	44°43'	-21'	107°	44°25'	-22'	108°	3
4	45°42'	-15'	103°	45°28'	-17'	104°	45°13'	-18'	105°	44°56'	-19'	106°	44°39'	-21'	107°	44°21'	-22'	108°	44°03'	-23'	109°	4
5	45°26'	-16'	104°	45°11'	-18'	105°	44°54'	-19'	106°	44°37'	-20'	107°	44°19'	-22'	108°	43°59'	-23'	109°	43°39'	-24'	110°	5
6	45°10'	-17'	106°	44°53'	-19'	107°	44°35'	-20'	108°	44°17'	-21'	109°	43°57'	-23'	110°	43°36'	-24'	110°	43°15'	-25'	111°	6
7	44°53'	-18'	107°	44°35'	-20'	108°	44°16'	-21'	109°	43°55'	-22'	110°	43°35'	-23'	111°	43°13'	-25'	112°	42°50'	-26'	113°	7
8	44°35'	-19'	109°	44°15'	-20'	109°	43°55'	-22'	110°	43°33'	-23'	111°	43°11'	-24'	112°	42°48'	-25'	113°	42°24'	-27'	114°	8
9	44°16'	-20'	110°	43°55'	-21'	111°	43°33'	-23'	112°	43°10'	-24'	113°	42°47'	-25'	113°	42°23'	-26'	114°	41°58'	-27'	115°	9
10	43°55'	-21'	111°	43°33'	-22'	112°	43°10'	-23'	113°	42°47'	-25'	114°	42°22'	-26'	115°	41°57'	-27'	115°	41°30'	-28'	116°	10
11	43°35'	-22'	112°	43°11'	-23'	113°	42°47'	-24'	114°	42°22'	-25'	115°	41°56'	-27'	116°	41°30'	-28'	117°	41°02'	-29'	117°	11
12	43°13'	-23'	114°	42°48'	-24'	115°	42°23'	-25'	115°	41°57'	-26'	116°	41°30'	-27'	117°	41°02'	-28'	118°	40°34'	-29'	119°	12
13	42°50'	-23'	115°	42°24'	-25'	116°	41°58'	-26'	117°	41°30'	-27'	117°	41°02'	-28'	118°	40°34'	-29'	119°	40°04'	-30'	120°	13
14	42°27'	-24'	116°	42°00'	-25'	117°	41°32'	-27'	118°	41°04'	-28'	119°	40°34'	-29'	119°	40°05'	-30'	120°	39°34'	-31'	121°	14
15	42°02'	-25'	118°	41°34'	-26'	118°	41°05'	-27'	119°	40°36'	-28'	120°	40°06'	-29'	121°	39°35'	-30'	121°	39°03'	-31'	122°	15
16	41°37'	-26'	119°	41°08'	-27'	119°	40°38'	-28'	120°	40°08'	-29'	121°	39°36'	-30'	122°	39°05'	-31'	122°	38°32'	-32'	123°	16
17	41°11'	-27'	120°	40°41'	-28'	121°	40°10'	-29'	121°	39°39'	-30'	122°	39°06'	-31'	123°	38°34'	-32'	123°	38°00'	-33'	124°	17
18	40°45'	-27'	121°	40°13'	-28'	122°	39°41'	-29'	123°	39°09'	-30'	123°	38°36'	-31'	124°	38°02'	-32'	125°	37°28'	-33'	125°	18
19	40°17'	-28'	122°	39°45'	-29'	123°	39°12'	-30'	124°	38°39'	-31'	124°	38°04'	-32'	125°	37°30'	-33'	126°	36°55'	-34'	126°	19
20	39°49'	-29'	123°	39°16'	-30'	124°	38°42'	-31'	125°	38°08'	-32'	125°	37°33'	-32'	126°	36°57'	-33'	127°	36°21'	-34'	127°	20
21	39°21'	-29'	125°	38°46'	-30'	125°	38°12'	-31'	126°	37°36'	-32'	127°	37°00'	-33'	127°	36°24'	-34'	128°	35°47'	-35'	128°	21
22	38°51'	-30'	126°	38°16'	-31'	126°	37°40'	-32'	127°	37°04'	-33'	128°	36°27'	-34'	128°	35°50'	-34'	129°	35°12'	-35'	129°	22
23	<u>38°22'</u>	<u>-31'</u>	<u>127°</u>	<u>37°45'</u>	<u>-31'</u>	<u>127°</u>	<u>37°09'</u>	<u>-32'</u>	<u>128°</u>	<u>36°31'</u>	<u>-33'</u>	<u>129°</u>	<u>35°54'</u>	<u>-34'</u>	<u>129°</u>	<u>35°16'</u>	<u>-35'</u>	<u>130°</u>	<u>34°37'</u>	<u>-36'</u>	<u>130°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

43° 317° LHA

**Latitude CONTRARY to DECLINATION**

43° 317° LHA

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

**42° 318° LHA**

**Latitude CONTRARY to Declination**

**42° 318° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	47°32'	-11'	98°	47°23'	-13'	99°	47°13'	-14'	100°	47°03'	-16'	101°	46°51'	-17'	102°	46°38'	-19'	103°	46°24'	-20'	104°	0
1	47°20'	-12'	99°	47°10'	-14'	100°	46°59'	-15'	101°	46°47'	-17'	102°	46°33'	-18'	103°	46°19'	-20'	104°	46°04'	-21'	105°	1
2	47°08'	-14'	101°	46°56'	-15'	102°	46°44'	-16'	103°	46°30'	-18'	104°	46°15'	-19'	105°	45°59'	-21'	106°	45°43'	-22'	107°	2
3	46°54'	-15'	102°	46°41'	-16'	103°	46°27'	-17'	104°	46°12'	-19'	105°	45°56'	-20'	106°	45°39'	-22'	107°	45°21'	-23'	108°	3
4	46°40'	-16'	103°	46°25'	-17'	104°	46°10'	-18'	105°	45°53'	-20'	106°	45°36'	-21'	107°	45°17'	-22'	108°	44°58'	-24'	109°	4
5	46°24'	-17'	105°	46°08'	-18'	106°	45°51'	-19'	107°	45°33'	-21'	108°	45°15'	-22'	109°	44°55'	-23'	110°	44°34'	-25'	111°	5
6	46°07'	-18'	106°	45°50'	-19'	107°	45°32'	-20'	108°	45°13'	-22'	109°	44°52'	-23'	110°	44°31'	-24'	111°	44°09'	-25'	112°	6
7	45°50'	-19'	108°	45°31'	-20'	109°	45°11'	-21'	110°	44°51'	-23'	110°	44°29'	-24'	111°	44°07'	-25'	112°	43°44'	-26'	113°	7
8	45°31'	-20'	109°	45°11'	-21'	110°	44°50'	-22'	111°	44°28'	-23'	112°	44°06'	-25'	113°	43°42'	-26'	114°	43°18'	-27'	114°	8
9	45°11'	-21'	110°	44°50'	-22'	111°	44°28'	-23'	112°	44°05'	-24'	113°	43°41'	-26'	114°	43°16'	-27'	115°	42°51'	-28'	116°	9
10	44°51'	-21'	112°	44°28'	-23'	113°	44°05'	-24'	113°	43°41'	-25'	114°	43°15'	-26'	115°	42°49'	-27'	116°	42°23'	-29'	117°	10
11	44°29'	-22'	113°	44°06'	-24'	114°	43°41'	-25'	115°	43°15'	-26'	116°	42°49'	-27'	116°	42°22'	-28'	117°	41°54'	-29'	118°	11
12	44°07'	-23'	114°	43°42'	-24'	115°	43°16'	-26'	116°	42°49'	-27'	117°	42°22'	-28'	118°	41°54'	-29'	118°	41°25'	-30'	119°	12
13	43°44'	-24'	116°	43°18'	-25'	116°	42°51'	-26'	117°	42°23'	-27'	118°	41°54'	-29'	119°	41°25'	-30'	120°	40°55'	-31'	120°	13
14	43°20'	-25'	117°	42°52'	-26'	118°	42°24'	-27'	118°	41°55'	-28'	119°	41°26'	-29'	120°	40°55'	-30'	121°	40°24'	-31'	122°	14
15	42°55'	-26'	118°	42°26'	-27'	119°	41°57'	-28'	120°	41°27'	-29'	120°	40°56'	-30'	121°	40°25'	-31'	122°	39°53'	-32'	123°	15
16	42°29'	-26'	119°	42°00'	-28'	120°	41°29'	-29'	121°	40°58'	-30'	122°	40°26'	-31'	122°	39°54'	-32'	123°	39°21'	-33'	124°	16
17	42°03'	-27'	120°	41°32'	-28'	121°	41°01'	-29'	122°	40°28'	-30'	123°	39°56'	-31'	123°	39°22'	-32'	124°	38°48'	-33'	125°	17
18	41°36'	-28'	122°	41°04'	-29'	122°	40°31'	-30'	123°	39°58'	-31'	124°	39°24'	-32'	125°	38°50'	-33'	125°	38°15'	-34'	126°	18
19	41°08'	-29'	123°	40°35'	-30'	124°	40°01'	-31'	124°	39°27'	-32'	125°	38°53'	-33'	126°	38°17'	-33'	126°	37°41'	-34'	127°	19
20	40°39'	-29'	124°	40°05'	-30'	125°	39°31'	-31'	125°	38°56'	-32'	126°	38°20'	-33'	127°	37°44'	-34'	127°	37°07'	-35'	128°	20
21	40°10'	-30'	125°	39°35'	-31'	126°	38°59'	-32'	127°	38°23'	-33'	127°	37°47'	-34'	128°	37°10'	-34'	128°	36°32'	-35'	129°	21
22	39°40'	-31'	126°	39°04'	-32'	127°	38°28'	-32'	128°	37°51'	-33'	128°	37°13'	-34'	129°	36°35'	-35'	129°	35°57'	-36'	130°	22
23	39°09'	-31'	127°	38°32'	-32'	128°	37°55'	-33'	129°	37°17'	-34'	129°	36°39'	-35'	130°	36°00'	-36'	130°	35°21'	-36'	131°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**42° 318° LHA**

**Latitude CONTRARY to DECLINATION**

**42° 318° LHA**

**41° 319° LHA**

**Latitude CONTRARY to Declination**

**41° 319° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	48°31'	-12'	98°	48°22'	-13'	99°	48°12'	-15'	100°	48°01'	-16'	101°	47°48'	-18'	102°	47°35'	-19'	103°	47°20'	-20'	105°	0
1	48°19'	-13'	99°	48°09'	-14'	101°	47°57'	-16'	102°	47°44'	-17'	103°	47°31'	-19'	104°	47°16'	-20'	105°	47°00'	-21'	106°	1
2	48°06'	-14'	101°	47°54'	-15'	102°	47°41'	-17'	103°	47°27'	-18'	104°	47°12'	-20'	105°	46°56'	-21'	106°	46°38'	-22'	107°	2
3	47°52'	-15'	102°	47°39'	-16'	103°	47°25'	-18'	105°	47°09'	-19'	106°	46°52'	-21'	107°	46°35'	-22'	108°	46°16'	-23'	109°	3
4	47°38'	-16'	104°	47°23'	-17'	105°	47°07'	-19'	106°	46°50'	-20'	107°	46°32'	-22'	108°	46°13'	-23'	109°	45°53'	-24'	110°	4
5	47°22'	-17'	105°	47°05'	-18'	106°	46°48'	-20'	107°	46°30'	-21'	108°	46°10'	-23'	109°	45°50'	-24'	110°	45°29'	-25'	111°	5
6	47°04'	-18'	107°	46°47'	-19'	108°	46°28'	-21'	109°	46°08'	-22'	110°	45°48'	-23'	111°	45°26'	-25'	112°	45°03'	-26'	113°	6
7	46°46'	-19'	108°	46°27'	-20'	109°	46°07'	-22'	110°	45°46'	-23'	111°	45°24'	-24'	112°	45°01'	-26'	113°	44°38'	-27'	114°	7
8	46°27'	-20'	109°	46°07'	-21'	110°	45°45'	-23'	111°	45°23'	-24'	112°	45°00'	-25'	113°	44°36'	-26'	114°	44°11'	-28'	115°	8
9	46°07'	-21'	111°	45°45'	-22'	112°	45°23'	-24'	113°	44°59'	-25'	114°	44°35'	-26'	115°	44°09'	-27'	115°	43°43'	-28'	116°	9
10	45°46'	-22'	112°	45°23'	-23'	113°	44°59'	-24'	114°	44°34'	-26'	115°	44°09'	-27'	116°	43°42'	-28'	117°	43°15'	-29'	118°	10
11	45°24'	-23'	113°	45°00'	-24'	114°	44°35'	-25'	115°	44°09'	-27'	116°	43°42'	-28'	117°	43°14'	-29'	118°	42°46'	-30'	119°	11
12	45°01'	-24'	115°	44°36'	-25'	116°	44°09'	-26'	117°	43°42'	-27'	117°	43°14'	-28'	118°	42°45'	-30'	119°	42°16'	-31'	120°	12
13	44°38'	-25'	116°	44°11'	-26'	117°	43°43'	-27'	118°	43°15'	-28'	119°	42°46'	-29'	119°	42°16'	-30'	120°	41°45'	-31'	121°	13
14	44°13'	-25'	117°	43°45'	-27'	118°	43°16'	-28'	119°	42°47'	-29'	120°	42°16'	-30'	121°	41°46'	-31'	121°	41°14'	-32'	122°	14
15	43°47'	-26'	119°	43°18'	-27'	119°	42°48'	-29'	120°	42°18'	-30'	121°	41°47'	-31'	122°	41°15'	-32'	123°	40°42'	-33'	123°	15
16	43°21'	-27'	120°	42°51'	-28'	121°	42°20'	-29'	121°	41°48'	-30'	122°	41°16'	-31'	123°	40°43'	-32'	124°	40°09'	-33'	124°	16
17	42°54'	-28'	121°	42°23'	-29'	122°	41°51'	-30'	123°	41°18'	-31'	123°	40°45'	-32'	124°	40°11'	-33'	125°	39°36'	-34'	125°	17
18	42°26'	-29'	122°	41°54'	-30'	123°	41°21'	-31'	124°	40°47'	-32'	125°	40°13'	-33'	125°	39°38'	-33'	126°	39°02'	-34'	127°	18
19	41°58'	-29'	123°	41°24'	-30'	124°	40°50'	-31'	125°	40°15'	-32'	126°	39°40'	-33'	126°	39°04'	-34'	127°	38°28'	-35'	128°	19
20	41°28'	-30'	125°	40°54'	-31'	125°	40°19'	-32'	126°	39°43'	-33'	127°	39°07'	-34'	127°	38°30'	-35'	128°	37°53'	-35'	129°	20
21	40°58'	-31'	126°	40°23'	-32'	126°	39°47'	-33'	127°	39°10'	-33'	128°	38°33'	-34'	128°	37°56'	-35'	129°	37°18'	-36'	130°	21
22	40°27'	-31'	127°	39°51'	-32'	128°	39°14'	-33'	128°	38°37'	-34'	129°	37°59'	-35'	129°	37°21'	-36'	130°	36°42'	-36'	131°	22
23	39°56'	-32'	128°	39°19'	-33'	129°	38°41'	-34'	129°	38°03'	-35'	130°	37°24'	-35'	131°	36°45'	-36'	131°	36°05'	-37'	132°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**41° 319° LHA**

**Latitude CONTRARY to DECLINATION**

**41° 319° LHA**



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

**40° 320° LHA**

**Latitude CONTRARY to Declination**

**40° 320° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	49°30'	-12'	98°	49°20'	-13'	99°	49°10'	-15'	101°	48°58'	-16'	102°	48°46'	-18'	103°	48°32'	-19'	104°	48°17'	-21'	105°	0
1	49°18'	-13'	100°	49°07'	-15'	101°	48°55'	-16'	102°	48°42'	-18'	103°	48°28'	-19'	104°	48°12'	-20'	105°	47°56'	-22'	106°	1
2	49°05'	-14'	101°	48°52'	-16'	102°	48°39'	-17'	104°	48°24'	-19'	105°	48°09'	-20'	106°	47°52'	-21'	107°	47°34'	-23'	108°	2
3	48°51'	-15'	103°	48°37'	-17'	104°	48°22'	-18'	105°	48°06'	-20'	106°	47°49'	-21'	107°	47°31'	-22'	108°	47°11'	-24'	109°	3
4	48°35'	-16'	104°	48°20'	-18'	105°	48°04'	-19'	106°	47°46'	-21'	107°	47°28'	-22'	108°	47°08'	-23'	110°	46°48'	-25'	111°	4
5	48°19'	-17'	106°	48°02'	-19'	107°	47°44'	-20'	108°	47°26'	-22'	109°	47°06'	-23'	110°	46°45'	-24'	111°	46°23'	-26'	112°	5
6	48°01'	-19'	107°	47°43'	-20'	108°	47°24'	-21'	109°	47°04'	-23'	110°	46°43'	-24'	111°	46°20'	-25'	112°	45°57'	-26'	113°	6
7	47°43'	-20'	109°	47°23'	-21'	110°	47°03'	-22'	111°	46°41'	-24'	112°	46°19'	-25'	113°	45°55'	-26'	113°	45°31'	-27'	114°	7
8	47°23'	-21'	110°	47°02'	-22'	111°	46°41'	-23'	112°	46°18'	-25'	113°	45°54'	-26'	114°	45°29'	-27'	115°	45°04'	-28'	116°	8
9	47°03'	-22'	111°	46°41'	-23'	112°	46°17'	-24'	113°	45°53'	-25'	114°	45°28'	-27'	115°	45°02'	-28'	116°	44°35'	-29'	117°	9
10	46°41'	-23'	113°	46°18'	-24'	114°	45°53'	-25'	115°	45°28'	-26'	116°	45°01'	-27'	116°	44°34'	-29'	117°	44°06'	-30'	118°	10
11	46°19'	-23'	114°	45°54'	-25'	115°	45°28'	-26'	116°	45°01'	-27'	117°	44°34'	-28'	118°	44°06'	-29'	119°	43°37'	-30'	119°	11
12	45°55'	-24'	115°	45°29'	-26'	116°	45°02'	-27'	117°	44°34'	-28'	118°	44°06'	-29'	119°	43°36'	-30'	120°	43°06'	-31'	121°	12
13	45°31'	-25'	117°	45°04'	-26'	118°	44°35'	-28'	118°	44°06'	-29'	119°	43°37'	-30'	120°	43°06'	-31'	121°	42°35'	-32'	122°	13
14	45°06'	-26'	118°	44°37'	-27'	119°	44°08'	-28'	120°	43°38'	-29'	120°	43°07'	-31'	121°	42°35'	-32'	122°	42°03'	-33'	123°	14
15	44°40'	-27'	119°	44°10'	-28'	120°	43°39'	-29'	121°	43°08'	-30'	122°	42°36'	-31'	122°	42°04'	-32'	123°	41°31'	-33'	124°	15
16	44°13'	-28'	120°	43°42'	-29'	121°	43°10'	-30'	122°	42°38'	-31'	123°	42°05'	-32'	124°	41°32'	-33'	124°	40°57'	-34'	125°	16
17	43°45'	-29'	122°	43°13'	-30'	122°	42°40'	-31'	123°	42°07'	-32'	124°	41°33'	-33'	125°	40°59'	-34'	125°	40°24'	-34'	126°	17
18	43°16'	-29'	123°	42°43'	-30'	124°	42°10'	-31'	124°	41°36'	-32'	125°	41°01'	-33'	126°	40°25'	-34'	127°	39°49'	-35'	127°	18
19	42°47'	-30'	124°	42°13'	-31'	125°	41°38'	-32'	126°	41°03'	-33'	126°	40°27'	-34'	127°	39°51'	-35'	128°	39°14'	-36'	128°	19
20	42°17'	-31'	125°	41°42'	-32'	126°	41°06'	-33'	127°	40°30'	-34'	127°	39°54'	-34'	128°	39°16'	-35'	129°	38°39'	-36'	129°	20
21	41°46'	-31'	126°	41°10'	-32'	127°	40°34'	-33'	128°	39°57'	-34'	128°	39°19'	-35'	129°	38°41'	-36'	130°	38°02'	-37'	130°	21
22	41°15'	-32'	128°	40°38'	-33'	128°	40°01'	-34'	129°	39°23'	-35'	130°	38°44'	-36'	130°	38°05'	-36'	131°	37°26'	-37'	131°	22
23	40°43'	-33'	129°	40°05'	-34'	129°	39°27'	-34'	130°	38°48'	-35'	131°	38°09'	-36'	131°	37°29'	-37'	132°	36°49'	-38'	132°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**40° 320° LHA**

**Latitude CONTRARY to 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

**39° 321° LHA**

**Latitude CONTRARY to Declination**

**39° 321° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	50°29'	-12'	99°	50°19'	-14'	100°	50°08'	-15'	101°	49°56'	-17'	102°	49°43'	-18'	103°	49°29'	-20'	104°	49°13'	-21'	106°	0
1	50°16'	-13'	100°	50°05'	-15'	101°	49°53'	-16'	102°	49°39'	-18'	104°	49°25'	-19'	105°	49°09'	-21'	106°	48°52'	-22'	107°	1
2	50°03'	-14'	102°	49°50'	-16'	103°	49°37'	-18'	104°	49°22'	-19'	105°	49°05'	-20'	106°	48°48'	-22'	107°	48°30'	-23'	108°	2
3	49°49'	-16'	103°	49°34'	-17'	104°	49°19'	-19'	105°	49°03'	-20'	107°	48°45'	-21'	108°	48°26'	-23'	109°	48°07'	-24'	110°	3
4	49°33'	-17'	105°	49°17'	-18'	106°	49°00'	-20'	107°	48°43'	-21'	108°	48°23'	-23'	109°	48°03'	-24'	110°	47°42'	-25'	111°	4
5	49°16'	-18'	106°	48°59'	-19'	107°	48°41'	-21'	108°	48°21'	-22'	109°	48°01'	-24'	110°	47°40'	-25'	111°	47°17'	-26'	112°	5
6	48°58'	-19'	108°	48°40'	-20'	109°	48°20'	-22'	110°	47°59'	-23'	111°	47°37'	-24'	112°	47°15'	-26'	113°	46°51'	-27'	114°	6
7	48°39'	-20'	109°	48°19'	-21'	110°	47°58'	-23'	111°	47°36'	-24'	112°	47°13'	-25'	113°	46°49'	-27'	114°	46°24'	-28'	115°	7
8	48°19'	-21'	110°	47°58'	-22'	111°	47°35'	-24'	112°	47°12'	-25'	113°	46°48'	-26'	114°	46°22'	-28'	115°	45°56'	-29'	116°	8
9	47°58'	-22'	112°	47°35'	-23'	113°	47°12'	-25'	114°	46°47'	-26'	115°	46°21'	-27'	116°	45°55'	-28'	117°	45°27'	-30'	118°	9
10	47°36'	-23'	113°	47°12'	-24'	114°	46°47'	-26'	115°	46°21'	-27'	116°	45°54'	-28'	117°	45°26'	-29'	118°	44°58'	-30'	119°	10
11	47°13'	-24'	115°	46°48'	-25'	116°	46°21'	-27'	116°	45°54'	-28'	117°	45°26'	-29'	118°	44°57'	-30'	119°	44°28'	-31'	120°	11
12	46°49'	-25'	116°	46°22'	-26'	117°	45°55'	-27'	118°	45°26'	-29'	119°	44°57'	-30'	120°	44°27'	-31'	120°	43°56'	-32'	121°	12
13	46°24'	-26'	117°	45°56'	-27'	118°	45°27'	-28'	119°	44°58'	-29'	120°	44°28'	-30'	121°	43°56'	-31'	122°	43°25'	-33'	122°	13
14	45°58'	-27'	119°	45°29'	-28'	119°	44°59'	-29'	120°	44°28'	-30'	121°	43°57'	-31'	122°	43°25'	-32'	123°	42°52'	-33'	124°	14
15	45°31'	-28'	120°	45°01'	-29'	121°	44°30'	-30'	122°	43°58'	-31'	122°	43°26'	-32'	123°	42°53'	-33'	124°	42°19'	-34'	125°	15
16	45°04'	-28'	121°	44°32'	-30'	122°	44°00'	-31'	123°	43°28'	-32'	124°	42°54'	-33'	124°	42°20'	-34'	125°	41°45'	-34'	126°	16
17	44°35'	-29'	122°	44°03'	-30'	123°	43°30'	-31'	124°	42°56'	-32'	125°	42°21'	-33'	125°	41°46'	-34'	126°	41°11'	-35'	127°	17
18	44°06'	-30'	124°	43°33'	-31'	124°	42°58'	-32'	125°	42°24'	-33'	126°	41°48'	-34'	127°	41°12'	-35'	127°	40°35'	-36'	128°	18
19	43°36'	-31'	125°	43°02'	-32'	126°	42°26'	-33'	126°	41°51'	-34'	127°	41°14'	-35'	128°	40°37'	-35'	128°	40°00'	-36'	129°	19
20	43°05'	-31'	126°	42°30'	-32'	127°	41°54'	-33'	127°	41°17'	-34'	128°	40°40'	-35'	129°	40°02'	-36'	129°	39°24'	-37'	130°	20
21	42°34'	-32'	127°	41°58'	-33'	128°	41°20'	-34'	129°	40°43'	-35'	129°	40°05'	-36'	130°	39°26'	-37'	130°	38°47'	-37'	131°	21
22	42°02'	-33'	128°	41°24'	-34'	129°	40°46'	-35'	130°	40°08'	-35'	130°	39°29'	-36'	131°	38°49'	-37'	131°	38°09'	-38'	132°	22
23	41°29'	-33'	129°	40°51'	-34'	130°	40°12'	-35'	131°	39°33'	-36'	131°	38°53'	-37'	132°	38°12'	-38'	133°	37°32'	-38'	133°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**39° 321° LHA**

**Latitude CONTRARY to 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

**38° 322° LHA**

**Latitude CONTRARY to Declination**

**38° 322° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	51°27'	-12'	99°	51°18'	-14'	100°	51°06'	-16'	101°	50°54'	-17'	103°	50°40'	-19'	104°	50°25'	-20'	105°	50°09'	-22'	106°	0
1	51°15'	-14'	100°	51°04'	-15'	102°	50°51'	-17'	103°	50°37'	-18'	104°	50°22'	-20'	105°	50°05'	-21'	106°	49°48'	-23'	108°	1
2	51°01'	-15'	102°	50°48'	-16'	103°	50°34'	-18'	104°	50°19'	-19'	106°	50°02'	-21'	107°	49°44'	-22'	108°	49°25'	-24'	109°	2
3	50°47'	-16'	104°	50°32'	-18'	105°	50°16'	-19'	106°	49°59'	-21'	107°	49°41'	-22'	108°	49°22'	-23'	109°	49°01'	-25'	110°	3
4	50°31'	-17'	105°	50°14'	-19'	106°	49°57'	-20'	107°	49°39'	-22'	108°	49°19'	-23'	110°	48°58'	-24'	111°	48°37'	-26'	112°	4
5	50°13'	-18'	107°	49°56'	-20'	108°	49°37'	-21'	109°	49°17'	-23'	110°	48°56'	-24'	111°	48°34'	-25'	112°	48°11'	-27'	113°	5
6	49°55'	-19'	108°	49°36'	-21'	109°	49°16'	-22'	110°	48°54'	-24'	111°	48°32'	-25'	112°	48°09'	-26'	113°	47°44'	-28'	114°	6
7	49°36'	-21'	109°	49°15'	-22'	111°	48°53'	-23'	112°	48°31'	-25'	113°	48°07'	-26'	114°	47°42'	-27'	115°	47°17'	-28'	116°	7
8	49°15'	-22'	111°	48°53'	-23'	112°	48°30'	-24'	113°	48°06'	-25'	114°	47°41'	-27'	115°	47°15'	-28'	116°	46°48'	-29'	117°	8
9	48°53'	-23'	112°	48°30'	-24'	113°	48°06'	-25'	114°	47°40'	-27'	115°	47°14'	-28'	116°	46°47'	-29'	117°	46°19'	-30'	118°	9
10	48°31'	-24'	114°	48°06'	-25'	115°	47°40'	-26'	116°	47°14'	-27'	117°	46°46'	-29'	118°	46°18'	-30'	119°	45°49'	-31'	120°	10
11	48°07'	-25'	115°	47°41'	-26'	116°	47°14'	-27'	117°	46°46'	-28'	118°	46°18'	-29'	119°	45°48'	-31'	120°	45°18'	-32'	121°	11
12	47°42'	-26'	117°	47°15'	-27'	117°	46°47'	-28'	118°	46°18'	-29'	119°	45°48'	-30'	120°	45°18'	-31'	121°	44°46'	-32'	122°	12
13	47°17'	-27'	118°	46°48'	-28'	119°	46°19'	-29'	120°	45°49'	-30'	121°	45°18'	-31'	121°	44°46'	-32'	122°	44°14'	-33'	123°	13
14	46°50'	-27'	119°	46°21'	-29'	120°	45°50'	-30'	121°	45°19'	-31'	122°	44°47'	-32'	123°	44°14'	-33'	124°	43°41'	-34'	124°	14
15	46°23'	-28'	120°	45°52'	-29'	121°	45°20'	-30'	122°	44°48'	-32'	123°	44°15'	-33'	124°	43°41'	-34'	125°	43°07'	-35'	125°	15
16	45°55'	-29'	122°	45°23'	-30'	123°	44°50'	-31'	123°	44°17'	-32'	124°	43°42'	-33'	125°	43°08'	-34'	126°	42°32'	-35'	127°	16
17	45°25'	-30'	123°	44°52'	-31'	124°	44°19'	-32'	125°	43°44'	-33'	125°	43°09'	-34'	126°	42°33'	-35'	127°	41°57'	-36'	128°	17
18	44°56'	-31'	124°	44°21'	-32'	125°	43°47'	-33'	126°	43°11'	-34'	127°	42°35'	-35'	127°	41°59'	-35'	128°	41°21'	-36'	129°	18
19	44°25'	-31'	125°	43°50'	-32'	126°	43°14'	-33'	127°	42°38'	-34'	128°	42°01'	-35'	128°	41°23'	-36'	129°	40°45'	-37'	130°	19
20	43°53'	-32'	127°	43°17'	-33'	127°	42°41'	-34'	128°	42°03'	-35'	129°	41°25'	-36'	130°	40°47'	-37'	130°	40°08'	-37'	131°	20
21	43°21'	-33'	128°	42°44'	-34'	129°	42°07'	-35'	129°	41°28'	-36'	130°	40°50'	-36'	131°	40°10'	-37'	131°	39°31'	-38'	132°	21
22	42°48'	-34'	129°	42°10'	-34'	130°	41°32'	-35'	130°	40°53'	-36'	131°	40°13'	-37'	132°	39°33'	-38'	132°	38°53'	-38'	133°	22
23	42°15'	-34'	130°	41°36'	-35'	131°	40°57'	-36'	131°	40°17'	-37'	132°	39°36'	-37'	133°	38°55'	-38'	133°	38°14'	-39'	134°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**38° 322° LHA**

**Latitude CONTRARY to 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

**37° 323° LHA**

**Latitude CONTRARY to Declination**

**37° 323° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	52°26'	-13'	99°	52°16'	-14'	100°	52°04'	-16'	102°	51°52'	-17'	103°	51°37'	-19'	104°	51°22'	-21'	105°	51°06'	-22'	107°	0
1	52°14'	-14'	101°	52°02'	-16'	102°	51°49'	-17'	103°	51°34'	-19'	105°	51°18'	-20'	106°	51°02'	-22'	107°	50°44'	-23'	108°	1
2	52°00'	-15'	102°	51°46'	-17'	104°	51°31'	-18'	105°	51°15'	-20'	106°	50°58'	-21'	107°	50°40'	-23'	108°	50°20'	-24'	110°	2
3	51°44'	-16'	104°	51°29'	-18'	105°	51°13'	-20'	106°	50°56'	-21'	108°	50°37'	-22'	109°	50°17'	-24'	110°	49°56'	-25'	111°	3
4	51°28'	-18'	105°	51°11'	-19'	107°	50°54'	-21'	108°	50°35'	-22'	109°	50°14'	-24'	110°	49°53'	-25'	111°	49°31'	-26'	112°	4
5	51°10'	-19'	107°	50°52'	-20'	108°	50°33'	-22'	109°	50°12'	-23'	110°	49°51'	-25'	112°	49°28'	-26'	113°	49°05'	-27'	114°	5
6	50°52'	-20'	109°	50°32'	-21'	110°	50°11'	-23'	111°	49°49'	-24'	112°	49°26'	-26'	113°	49°02'	-27'	114°	48°37'	-28'	115°	6
7	50°32'	-21'	110°	50°11'	-23'	111°	49°48'	-24'	112°	49°25'	-25'	113°	49°01'	-27'	114°	48°36'	-28'	115°	48°09'	-29'	116°	7
8	50°11'	-22'	111°	49°48'	-24'	113°	49°24'	-25'	114°	49°00'	-26'	115°	48°34'	-27'	116°	48°08'	-29'	117°	47°40'	-30'	118°	8
9	49°48'	-23'	113°	49°24'	-25'	114°	49°00'	-26'	115°	48°34'	-27'	116°	48°07'	-28'	117°	47°39'	-30'	118°	47°10'	-31'	119°	9
10	49°25'	-24'	114°	49°00'	-26'	115°	48°34'	-27'	116°	48°06'	-28'	117°	47°38'	-29'	118°	47°09'	-30'	119°	46°40'	-32'	120°	10
11	49°01'	-25'	116°	48°34'	-27'	117°	48°07'	-28'	118°	47°38'	-29'	119°	47°09'	-30'	120°	46°39'	-31'	121°	46°08'	-32'	122°	11
12	48°36'	-26'	117°	48°08'	-27'	118°	47°39'	-29'	119°	47°09'	-30'	120°	46°39'	-31'	121°	46°08'	-32'	122°	45°36'	-33'	123°	12
13	48°09'	-27'	118°	47°40'	-28'	119°	47°10'	-30'	120°	46°40'	-31'	121°	46°08'	-32'	122°	45°36'	-33'	123°	45°02'	-34'	124°	13
14	47°42'	-28'	120°	47°12'	-29'	121°	46°41'	-30'	122°	46°09'	-31'	123°	45°36'	-33'	123°	45°03'	-34'	124°	44°29'	-35'	125°	14
15	47°14'	-29'	121°	46°43'	-30'	122°	46°10'	-31'	123°	45°37'	-32'	124°	45°04'	-33'	125°	44°29'	-34'	125°	43°54'	-35'	126°	15
16	46°45'	-30'	122°	46°13'	-31'	123°	45°39'	-32'	124°	45°05'	-33'	125°	44°30'	-34'	126°	43°55'	-35'	127°	43°19'	-36'	127°	16
17	46°15'	-31'	124°	45°42'	-32'	125°	45°07'	-33'	125°	44°32'	-34'	126°	43°56'	-35'	127°	43°20'	-36'	128°	42°43'	-36'	128°	17
18	45°45'	-31'	125°	45°10'	-32'	126°	44°35'	-33'	127°	43°59'	-34'	127°	43°22'	-35'	128°	42°45'	-36'	129°	42°07'	-37'	130°	18
19	45°13'	-32'	126°	44°38'	-33'	127°	44°01'	-34'	128°	43°24'	-35'	128°	42°47'	-36'	129°	42°08'	-37'	130°	41°30'	-38'	131°	19
20	44°41'	-33'	127°	44°04'	-34'	128°	43°27'	-35'	129°	42°49'	-36'	130°	42°11'	-37'	130°	41°32'	-37'	131°	40°52'	-38'	132°	20
21	44°08'	-34'	128°	43°30'	-35'	129°	42°52'	-35'	130°	42°13'	-36'	131°	41°34'	-37'	131°	40°54'	-38'	132°	40°14'	-39'	133°	21
22	43°35'	-34'	130°	42°56'	-35'	130°	42°17'	-36'	131°	41°37'	-37'	132°	40°57'	-38'	132°	40°16'	-38'	133°	39°35'	-39'	134°	22
23	43°00'	-35'	131°	42°21'	-36'	131°	41°41'	-37'	132°	41°00'	-37'	133°	40°19'	-38'	133°	39°38'	-39'	134°	38°56'	-40'	135°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**37° 323° LHA**

**Latitude CONTRARY to DECLINATION**

**37° 323° LHA**

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

**36° 324° LHA**

**Latitude CONTRARY to Declination**

**36° 324° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	53°25'	-13'	100°	53°14'	-15'	101°	53°02'	-16'	102°	52°49'	-18'	103°	52°35'	-19'	105°	52°19'	-21'	106°	52°02'	-23'	107°	0
1	53°12'	-14'	101°	53°00'	-16'	102°	52°46'	-18'	104°	52°31'	-19'	105°	52°15'	-21'	106°	51°58'	-22'	107°	51°39'	-24'	109°	1
2	52°58'	-16'	103°	52°44'	-17'	104°	52°29'	-19'	105°	52°12'	-20'	107°	51°54'	-22'	108°	51°35'	-23'	109°	51°15'	-25'	110°	2
3	52°42'	-17'	104°	52°27'	-18'	106°	52°10'	-20'	107°	51°52'	-21'	108°	51°33'	-23'	109°	51°12'	-24'	110°	50°51'	-26'	112°	3
4	52°25'	-18'	106°	52°08'	-20'	107°	51°50'	-21'	108°	51°30'	-23'	110°	51°10'	-24'	111°	50°48'	-25'	112°	50°25'	-27'	113°	4
5	52°07'	-19'	108°	51°49'	-21'	109°	51°29'	-22'	110°	51°08'	-24'	111°	50°46'	-25'	112°	50°22'	-26'	113°	49°58'	-28'	114°	5
6	51°48'	-20'	109°	51°28'	-22'	110°	51°06'	-23'	111°	50°44'	-25'	113°	50°20'	-26'	114°	49°56'	-27'	115°	49°30'	-29'	116°	6
7	51°27'	-22'	111°	51°06'	-23'	112°	50°43'	-24'	113°	50°19'	-26'	114°	49°54'	-27'	115°	49°28'	-28'	116°	49°01'	-30'	117°	7
8	51°06'	-23'	112°	50°43'	-24'	113°	50°19'	-26'	114°	49°53'	-27'	115°	49°27'	-28'	116°	49°00'	-29'	117°	48°32'	-31'	118°	8
9	50°43'	-24'	114°	50°19'	-25'	115°	49°53'	-27'	116°	49°27'	-28'	117°	48°59'	-29'	118°	48°31'	-30'	119°	48°01'	-31'	120°	9
10	50°19'	-25'	115°	49°53'	-26'	116°	49°27'	-28'	117°	48°59'	-29'	118°	48°30'	-30'	119°	48°00'	-31'	120°	47°30'	-32'	121°	10
11	49°54'	-26'	116°	49°27'	-27'	117°	48°59'	-28'	118°	48°30'	-30'	119°	48°00'	-31'	120°	47°29'	-32'	121°	46°58'	-33'	122°	11
12	49°28'	-27'	118°	49°00'	-28'	119°	48°31'	-29'	120°	48°00'	-31'	121°	47°29'	-32'	122°	46°57'	-33'	123°	46°25'	-34'	124°	12
13	49°01'	-28'	119°	48°32'	-29'	120°	48°01'	-30'	121°	47°30'	-31'	122°	46°58'	-32'	123°	46°25'	-33'	124°	45°51'	-35'	125°	13
14	48°34'	-29'	120°	48°03'	-30'	121°	47°31'	-31'	122°	46°58'	-32'	123°	46°25'	-33'	124°	45°51'	-34'	125°	45°16'	-35'	126°	14
15	48°05'	-30'	122°	47°33'	-31'	123°	47°00'	-32'	124°	46°26'	-33'	125°	45°52'	-34'	125°	45°17'	-35'	126°	44°41'	-36'	127°	15
16	47°35'	-31'	123°	47°02'	-32'	124°	46°28'	-33'	125°	45°53'	-34'	126°	45°18'	-35'	127°	44°42'	-36'	127°	44°05'	-37'	128°	16
17	47°05'	-31'	124°	46°30'	-32'	125°	45°55'	-33'	126°	45°20'	-34'	127°	44°43'	-35'	128°	44°06'	-36'	128°	43°29'	-37'	129°	17
18	46°33'	-32'	126°	45°58'	-33'	126°	45°22'	-34'	127°	44°45'	-35'	128°	44°08'	-36'	129°	43°30'	-37'	130°	42°51'	-38'	130°	18
19	46°01'	-33'	127°	45°25'	-34'	128°	44°48'	-35'	128°	44°10'	-36'	129°	43°32'	-37'	130°	42°53'	-37'	131°	42°14'	-38'	131°	19
20	45°28'	-34'	128°	44°51'	-35'	129°	44°13'	-36'	130°	43°34'	-36'	130°	42°55'	-37'	131°	42°16'	-38'	132°	41°35'	-39'	132°	20
21	44°55'	-34'	129°	44°16'	-35'	130°	43°37'	-36'	131°	42°58'	-37'	131°	42°18'	-38'	132°	41°38'	-39'	133°	40°57'	-39'	133°	21
22	44°20'	-35'	130°	43°41'	-36'	131°	43°01'	-37'	132°	42°21'	-38'	132°	41°40'	-38'	133°	40°59'	-39'	134°	40°17'	-40'	134°	22
23	43°45'	-36'	131°	43°05'	-37'	132°	42°25'	-37'	133°	41°43'	-38'	134°	41°02'	-39'	134°	40°20'	-40'	135°	39°37'	-40'	135°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**36° 324° LHA**

**Latitude CONTRARY to DECLINATION**

**36° 324° LHA**

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

**35° 325° LHA**

**Latitude CONTRARY to Declination**

**35° 325° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	54°24'	-13'	100°	54°13'	-15'	101°	54°00'	-17'	103°	53°47'	-18'	104°	53°31'	-20'	105°	53°15'	-21'	107°	52°57'	-23'	108°	0
1	54°10'	-15'	102°	53°58'	-16'	103°	53°44'	-18'	104°	53°28'	-20'	106°	53°12'	-21'	107°	52°54'	-23'	108°	52°34'	-24'	109°	1
2	53°56'	-16'	103°	53°41'	-18'	105°	53°26'	-19'	106°	53°09'	-21'	107°	52°50'	-22'	108°	52°31'	-24'	110°	52°10'	-25'	111°	2
3	53°40'	-17'	105°	53°24'	-19'	106°	53°06'	-20'	107°	52°48'	-22'	109°	52°28'	-23'	110°	52°07'	-25'	111°	51°45'	-26'	112°	3
4	53°23'	-19'	106°	53°05'	-20'	108°	52°46'	-22'	109°	52°26'	-23'	110°	52°05'	-25'	111°	51°42'	-26'	113°	51°18'	-27'	114°	4
5	53°04'	-20'	108°	52°45'	-21'	109°	52°24'	-23'	111°	52°03'	-24'	112°	51°40'	-26'	113°	51°16'	-27'	114°	50°51'	-28'	115°	5
6	52°44'	-21'	110°	52°23'	-23'	111°	52°02'	-24'	112°	51°38'	-25'	113°	51°14'	-27'	114°	50°49'	-28'	115°	50°23'	-29'	117°	6
7	52°23'	-22'	111°	52°01'	-24'	112°	51°38'	-25'	114°	51°13'	-26'	115°	50°48'	-28'	116°	50°21'	-29'	117°	49°53'	-30'	118°	7
8	52°01'	-23'	113°	51°37'	-25'	114°	51°12'	-26'	115°	50°47'	-27'	116°	50°20'	-29'	117°	49°52'	-30'	118°	49°23'	-31'	119°	8
9	51°38'	-24'	114°	51°12'	-26'	115°	50°46'	-27'	116°	50°19'	-28'	117°	49°51'	-30'	119°	49°22'	-31'	120°	48°52'	-32'	121°	9
10	51°13'	-26'	116°	50°47'	-27'	117°	50°19'	-28'	118°	49°51'	-29'	119°	49°21'	-31'	120°	48°51'	-32'	121°	48°20'	-33'	122°	10
11	50°48'	-27'	117°	50°20'	-28'	118°	49°51'	-29'	119°	49°21'	-30'	120°	48°51'	-31'	121°	48°19'	-33'	122°	47°47'	-34'	123°	11
12	50°21'	-28'	118°	49°52'	-29'	119°	49°22'	-30'	121°	48°51'	-31'	122°	48°19'	-32'	122°	47°47'	-33'	123°	47°13'	-34'	124°	12
13	49°53'	-29'	120°	49°23'	-30'	121°	48°52'	-31'	122°	48°20'	-32'	123°	47°47'	-33'	124°	47°13'	-34'	125°	46°39'	-35'	126°	13
14	49°25'	-30'	121°	48°53'	-31'	122°	48°21'	-32'	123°	47°48'	-33'	124°	47°14'	-34'	125°	46°39'	-35'	126°	46°03'	-36'	127°	14
15	48°55'	-30'	123°	48°23'	-32'	123°	47°49'	-33'	124°	47°15'	-34'	125°	46°40'	-35'	126°	46°04'	-36'	127°	45°27'	-37'	128°	15
16	48°25'	-31'	124°	47°51'	-32'	125°	47°16'	-33'	126°	46°41'	-34'	127°	46°05'	-35'	127°	45°28'	-36'	128°	44°51'	-37'	129°	16
17	47°54'	-32'	125°	47°19'	-33'	126°	46°43'	-34'	127°	46°07'	-35'	128°	45°30'	-36'	129°	44°52'	-37'	129°	44°14'	-38'	130°	17
18	47°21'	-33'	126°	46°46'	-34'	127°	46°09'	-35'	128°	45°32'	-36'	129°	44°54'	-37'	130°	44°15'	-38'	130°	43°36'	-38'	131°	18
19	46°49'	-34'	128°	46°12'	-35'	128°	45°34'	-36'	129°	44°56'	-37'	130°	44°17'	-37'	131°	43°37'	-38'	131°	42°57'	-39'	132°	19
20	46°15'	-34'	129°	45°37'	-35'	130°	44°58'	-36'	130°	44°19'	-37'	131°	43°39'	-38'	132°	42°59'	-39'	133°	42°18'	-40'	133°	20
21	45°40'	-35'	130°	45°02'	-36'	131°	44°22'	-37'	131°	43°42'	-38'	132°	43°01'	-39'	133°	42°20'	-39'	134°	41°39'	-40'	134°	21
22	45°05'	-36'	131°	44°26'	-37'	132°	43°45'	-38'	133°	43°04'	-38'	133°	42°23'	-39'	134°	41°41'	-40'	135°	40°59'	-41'	135°	22
23	44°29'	-36'	132°	43°49'	-37'	133°	43°08'	-38'	134°	42°26'	-39'	134°	41°44'	-40'	135°	41°01'	-40'	136°	40°18'	-41'	136°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**35° 325° LHA**

**Latitude CONTRARY to 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

**34° 326° LHA**

**Latitude CONTRARY to Declination**

**34° 326° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	55°22'	-14'	100°	55°11'	-15'	102°	54°58'	-17'	103°	54°44'	-19'	104°	54°28'	-20'	106°	54°11'	-22'	107°	53°53'	-24'	108°	0
1	55°09'	-15'	102°	54°56'	-17'	103°	54°41'	-18'	105°	54°25'	-20'	106°	54°08'	-22'	107°	53°49'	-23'	109°	53°29'	-25'	110°	1
2	54°54'	-16'	104°	54°39'	-18'	105°	54°23'	-20'	106°	54°05'	-21'	108°	53°46'	-23'	109°	53°26'	-24'	110°	53°05'	-26'	112°	2
3	54°37'	-18'	105°	54°21'	-19'	107°	54°03'	-21'	108°	53°44'	-23'	109°	53°23'	-24'	111°	53°02'	-26'	112°	52°39'	-27'	113°	3
4	54°20'	-19'	107°	54°01'	-21'	108°	53°42'	-22'	110°	53°21'	-24'	111°	52°59'	-25'	112°	52°36'	-27'	113°	52°12'	-28'	114°	4
5	54°01'	-20'	109°	53°41'	-22'	110°	53°20'	-23'	111°	52°58'	-25'	112°	52°34'	-26'	114°	52°10'	-28'	115°	51°44'	-29'	116°	5
6	53°40'	-22'	110°	53°19'	-23'	111°	52°56'	-25'	113°	52°33'	-26'	114°	52°08'	-27'	115°	51°42'	-29'	116°	51°15'	-30'	117°	6
7	53°19'	-23'	112°	52°56'	-24'	113°	52°32'	-26'	114°	52°07'	-27'	115°	51°40'	-28'	116°	51°13'	-30'	118°	50°45'	-31'	119°	7
8	52°56'	-24'	113°	52°31'	-25'	114°	52°06'	-27'	116°	51°40'	-28'	117°	51°12'	-29'	118°	50°43'	-31'	119°	50°14'	-32'	120°	8
9	52°32'	-25'	115°	52°06'	-27'	116°	51°39'	-28'	117°	51°11'	-29'	118°	50°43'	-30'	119°	50°13'	-32'	120°	49°42'	-33'	121°	9
10	52°07'	-26'	116°	51°40'	-28'	117°	51°11'	-29'	119°	50°42'	-30'	120°	50°12'	-31'	121°	49°41'	-32'	122°	49°09'	-34'	123°	10
11	51°40'	-27'	118°	51°12'	-29'	119°	50°43'	-30'	120°	50°12'	-31'	121°	49°41'	-32'	122°	49°09'	-33'	123°	48°36'	-34'	124°	11
12	51°13'	-28'	119°	50°43'	-30'	120°	50°13'	-31'	121°	49°41'	-32'	122°	49°09'	-33'	123°	48°35'	-34'	124°	48°01'	-35'	125°	12
13	50°45'	-29'	121°	50°14'	-31'	122°	49°42'	-32'	123°	49°09'	-33'	124°	48°36'	-34'	125°	48°01'	-35'	125°	47°26'	-36'	126°	13
14	50°15'	-30'	122°	49°43'	-31'	123°	49°10'	-33'	124°	48°36'	-34'	125°	48°02'	-35'	126°	47°26'	-36'	127°	46°50'	-37'	128°	14
15	49°45'	-31'	123°	49°12'	-32'	124°	48°38'	-33'	125°	48°03'	-34'	126°	47°27'	-35'	127°	46°51'	-36'	128°	46°13'	-37'	129°	15
16	49°14'	-32'	125°	48°40'	-33'	126°	48°04'	-34'	126°	47°28'	-35'	127°	46°52'	-36'	128°	46°14'	-37'	129°	45°36'	-38'	130°	16
17	48°42'	-33'	126°	48°06'	-34'	127°	47°30'	-35'	128°	46°53'	-36'	129°	46°15'	-37'	129°	45°37'	-38'	130°	44°58'	-39'	131°	17
18	48°09'	-34'	127°	47°33'	-35'	128°	46°55'	-36'	129°	46°17'	-37'	130°	45°39'	-37'	130°	44°59'	-38'	131°	44°20'	-39'	132°	18
19	47°35'	-34'	128°	46°58'	-35'	129°	46°20'	-36'	130°	45°41'	-37'	131°	45°01'	-38'	132°	44°21'	-39'	132°	43°40'	-40'	133°	19
20	47°01'	-35'	130°	46°22'	-36'	130°	45°43'	-37'	131°	45°03'	-38'	132°	44°23'	-39'	133°	43°42'	-40'	133°	43°01'	-40'	134°	20
21	46°26'	-36'	131°	45°46'	-37'	132°	45°06'	-38'	132°	44°26'	-39'	133°	43°44'	-39'	134°	43°03'	-40'	134°	42°20'	-41'	135°	21
22	45°50'	-37'	132°	45°09'	-37'	133°	44°29'	-38'	133°	43°47'	-39'	134°	43°05'	-40'	135°	42°23'	-41'	135°	41°40'	-41'	136°	22
23	45°13'	-37'	133°	44°32'	-38'	134°	43°50'	-39'	134°	43°08'	-40'	135°	42°25'	-40'	136°	41°42'	-41'	136°	40°58'	-42'	137°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**34° 326° LHA**

**Latitude CONTRARY to 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

**33° 327° LHA**

**Latitude CONTRARY to Declination**

**33° 327° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	56°21'	-14'	101°	56°09'	-16'	102°	55°56'	-17'	104°	55°41'	-19'	105°	55°25'	-21'	106°	55°07'	-22'	108°	54°48'	-24'	109°	0
1	56°07'	-15'	102°	55°53'	-17'	104°	55°38'	-19'	105°	55°22'	-21'	107°	55°04'	-22'	108°	54°45'	-24'	109°	54°24'	-25'	111°	1
2	55°52'	-17'	104°	55°36'	-19'	106°	55°19'	-20'	107°	55°01'	-22'	108°	54°42'	-23'	110°	54°21'	-25'	111°	53°59'	-26'	112°	2
3	55°35'	-18'	106°	55°18'	-20'	107°	54°59'	-22'	109°	54°39'	-23'	110°	54°18'	-25'	111°	53°56'	-26'	113°	53°32'	-28'	114°	3
4	55°16'	-20'	107°	54°58'	-21'	109°	54°38'	-23'	110°	54°16'	-24'	111°	53°54'	-26'	113°	53°30'	-27'	114°	53°05'	-29'	115°	4
5	54°57'	-21'	109°	54°37'	-22'	110°	54°15'	-24'	112°	53°52'	-26'	113°	53°28'	-27'	114°	53°03'	-28'	116°	52°36'	-30'	117°	5
6	54°36'	-22'	111°	54°14'	-24'	112°	53°51'	-25'	113°	53°27'	-27'	115°	53°01'	-28'	116°	52°34'	-29'	117°	52°07'	-31'	118°	6
7	54°14'	-23'	112°	53°50'	-25'	114°	53°26'	-26'	115°	53°00'	-28'	116°	52°33'	-29'	117°	52°05'	-30'	118°	51°36'	-32'	120°	7
8	53°50'	-25'	114°	53°25'	-26'	115°	52°59'	-27'	116°	52°32'	-29'	118°	52°04'	-30'	119°	51°35'	-31'	120°	51°04'	-33'	121°	8
9	53°26'	-26'	115°	52°59'	-27'	117°	52°32'	-29'	118°	52°03'	-30'	119°	51°34'	-31'	120°	51°03'	-32'	121°	50°32'	-33'	122°	9
10	53°00'	-27'	117°	52°32'	-28'	118°	52°03'	-30'	119°	51°33'	-31'	120°	51°03'	-32'	121°	50°31'	-33'	122°	49°58'	-34'	123°	10
11	52°33'	-28'	118°	52°04'	-29'	120°	51°34'	-31'	121°	51°03'	-32'	122°	50°31'	-33'	123°	49°58'	-34'	124°	49°24'	-35'	125°	11
12	52°05'	-29'	120°	51°35'	-30'	121°	51°03'	-32'	122°	50°31'	-33'	123°	49°58'	-34'	124°	49°24'	-35'	125°	48°49'	-36'	126°	12
13	51°36'	-30'	121°	51°04'	-31'	122°	50°32'	-32'	123°	49°58'	-34'	124°	49°24'	-35'	125°	48°49'	-36'	126°	48°13'	-37'	127°	13
14	51°06'	-31'	123°	50°33'	-32'	124°	49°59'	-33'	125°	49°25'	-34'	126°	48°49'	-35'	127°	48°13'	-36'	128°	47°36'	-37'	128°	14
15	50°35'	-32'	124°	50°01'	-33'	125°	49°26'	-34'	126°	48°50'	-35'	127°	48°14'	-36'	128°	47°37'	-37'	129°	46°59'	-38'	130°	15
16	50°03'	-33'	125°	49°28'	-34'	126°	48°52'	-35'	127°	48°15'	-36'	128°	47°38'	-37'	129°	47°00'	-38'	130°	46°21'	-39'	131°	16
17	49°30'	-34'	127°	48°54'	-35'	128°	48°17'	-36'	128°	47°39'	-37'	129°	47°01'	-38'	130°	46°22'	-38'	131°	45°42'	-39'	132°	17
18	48°56'	-34'	128°	48°19'	-35'	129°	47°41'	-36'	130°	47°02'	-37'	131°	46°23'	-38'	131°	45°43'	-39'	132°	45°03'	-40'	133°	18
19	48°22'	-35'	129°	47°44'	-36'	130°	47°05'	-37'	131°	46°25'	-38'	132°	45°45'	-39'	132°	45°04'	-40'	133°	44°23'	-40'	134°	19
20	47°47'	-36'	130°	47°07'	-37'	131°	46°28'	-38'	132°	45°47'	-39'	133°	45°06'	-39'	134°	44°24'	-40'	134°	43°42'	-41'	135°	20
21	47°11'	-37'	132°	46°30'	-38'	132°	45°50'	-38'	133°	45°08'	-39'	134°	44°27'	-40'	135°	43°44'	-41'	135°	43°01'	-42'	136°	21
22	46°34'	-37'	133°	45°53'	-38'	133°	45°11'	-39'	134°	44°29'	-40'	135°	43°47'	-41'	136°	43°03'	-41'	136°	42°20'	-42'	137°	22
23	45°56'	-38'	134°	45°15'	-39'	135°	44°32'	-40'	135°	43°49'	-40'	136°	43°06'	-41'	137°	42°22'	-42'	137°	41°38'	-42'	138°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**33° 327° LHA**

**Latitude CONTRARY to 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

32° 328° LHA

Latitude CONTRARY to Declination

32° 328° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	57°19'	-14'	101°	57°07'	-16'	103°	56°53'	-18'	104°	56°38'	-20'	106°	56°21'	-21'	107°	56°03'	-23'	108°	55°43'	-25'	110°	0
1	57°05'	-16'	103°	56°51'	-18'	104°	56°35'	-19'	106°	56°18'	-21'	107°	56°00'	-23'	109°	55°40'	-24'	110°	55°19'	-26'	111°	1
2	56°49'	-17'	105°	56°33'	-19'	106°	56°16'	-21'	108°	55°57'	-22'	109°	55°37'	-24'	110°	55°16'	-26'	112°	54°53'	-27'	113°	2
3	56°32'	-19'	106°	56°14'	-20'	108°	55°55'	-22'	109°	55°35'	-24'	111°	55°13'	-25'	112°	54°50'	-27'	113°	54°26'	-28'	115°	3
4	56°13'	-20'	108°	55°54'	-22'	109°	55°33'	-23'	111°	55°11'	-25'	112°	54°48'	-26'	114°	54°23'	-28'	115°	53°58'	-29'	116°	4
5	55°53'	-22'	110°	55°32'	-23'	111°	55°10'	-25'	112°	54°46'	-26'	114°	54°21'	-28'	115°	53°55'	-29'	116°	53°28'	-30'	118°	5
6	55°32'	-23'	111°	55°09'	-24'	113°	54°45'	-26'	114°	54°20'	-27'	115°	53°54'	-29'	117°	53°26'	-30'	118°	52°58'	-31'	119°	6
7	55°09'	-24'	113°	54°45'	-26'	114°	54°19'	-27'	116°	53°53'	-28'	117°	53°25'	-30'	118°	52°56'	-31'	119°	52°27'	-32'	120°	7
8	54°45'	-25'	115°	54°19'	-27'	116°	53°52'	-28'	117°	53°24'	-30'	118°	52°55'	-31'	119°	52°25'	-32'	121°	51°54'	-33'	122°	8
9	54°19'	-27'	116°	53°52'	-28'	117°	53°24'	-29'	119°	52°55'	-31'	120°	52°24'	-32'	121°	51°53'	-33'	122°	51°21'	-34'	123°	9
10	53°53'	-28'	118°	53°24'	-29'	119°	52°55'	-30'	120°	52°24'	-32'	121°	51°53'	-33'	122°	51°20'	-34'	123°	50°47'	-35'	124°	10
11	53°25'	-29'	119°	52°55'	-30'	120°	52°24'	-31'	121°	51°53'	-33'	123°	51°20'	-34'	124°	50°46'	-35'	125°	50°12'	-36'	126°	11
12	52°56'	-30'	121°	52°25'	-31'	122°	51°53'	-32'	123°	51°20'	-33'	124°	50°46'	-35'	125°	50°11'	-36'	126°	49°36'	-37'	127°	12
13	52°27'	-31'	122°	51°54'	-32'	123°	51°21'	-33'	124°	50°47'	-34'	125°	50°12'	-35'	126°	49°36'	-36'	127°	48°59'	-37'	128°	13
14	51°56'	-32'	124°	51°22'	-33'	125°	50°48'	-34'	126°	50°12'	-35'	127°	49°36'	-36'	127°	48°59'	-37'	128°	48°22'	-38'	129°	14
15	51°24'	-33'	125°	50°49'	-34'	126°	50°14'	-35'	127°	49°37'	-36'	128°	49°00'	-37'	129°	48°22'	-38'	130°	47°44'	-39'	130°	15
16	50°51'	-34'	126°	50°15'	-35'	127°	49°39'	-36'	128°	49°01'	-37'	129°	48°23'	-38'	130°	47°44'	-39'	131°	47°05'	-39'	132°	16
17	50°18'	-34'	128°	49°41'	-36'	128°	49°03'	-36'	129°	48°25'	-37'	130°	47°45'	-38'	131°	47°06'	-39'	132°	46°25'	-40'	133°	17
18	49°43'	-35'	129°	49°05'	-36'	130°	48°26'	-37'	131°	47°47'	-38'	131°	47°07'	-39'	132°	46°26'	-40'	133°	45°45'	-41'	134°	18
19	49°08'	-36'	130°	48°29'	-37'	131°	47°49'	-38'	132°	47°09'	-39'	133°	46°28'	-40'	133°	45°47'	-40'	134°	45°05'	-41'	135°	19
20	48°32'	-37'	131°	47°52'	-38'	132°	47°11'	-39'	133°	46°30'	-39'	134°	45°48'	-40'	134°	45°06'	-41'	135°	44°23'	-42'	136°	20
21	47°55'	-38'	132°	47°14'	-38'	133°	46°33'	-39'	134°	45°51'	-40'	135°	45°08'	-41'	135°	44°25'	-42'	136°	43°42'	-42'	137°	21
22	47°17'	-38'	134°	46°36'	-39'	134°	45°53'	-40'	135°	45°11'	-41'	136°	44°27'	-41'	136°	43°44'	-42'	137°	42°59'	-43'	138°	22
23	46°39'	-39'	135°	45°57'	-40'	135°	45°14'	-40'	136°	44°30'	-41'	137°	43°46'	-42'	138°	43°02'	-43'	138°	42°17'	-43'	139°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

32° 328° LHA

Latitude CONTRARY to 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

31° 329° LHA

Latitude CONTRARY to Declination

31° 329° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	58°18'	-15'	101°	58°05'	-17'	103°	57°51'	-18'	105°	57°35'	-20'	106°	57°17'	-22'	108°	56°59'	-24'	109°	56°38'	-25'	111°	0
1	58°03'	-16'	103°	57°48'	-18'	105°	57°32'	-20'	106°	57°15'	-22'	108°	56°56'	-23'	109°	56°35'	-25'	111°	56°13'	-26'	112°	1
2	57°47'	-18'	105°	57°30'	-20'	107°	57°12'	-21'	108°	56°53'	-23'	110°	56°32'	-25'	111°	56°10'	-26'	112°	55°47'	-28'	114°	2
3	57°29'	-19'	107°	57°11'	-21'	108°	56°51'	-23'	110°	56°30'	-24'	111°	56°08'	-26'	113°	55°44'	-27'	114°	55°19'	-29'	115°	3
4	57°10'	-21'	109°	56°50'	-22'	110°	56°28'	-24'	112°	56°06'	-26'	113°	55°42'	-27'	114°	55°16'	-29'	116°	54°50'	-30'	117°	4
5	56°49'	-22'	110°	56°27'	-24'	112°	56°04'	-25'	113°	55°40'	-27'	115°	55°15'	-28'	116°	54°48'	-30'	117°	54°20'	-31'	118°	5
6	56°27'	-23'	112°	56°04'	-25'	113°	55°39'	-27'	115°	55°13'	-28'	116°	54°46'	-29'	117°	54°18'	-31'	119°	53°49'	-32'	120°	6
7	56°03'	-25'	114°	55°39'	-26'	115°	55°13'	-28'	116°	54°45'	-29'	118°	54°17'	-31'	119°	53°47'	-32'	120°	53°17'	-33'	121°	7
8	55°39'	-26'	115°	55°12'	-28'	117°	54°45'	-29'	118°	54°16'	-30'	119°	53°46'	-32'	120°	53°15'	-33'	122°	52°44'	-34'	123°	8
9	55°13'	-27'	117°	54°45'	-29'	118°	54°16'	-30'	119°	53°46'	-31'	121°	53°15'	-33'	122°	52°43'	-34'	123°	52°10'	-35'	124°	9
10	54°45'	-28'	118°	54°16'	-30'	120°	53°46'	-31'	121°	53°15'	-32'	122°	52°42'	-34'	123°	52°09'	-35'	124°	51°35'	-36'	125°	10
11	54°17'	-30'	120°	53°46'	-31'	121°	53°15'	-32'	122°	52°42'	-33'	123°	52°09'	-34'	125°	51°34'	-36'	126°	50°59'	-37'	127°	11
12	53°47'	-31'	121°	53°15'	-32'	123°	52°43'	-33'	124°	52°09'	-34'	125°	51°34'	-35'	126°	50°59'	-36'	127°	50°22'	-37'	128°	12
13	53°17'	-32'	123°	52°44'	-33'	124°	52°10'	-34'	125°	51°35'	-35'	126°	50°59'	-36'	127°	50°22'	-37'	128°	49°45'	-38'	129°	13
14	52°45'	-33'	124°	52°11'	-34'	125°	51°36'	-35'	126°	51°00'	-36'	127°	50°23'	-37'	128°	49°45'	-38'	129°	49°07'	-39'	130°	14
15	52°13'	-34'	126°	51°37'	-35'	127°	51°01'	-36'	128°	50°24'	-37'	129°	49°46'	-38'	130°	49°07'	-39'	131°	48°28'	-40'	131°	15
16	51°39'	-34'	127°	51°02'	-36'	128°	50°25'	-37'	129°	49°47'	-38'	130°	49°08'	-38'	131°	48°28'	-39'	132°	47°48'	-40'	133°	16
17	51°05'	-35'	128°	50°27'	-36'	129°	49°48'	-37'	130°	49°09'	-38'	131°	48°30'	-39'	132°	47°49'	-40'	133°	47°08'	-41'	134°	17
18	50°29'	-36'	130°	49°51'	-37'	131°	49°11'	-38'	131°	48°31'	-39'	132°	47°50'	-40'	133°	47°09'	-41'	134°	46°27'	-41'	135°	18
19	49°53'	-37'	131°	49°13'	-38'	132°	48°33'	-39'	133°	47°52'	-40'	133°	47°11'	-40'	134°	46°28'	-41'	135°	45°46'	-42'	136°	19
20	49°16'	-38'	132°	48°36'	-39'	133°	47°54'	-39'	134°	47°13'	-40'	135°	46°30'	-41'	135°	45°47'	-42'	136°	45°04'	-42'	137°	20
21	48°39'	-38'	133°	47°57'	-39'	134°	47°15'	-40'	135°	46°32'	-41'	136°	45°49'	-42'	136°	45°06'	-42'	137°	44°21'	-43'	138°	21
22	48°00'	-39'	134°	47°18'	-40'	135°	46°35'	-41'	136°	45°52'	-41'	137°	45°08'	-42'	137°	44°23'	-43'	138°	43°38'	-43'	139°	22
23	47°21'	-40'	136°	46°38'	-40'	136°	45°54'	-41'	137°	45°10'	-42'	138°	44°25'	-43'	138°	43°40'	-43'	139°	42°55'	-44'	140°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

31° 329° LHA

Latitude CONTRARY to 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

**30° 330° LHA**

**Latitude CONTRARY to Declination**

**30° 330° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	59°16'	-15'	102°	59°03'	-17'	104°	58°48'	-19'	105°	58°32'	-21'	107°	58°13'	-22'	108°	57°54'	-24'	110°	57°33'	-26'	111°	0
1	59°01'	-17'	104°	58°46'	-19'	105°	58°29'	-20'	107°	58°11'	-22'	109°	57°51'	-24'	110°	57°30'	-26'	112°	57°07'	-27'	113°	1
2	58°44'	-18'	106°	58°27'	-20'	107°	58°09'	-22'	109°	57°49'	-24'	110°	57°27'	-25'	112°	57°04'	-27'	113°	56°40'	-28'	115°	2
3	58°26'	-20'	107°	58°07'	-22'	109°	57°47'	-23'	111°	57°25'	-25'	112°	57°02'	-27'	113°	56°37'	-28'	115°	56°11'	-30'	116°	3
4	58°06'	-21'	109°	57°45'	-23'	111°	57°23'	-25'	112°	57°00'	-26'	114°	56°35'	-28'	115°	56°09'	-29'	116°	55°42'	-31'	118°	4
5	57°45'	-23'	111°	57°22'	-24'	113°	56°59'	-26'	114°	56°34'	-28'	115°	56°07'	-29'	117°	55°40'	-30'	118°	55°11'	-32'	119°	5
6	57°22'	-24'	113°	56°58'	-26'	114°	56°33'	-27'	116°	56°06'	-29'	117°	55°38'	-30'	118°	55°09'	-32'	119°	54°39'	-33'	121°	6
7	56°58'	-25'	114°	56°32'	-27'	116°	56°05'	-29'	117°	55°37'	-30'	118°	55°08'	-31'	120°	54°38'	-33'	121°	54°06'	-34'	122°	7
8	56°32'	-27'	116°	56°05'	-28'	117°	55°37'	-30'	119°	55°07'	-31'	120°	54°37'	-32'	121°	54°05'	-34'	122°	53°33'	-35'	124°	8
9	56°05'	-28'	118°	55°37'	-29'	119°	55°07'	-31'	120°	54°36'	-32'	121°	54°05'	-33'	123°	53°32'	-35'	124°	52°58'	-36'	125°	9
10	55°37'	-29'	119°	55°07'	-31'	121°	54°36'	-32'	122°	54°04'	-33'	123°	53°31'	-34'	124°	52°57'	-35'	125°	52°22'	-37'	126°	10
11	55°08'	-30'	121°	54°37'	-32'	122°	54°05'	-33'	123°	53°31'	-34'	124°	52°57'	-35'	125°	52°22'	-36'	127°	51°45'	-37'	128°	11
12	54°38'	-31'	122°	54°05'	-33'	124°	53°32'	-34'	125°	52°57'	-35'	126°	52°22'	-36'	127°	51°45'	-37'	128°	51°08'	-38'	129°	12
13	54°06'	-32'	124°	53°33'	-34'	125°	52°58'	-35'	126°	52°22'	-36'	127°	51°45'	-37'	128°	51°08'	-38'	129°	50°30'	-39'	130°	13
14	53°34'	-33'	125°	52°59'	-35'	126°	52°23'	-36'	127°	51°46'	-37'	128°	51°09'	-38'	129°	50°30'	-39'	130°	49°51'	-40'	131°	14
15	53°01'	-34'	127°	52°24'	-35'	128°	51°47'	-37'	129°	51°09'	-38'	130°	50°31'	-39'	131°	49°51'	-39'	131°	49°11'	-40'	132°	15
16	52°26'	-35'	128°	51°49'	-36'	129°	51°11'	-37'	130°	50°32'	-38'	131°	49°52'	-39'	132°	49°12'	-40'	133°	48°31'	-41'	133°	16
17	51°51'	-36'	129°	51°13'	-37'	130°	50°33'	-38'	131°	49°54'	-39'	132°	49°13'	-40'	133°	48°32'	-41'	134°	47°50'	-42'	135°	17
18	51°15'	-37'	131°	50°35'	-38'	131°	49°55'	-39'	132°	49°14'	-40'	133°	48°33'	-41'	134°	47°51'	-41'	135°	47°08'	-42'	136°	18
19	50°38'	-38'	132°	49°57'	-39'	133°	49°16'	-40'	134°	48°35'	-40'	134°	47°52'	-41'	135°	47°10'	-42'	136°	46°26'	-43'	137°	19
20	50°00'	-38'	133°	49°19'	-39'	134°	48°37'	-40'	135°	47°54'	-41'	136°	47°11'	-42'	136°	46°28'	-43'	137°	45°44'	-43'	138°	20
21	49°22'	-39'	134°	48°39'	-40'	135°	47°57'	-41'	136°	47°13'	-42'	137°	46°29'	-42'	137°	45°45'	-43'	138°	45°00'	-44'	139°	21
22	48°42'	-40'	135°	47°59'	-41'	136°	47°16'	-41'	137°	46°32'	-42'	138°	45°47'	-43'	138°	45°02'	-44'	139°	44°17'	-44'	140°	22
23	48°02'	-41'	136°	47°19'	-41'	137°	46°34'	-42'	138°	45°50'	-43'	139°	45°04'	-43'	139°	44°19'	-44'	140°	43°32'	-45'	141°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**30° 330° LHA**

**Latitude CONTRARY to 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

**29° 331° LHA**

**Latitude CONTRARY to Declination**

**29° 331° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	60°14'	-16'	102°	60°01'	-18'	104°	59°45'	-19'	106°	59°28'	-21'	107°	59°09'	-23'	109°	58°49'	-25'	111°	58°27'	-26'	112°	0
1	59°59'	-17'	104°	59°43'	-19'	106°	59°26'	-21'	108°	59°07'	-23'	109°	58°46'	-25'	111°	58°24'	-26'	112°	58°01'	-28'	114°	1
2	59°41'	-19'	106°	59°24'	-21'	108°	59°05'	-23'	109°	58°44'	-24'	111°	58°22'	-26'	113°	57°58'	-28'	114°	57°33'	-29'	115°	2
3	59°23'	-20'	108°	59°03'	-22'	110°	58°42'	-24'	111°	58°20'	-26'	113°	57°56'	-27'	114°	57°30'	-29'	116°	57°04'	-30'	117°	3
4	59°02'	-22'	110°	58°41'	-24'	111°	58°18'	-25'	113°	57°54'	-27'	114°	57°28'	-29'	116°	57°02'	-30'	117°	56°33'	-31'	119°	4
5	58°40'	-23'	112°	58°17'	-25'	113°	57°53'	-27'	115°	57°27'	-28'	116°	57°00'	-30'	118°	56°32'	-31'	119°	56°02'	-33'	120°	5
6	58°17'	-25'	114°	57°52'	-26'	115°	57°26'	-28'	116°	56°59'	-30'	118°	56°30'	-31'	119°	56°00'	-32'	120°	55°29'	-34'	122°	6
7	57°52'	-26'	115°	57°26'	-28'	117°	56°58'	-29'	118°	56°29'	-31'	119°	55°59'	-32'	121°	55°28'	-33'	122°	54°56'	-35'	123°	7
8	57°26'	-28'	117°	56°58'	-29'	118°	56°29'	-30'	120°	55°58'	-32'	121°	55°27'	-33'	122°	54°55'	-34'	123°	54°21'	-36'	125°	8
9	56°58'	-29'	119°	56°29'	-30'	120°	55°58'	-32'	121°	55°27'	-33'	122°	54°54'	-34'	124°	54°20'	-35'	125°	53°45'	-37'	126°	9
10	56°29'	-30'	120°	55°58'	-31'	121°	55°27'	-33'	123°	54°54'	-34'	124°	54°20'	-35'	125°	53°45'	-36'	126°	53°09'	-37'	127°	10
11	55°59'	-31'	122°	55°27'	-32'	123°	54°54'	-34'	124°	54°20'	-35'	125°	53°45'	-36'	126°	53°08'	-37'	127°	52°32'	-38'	129°	11
12	55°28'	-32'	123°	54°55'	-34'	124°	54°20'	-35'	126°	53°45'	-36'	127°	53°08'	-37'	128°	52°31'	-38'	129°	51°53'	-39'	130°	12
13	54°56'	-33'	125°	54°21'	-35'	126°	53°45'	-36'	127°	53°09'	-37'	128°	52°32'	-38'	129°	51°53'	-39'	130°	51°14'	-40'	131°	13
14	54°22'	-34'	126°	53°47'	-35'	127°	53°10'	-37'	128°	52°32'	-38'	129°	51°54'	-39'	130°	51°15'	-40'	131°	50°35'	-40'	132°	14
15	53°48'	-35'	128°	53°11'	-36'	129°	52°33'	-37'	130°	51°55'	-38'	131°	51°15'	-39'	132°	50°35'	-40'	132°	49°54'	-41'	133°	15
16	53°13'	-36'	129°	52°35'	-37'	130°	51°56'	-38'	131°	51°16'	-39'	132°	50°36'	-40'	133°	49°55'	-41'	134°	49°13'	-42'	134°	16
17	52°37'	-37'	130°	51°58'	-38'	131°	51°18'	-39'	132°	50°37'	-40'	133°	49°56'	-41'	134°	49°14'	-42'	135°	48°31'	-42'	136°	17
18	52°00'	-38'	132°	51°20'	-39'	132°	50°39'	-40'	133°	49°57'	-41'	134°	49°15'	-41'	135°	48°32'	-42'	136°	47°49'	-43'	137°	18
19	51°22'	-39'	133°	50°41'	-40'	134°	49°59'	-40'	135°	49°17'	-41'	135°	48°34'	-42'	136°	47°50'	-43'	137°	47°06'	-43'	138°	19
20	50°43'	-39'	134°	50°01'	-40'	135°	49°19'	-41'	136°	48°35'	-42'	136°	47°52'	-43'	137°	47°07'	-43'	138°	46°23'	-44'	139°	20
21	50°04'	-40'	135°	49°21'	-41'	136°	48°38'	-42'	137°	47°54'	-42'	138°	47°09'	-43'	138°	46°24'	-44'	139°	45°39'	-44'	140°	21
22	49°24'	-41'	136°	48°40'	-42'	137°	47°56'	-42'	138°	47°11'	-43'	139°	46°26'	-44'	139°	45°40'	-44'	140°	44°54'	-45'	141°	22
23	48°43'	-41'	137°	47°59'	-42'	138°	47°14'	-43'	139°	46°28'	-44'	140°	45°42'	-44'	140°	44°56'	-45'	141°	44°09'	-45'	142°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**29° 331° LHA**

**Latitude CONTRARY to 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

28° 332° LHA

**Latitude CONTRARY to Declination**

28° 332° LHA

Dec°	7			8			9			10			11			12			13			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	61°12'	-16'	103°	60°58'	-18'	105°	60°42'	-20'	106°	60°24'	-22'	108°	60°05'	-24'	110°	59°44'	-25'	111°	59°21'	-27'	113°	0			
1	60°56'	-18'	105°	60°40'	-20'	107°	60°22'	-22'	108°	60°02'	-23'	110°	59°41'	-25'	112°	59°18'	-27'	113°	58°54'	-29'	115°	1			
2	60°39'	-19'	107°	60°20'	-21'	109°	60°00'	-23'	110°	59°39'	-25'	112°	59°16'	-27'	113°	58°51'	-28'	115°	58°25'	-30'	116°	2			
3	60°19'	-21'	109°	59°59'	-23'	110°	59°37'	-25'	112°	59°14'	-26'	114°	58°49'	-28'	115°	58°23'	-30'	117°	57°56'	-31'	118°	3			
4	59°58'	-23'	111°	59°36'	-24'	112°	59°13'	-26'	114°	58°48'	-28'	115°	58°21'	-29'	117°	57°54'	-31'	118°	57°24'	-32'	120°	4			
5	59°35'	-24'	112°	59°12'	-26'	114°	58°46'	-28'	116°	58°20'	-29'	117°	57°52'	-31'	118°	57°23'	-32'	120°	56°52'	-33'	121°	5			
6	59°11'	-26'	114°	58°46'	-27'	116°	58°19'	-29'	117°	57°51'	-30'	119°	57°21'	-32'	120°	56°51'	-33'	121°	56°19'	-34'	123°	6			
7	58°45'	-27'	116°	58°18'	-29'	118°	57°50'	-30'	119°	57°20'	-32'	120°	56°50'	-33'	122°	56°18'	-34'	123°	55°44'	-35'	124°	7			
8	58°18'	-28'	118°	57°50'	-30'	119°	57°20'	-31'	121°	56°49'	-32'	122°	56°17'	-34'	123°	55°43'	-35'	124°	55°09'	-36'	126°	8			
9	57°50'	-30'	119°	57°20'	-31'	121°	56°49'	-32'	122°	56°16'	-34'	123°	55°43'	-35'	125°	55°08'	-36'	126°	54°32'	-37'	127°	9			
10	57°20'	-31'	121°	56°49'	-32'	122°	56°16'	-34'	124°	55°42'	-35'	125°	55°08'	-36'	126°	54°32'	-37'	127°	53°55'	-38'	128°	10			
11	56°50'	-32'	123°	56°17'	-33'	124°	55°43'	-35'	125°	55°08'	-36'	126°	54°32'	-37'	127°	53°55'	-38'	129°	53°17'	-39'	130°	11			
12	56°18'	-33'	124°	55°43'	-34'	125°	55°08'	-36'	127°	54°32'	-37'	128°	53°55'	-38'	129°	53°17'	-39'	130°	52°38'	-40'	131°	12			
13	55°44'	-34'	126°	55°09'	-35'	127°	54°32'	-37'	128°	53°55'	-38'	129°	53°17'	-39'	130°	52°38'	-40'	131°	51°58'	-41'	132°	13			
14	55°10'	-35'	127°	54°34'	-36'	128°	53°56'	-37'	129°	53°18'	-38'	130°	52°38'	-39'	131°	51°58'	-40'	132°	51°18'	-41'	133°	14			
15	54°35'	-36'	129°	53°57'	-37'	130°	53°19'	-38'	131°	52°39'	-39'	132°	51°59'	-40'	133°	51°18'	-41'	134°	50°36'	-42'	134°	15			
16	53°59'	-37'	130°	53°20'	-38'	131°	52°40'	-39'	132°	52°00'	-40'	133°	51°19'	-41'	134°	50°37'	-42'	135°	49°54'	-43'	136°	16			
17	53°22'	-38'	131°	52°42'	-39'	132°	52°01'	-40'	133°	51°20'	-41'	134°	50°38'	-42'	135°	49°55'	-42'	136°	49°12'	-43'	137°	17			
18	52°44'	-39'	132°	52°03'	-40'	133°	51°21'	-41'	134°	50°39'	-41'	135°	49°56'	-42'	136°	49°13'	-43'	137°	48°29'	-44'	138°	18			
19	52°05'	-39'	134°	51°23'	-40'	135°	50°41'	-41'	136°	49°58'	-42'	136°	49°14'	-43'	137°	48°30'	-44'	138°	47°45'	-44'	139°	19			
20	51°26'	-40'	135°	50°43'	-41'	136°	50°00'	-42'	137°	49°16'	-43'	137°	48°31'	-43'	138°	47°46'	-44'	139°	47°01'	-45'	140°	20			
21	50°45'	-41'	136°	50°02'	-42'	137°	49°18'	-42'	138°	48°33'	-43'	139°	47°48'	-44'	139°	47°02'	-45'	140°	46°16'	-45'	141°	21			
22	50°05'	-42'	137°	49°20'	-42'	138°	48°35'	-43'	139°	47°50'	-44'	140°	47°04'	-44'	140°	46°18'	-45'	141°	45°31'	-46'	142°	22			
23	49°23'	-42'	138°	48°38'	-43'	139°	47°52'	-44'	140°	47°06'	-44'	141°	46°20'	-45'	141°	45°32'	-46'	142°	44°45'	-46'	143°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13						

28° 332° LHA

**Latitude CONTRARY to 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

27° 333° LHA

**Latitude CONTRARY to Declination**

27° 333° LHA

Dec°	7			8			9			10			11			12			13			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	62°10'	-17'	103°	61°56'	-19'	105°	61°39'	-21'	107°	61°20'	-23'	109°	61°00'	-24'	111°	60°38'	-26'	112°	60°15'	-28'	114°	0			
1	61°54'	-18'	106°	61°37'	-20'	107°	61°18'	-22'	109°	60°58'	-24'	111°	60°36'	-26'	112°	60°12'	-28'	114°	59°47'	-29'	116°	1			
2	61°35'	-20'	108°	61°17'	-22'	109°	60°56'	-24'	111°	60°34'	-26'	113°	60°10'	-27'	114°	59°44'	-29'	116°	59°18'	-31'	117°	2			
3	61°15'	-22'	109°	60°54'	-24'	111°	60°32'	-25'	113°	60°08'	-27'	114°	59°42'	-29'	116°	59°15'	-30'	118°	58°47'	-32'	119°	3			
4	60°54'	-23'	111°	60°31'	-25'	113°	60°07'	-27'	115°	59°41'	-29'	116°	59°14'	-30'	118°	58°45'	-32'	119°	58°15'	-33'	121°	4			
5	60°30'	-25'	113°	60°06'	-27'	115°	59°40'	-28'	116°	59°12'	-30'	118°	58°43'	-31'	119°	58°13'	-33'	121°	57°42'	-34'	122°	5			
6	60°05'	-26'	115°	59°39'	-28'	117°	59°11'	-30'	118°	58°42'	-31'	120°	58°12'	-33'	121°	57°41'	-34'	122°	57°08'	-35'	124°	6			
7	59°39'	-28'	117°	59°11'	-29'	118°	58°42'	-31'	120°	58°11'	-32'	121°	57°39'	-34'	123°	57°07'	-35'	124°	56°32'	-36'	125°	7			
8	59°11'	-29'	119°	58°41'	-31'	120°	58°11'	-32'	121°	57°39'	-34'	123°	57°06'	-35'	124°	56°31'	-36'	125°	55°56'	-37'	127°	8			
9	58°42'	-31'	120°	58°11'	-32'	122°	57°39'	-33'	123°	57°05'	-35'	124°	56°31'	-36'	126°	55°55'	-37'	127°	55°19'	-38'	128°	9			
10	58°11'	-32'	122°	57°39'	-33'	123°	57°05'	-34'	125°	56°31'	-36'	126°	55°55'	-37'	127°	55°18'	-38'	128°	54°41'	-39'	129°	10			
11	57°39'	-33'	124°	57°06'	-34'	125°	56°31'	-35'	126°	55°55'	-37'	127°	55°18'	-38'	128°	54°40'	-39'	130°	54°02'	-40'	131°	11			
12	57°07'	-34'	125°	56°31'	-35'	126°	55°55'	-36'	128°	55°18'	-38'	129°	54°40'	-39'	130°	54°01'	-40'	131°	53°22'	-41'	132°	12			
13	56°32'	-35'	127°	55°56'	-36'	128°	55°19'	-37'	129°	54°41'	-38'	130°	54°02'	-39'	131°	53°22'	-40'	132°	52°41'	-41'	133°	13			
14	55°57'	-36'	128°	55°20'	-37'	129°	54°41'	-38'	130°	54°02'	-39'	131°	53°22'	-40'	132°	52°41'	-41'	133°	52°00'	-42'	134°	14			
15	55°21'	-37'	130°	54°43'	-38'	131°	54°03'	-39'	132°	53°23'	-40'	133°	52°42'	-41'	134°	52°00'	-42'	135°	51°18'	-43'	135°	15			
16	54°44'	-38'	131°	54°05'	-39'	132°	53°24'	-40'	133°	52°43'	-41'	134°	52°01'	-42'	135°	51°18'	-43'	136°	50°35'	-43'	137°	16			
17	54°06'	-39'	132°	53°26'	-40'	133°	52°44'	-41'	134°	52°02'	-42'	135°	51°19'	-42'	136°	50°36'	-43'	137°	49°52'	-44'	138°	17			
18	53°27'	-40'	134°	52°46'	-41'	134°	52°03'	-41'	135°	51°20'	-42'	136°	50°37'	-43'	137°	49°52'	-44'	138°	49°08'	-44'	139°	18			
19	52°48'	-40'	135°	52°05'	-41'	136°	51°22'	-42'	137°	50°38'	-43'	137°	49°54'	-44'	138°	49°09'	-44'	139°	48°23'	-45'	140°	19			
20	52°07'	-41'	136°	51°24'	-42'	137°	50°40'	-43'	138°	49°55'	-43'	139°	49°10'	-44'	139°	48°24'	-45'	140°	47°38'	-46'	141°	20			
21	51°26'	-42'	137°	50°42'	-43'	138°	49°57'	-43'	139°	49°12'	-44'	140°	48°26'	-45'	140°	47°39'	-45'	141°	46°53'	-46'	142°	21			
22	50°45'	-42'	138°	50°00'	-43'	139°	49°14'	-44'	140°	48°28'	-45'	141°	47°41'	-45'	141°	46°54'	-46'	142°	46°07'	-46'	143°	22			
23	50°02'	-43'	139°	49°16'	-44'	140°	48°30'	-44'	141°	47°43'	-45'	142°	46°56'	-46'	142°	46°08'	-46'	143°	45°20'	-47'	144°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13						

27° 333° LHA

**Latitude CONTRARY to DECLINATION**

27° 333° LHA

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

**26° 334° LHA**

**Latitude CONTRARY to Declination**

**26° 334° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	63°08'	-17'	104°	62°53'	-19'	106°	62°35'	-21'	108°	62°16'	-23'	110°	61°55'	-25'	111°	61°32'	-27'	113°	61°08'	-29'	115°	0
1	62°51'	-19'	106°	62°34'	-21'	108°	62°14'	-23'	110°	61°53'	-25'	112°	61°30'	-27'	113°	61°05'	-28'	115°	60°39'	-30'	117°	1
2	62°32'	-21'	108°	62°12'	-23'	110°	61°51'	-25'	112°	61°28'	-26'	113°	61°03'	-28'	115°	60°37'	-30'	117°	60°09'	-31'	118°	2
3	62°11'	-23'	110°	61°50'	-24'	112°	61°26'	-26'	114°	61°02'	-28'	115°	60°35'	-30'	117°	60°07'	-31'	119°	59°38'	-33'	120°	3
4	61°49'	-24'	112°	61°25'	-26'	114°	61°00'	-28'	116°	60°34'	-29'	117°	60°05'	-31'	119°	59°36'	-32'	120°	59°05'	-34'	122°	4
5	61°25'	-26'	114°	60°59'	-27'	116°	60°33'	-29'	117°	60°04'	-31'	119°	59°35'	-32'	120°	59°03'	-34'	122°	58°31'	-35'	123°	5
6	60°59'	-27'	116°	60°32'	-29'	118°	60°03'	-31'	119°	59°33'	-32'	121°	59°02'	-33'	122°	58°30'	-35'	123°	57°56'	-36'	125°	6
7	60°32'	-29'	118°	60°03'	-30'	119°	59°33'	-32'	121°	59°01'	-33'	122°	58°29'	-35'	124°	57°55'	-36'	125°	57°20'	-37'	126°	7
8	60°03'	-30'	120°	59°33'	-32'	121°	59°01'	-33'	123°	58°28'	-34'	124°	57°54'	-36'	125°	57°19'	-37'	126°	56°43'	-38'	128°	8
9	59°33'	-31'	121°	59°01'	-33'	123°	58°28'	-34'	124°	57°54'	-36'	125°	57°18'	-37'	127°	56°42'	-38'	128°	56°05'	-39'	129°	9
10	59°01'	-33'	123°	58°28'	-34'	124°	57°54'	-35'	126°	57°18'	-37'	127°	56°42'	-38'	128°	56°04'	-39'	129°	55°26'	-40'	130°	10
11	58°29'	-34'	125°	57°54'	-35'	126°	57°18'	-36'	127°	56°42'	-38'	128°	56°04'	-39'	130°	55°25'	-40'	131°	54°46'	-41'	132°	11
12	57°55'	-35'	126°	57°19'	-36'	127°	56°42'	-37'	129°	56°04'	-38'	130°	55°25'	-40'	131°	54°45'	-41'	132°	54°05'	-42'	133°	12
13	57°20'	-36'	128°	56°43'	-37'	129°	56°05'	-38'	130°	55°26'	-39'	131°	54°46'	-40'	132°	54°05'	-41'	133°	53°23'	-42'	134°	13
14	56°44'	-37'	129°	56°06'	-38'	130°	55°26'	-39'	131°	54°46'	-40'	132°	54°05'	-41'	134°	53°24'	-42'	134°	52°41'	-43'	135°	14
15	56°07'	-38'	131°	55°27'	-39'	132°	54°47'	-40'	133°	54°06'	-41'	134°	53°24'	-42'	135°	52°41'	-43'	136°	51°58'	-44'	137°	15
16	55°29'	-39'	132°	54°48'	-40'	133°	54°07'	-41'	134°	53°25'	-42'	135°	52°42'	-43'	136°	51°59'	-43'	137°	51°15'	-44'	138°	16
17	54°50'	-40'	133°	54°08'	-41'	134°	53°26'	-42'	135°	52°43'	-42'	136°	52°00'	-43'	137°	51°15'	-44'	138°	50°31'	-45'	139°	17
18	54°10'	-41'	135°	53°28'	-41'	136°	52°45'	-42'	136°	52°01'	-43'	137°	51°16'	-44'	138°	50°31'	-45'	139°	49°46'	-45'	140°	18
19	53°30'	-41'	136°	52°46'	-42'	137°	52°02'	-43'	138°	51°18'	-44'	138°	50°33'	-44'	139°	49°47'	-45'	140°	49°01'	-46'	141°	19
20	52°48'	-42'	137°	52°04'	-43'	138°	51°19'	-44'	139°	50°34'	-44'	140°	49°48'	-45'	140°	49°02'	-46'	141°	48°15'	-46'	142°	20
21	52°06'	-43'	138°	51°21'	-43'	139°	50°36'	-44'	140°	49°50'	-45'	141°	49°03'	-46'	141°	48°16'	-46'	142°	47°28'	-47'	143°	21
22	51°24'	-43'	139°	50°38'	-44'	140°	49°52'	-45'	141°	49°05'	-45'	142°	48°18'	-46'	142°	47°30'	-47'	143°	46°42'	-47'	144°	22
23	50°40'	-44'	140°	49°54'	-45'	141°	49°07'	-45'	142°	48°19'	-46'	143°	47°32'	-46'	143°	46°43'	-47'	144°	45°55'	-48'	145°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	<b>7</b>			<b>8</b>			<b>9</b>			<b>10</b>			<b>11</b>			<b>12</b>			<b>13</b>			

**26° 334° LHA**

**Latitude CONTRARY to DECLINATION**

**26° 334° LHA**

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

**25° 335° LHA**

**Latitude CONTRARY to Declination**

**25° 335° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	64°06'	-18'	105°	63°50'	-20'	107°	63°32'	-22'	109°	63°12'	-24'	110°	62°50'	-26'	112°	62°26'	-28'	114°	62°01'	-30'	116°	0
1	63°48'	-20'	107°	63°30'	-22'	109°	63°10'	-24'	111°	62°48'	-26'	112°	62°24'	-28'	114°	61°58'	-29'	116°	61°31'	-31'	118°	1
2	63°29'	-21'	109°	63°08'	-24'	111°	62°46'	-25'	113°	62°22'	-27'	114°	61°56'	-29'	116°	61°29'	-31'	118°	61°01'	-32'	119°	2
3	63°07'	-23'	111°	62°45'	-25'	113°	62°21'	-27'	115°	61°55'	-29'	116°	61°27'	-30'	118°	60°58'	-32'	120°	60°28'	-34'	121°	3
4	62°44'	-25'	113°	62°19'	-27'	115°	61°53'	-29'	117°	61°26'	-30'	118°	60°57'	-32'	120°	60°26'	-33'	121°	59°55'	-35'	123°	4
5	62°19'	-27'	115°	61°53'	-28'	117°	61°25'	-30'	118°	60°56'	-32'	120°	60°25'	-33'	121°	59°53'	-35'	123°	59°20'	-36'	124°	5
6	61°52'	-28'	117°	61°24'	-30'	119°	60°55'	-31'	120°	60°24'	-33'	122°	59°52'	-34'	123°	59°18'	-36'	125°	58°44'	-37'	126°	6
7	61°24'	-30'	119°	60°54'	-31'	120°	60°23'	-33'	122°	59°51'	-34'	123°	59°17'	-36'	125°	58°43'	-37'	126°	58°07'	-38'	127°	7
8	60°54'	-31'	121°	60°23'	-33'	122°	59°51'	-34'	124°	59°17'	-35'	125°	58°42'	-37'	126°	58°06'	-38'	128°	57°29'	-39'	129°	8
9	60°23'	-32'	122°	59°51'	-34'	124°	59°17'	-35'	125°	58°42'	-36'	127°	58°05'	-38'	128°	57°28'	-39'	129°	56°50'	-40'	130°	9
10	59°51'	-34'	124°	59°17'	-35'	125°	58°42'	-36'	127°	58°05'	-38'	128°	57°28'	-39'	129°	56°49'	-40'	130°	56°10'	-41'	132°	10
11	59°17'	-35'	126°	58°42'	-36'	127°	58°05'	-37'	128°	57°28'	-38'	130°	56°49'	-40'	131°	56°09'	-41'	132°	55°29'	-42'	133°	11
12	58°43'	-36'	127°	58°06'	-37'	129°	57°28'	-38'	130°	56°49'	-39'	131°	56°09'	-40'	132°	55°29'	-41'	133°	54°47'	-42'	134°	12
13	58°07'	-37'	129°	57°29'	-38'	130°	56°50'	-39'	131°	56°10'	-40'	132°	55°29'	-41'	133°	54°47'	-42'	134°	54°05'	-43'	135°	13
14	57°30'	-38'	130°	56°50'	-39'	131°	56°10'	-40'	133°	55°29'	-41'	134°	54°48'	-42'	135°	54°05'	-43'	136°	53°22'	-44'	137°	14
15	56°52'	-39'	132°	56°11'	-40'	133°	55°30'	-41'	134°	54°48'	-42'	135°	54°06'	-43'	136°	53°22'	-44'	137°	52°38'	-44'	138°	15
16	56°13'	-40'	133°	55°31'	-41'	134°	54°49'	-42'	135°	54°06'	-43'	136°	53°23'	-43'	137°	52°38'	-44'	138°	51°54'	-45'	139°	16
17	55°33'	-41'	134°	54°51'	-42'	135°	54°08'	-42'	136°	53°24'	-43'	137°	52°39'	-44'	138°	51°54'	-45'	139°	51°09'	-46'	140°	17
18	54°52'	-41'	136°	54°09'	-42'	137°	53°25'	-43'	138°	52°40'	-44'	138°	51°55'	-45'	139°	51°09'	-45'	140°	50°23'	-46'	141°	18
19	54°11'	-42'	137°	53°27'	-43'	138°	52°42'	-44'	139°	51°56'	-45'	140°	51°11'	-45'	140°	50°24'	-46'	141°	49°37'	-47'	142°	19
20	53°29'	-43'	138°	52°44'	-44'	139°	51°58'	-44'	140°	51°12'	-45'	141°	50°25'	-46'	141°	49°38'	-46'	142°	48°50'	-47'	143°	20
21	52°46'	-44'	139°	52°00'	-44'	140°	51°14'	-45'	141°	50°27'	-46'	142°	49°39'	-46'	142°	48°52'	-47'	143°	48°03'	-47'	144°	21
22	52°02'	-44'	140°	51°16'	-45'	141°	50°29'	-46'	142°	49°41'	-46'	143°	48°53'	-47'	143°	48°05'	-47'	144°	47°16'	-48'	145°	22
23	51°18'	-45'	142°	50°31'	-45'	142°	49°43'	-46'	143°	48°55'	-47'	144°	48°06'	-47'	144°	47°17'	-48'	145°	46°28'	-48'	146°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	<b>7</b>			<b>8</b>			<b>9</b>			<b>10</b>			<b>11</b>			<b>12</b>			<b>13</b>			

**25° 335° LHA**

**Latitude CONTRARY to 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

**24° 336° LHA**

**Latitude CONTRARY to Declination**

**24° 336° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	65°03'	-18'	105°	64°47'	-21'	107°	64°28'	-23'	109°	64°07'	-25'	111°	63°44'	-27'	113°	63°20'	-29'	115°	62°53'	-30'	117°	0
1	64°45'	-20'	108°	64°26'	-22'	110°	64°05'	-25'	111°	63°42'	-26'	113°	63°17'	-28'	115°	62°51'	-30'	117°	62°23'	-32'	119°	1
2	64°25'	-22'	110°	64°04'	-24'	112°	63°40'	-26'	114°	63°16'	-28'	115°	62°49'	-30'	117°	62°21'	-32'	119°	61°51'	-33'	120°	2
3	64°03'	-24'	112°	63°39'	-26'	114°	63°14'	-28'	116°	62°47'	-30'	117°	62°19'	-31'	119°	61°49'	-33'	121°	61°18'	-35'	122°	3
4	63°38'	-26'	114°	63°13'	-28'	116°	62°46'	-29'	118°	62°18'	-31'	119°	61°48'	-33'	121°	61°16'	-34'	122°	60°43'	-36'	124°	4
5	63°13'	-27'	116°	62°45'	-29'	118°	62°17'	-31'	119°	61°47'	-33'	121°	61°15'	-34'	123°	60°42'	-36'	124°	60°08'	-37'	126°	5
6	62°45'	-29'	118°	62°16'	-31'	120°	61°46'	-32'	121°	61°14'	-34'	123°	60°41'	-35'	124°	60°06'	-37'	126°	59°31'	-38'	127°	6
7	62°16'	-31'	120°	61°45'	-32'	121°	61°13'	-34'	123°	60°40'	-35'	125°	60°05'	-37'	126°	59°30'	-38'	127°	58°53'	-39'	129°	7
8	61°45'	-32'	122°	61°13'	-34'	123°	60°40'	-35'	125°	60°05'	-36'	126°	59°29'	-38'	128°	58°52'	-39'	129°	58°14'	-40'	130°	8
9	61°13'	-33'	123°	60°40'	-35'	125°	60°05'	-36'	126°	59°29'	-37'	128°	58°51'	-39'	129°	58°13'	-40'	130°	57°34'	-41'	131°	9
10	60°40'	-35'	125°	60°05'	-36'	127°	59°29'	-37'	128°	58°51'	-38'	129°	58°13'	-40'	131°	57°33'	-41'	132°	56°53'	-42'	133°	10
11	60°05'	-36'	127°	59°29'	-37'	128°	58°51'	-38'	129°	58°13'	-39'	131°	57°33'	-41'	132°	56°53'	-42'	133°	56°11'	-43'	134°	11
12	59°30'	-37'	128°	58°52'	-38'	130°	58°13'	-39'	131°	57°33'	-40'	132°	56°53'	-41'	133°	56°11'	-42'	134°	55°29'	-43'	135°	12
13	58°53'	-38'	130°	58°14'	-39'	131°	57°34'	-40'	132°	56°53'	-41'	134°	56°11'	-42'	135°	55°29'	-43'	136°	54°45'	-44'	137°	13
14	58°15'	-39'	131°	57°35'	-40'	133°	56°54'	-41'	134°	56°12'	-42'	135°	55°29'	-43'	136°	54°46'	-44'	137°	54°01'	-45'	138°	14
15	57°36'	-40'	133°	56°55'	-41'	134°	56°12'	-42'	135°	55°30'	-43'	136°	54°46'	-44'	137°	54°02'	-44'	138°	53°17'	-45'	139°	15
16	56°56'	-41'	134°	56°14'	-42'	135°	55°31'	-43'	136°	54°47'	-44'	137°	54°02'	-44'	138°	53°17'	-45'	139°	52°32'	-46'	140°	16
17	56°15'	-42'	136°	55°32'	-43'	137°	54°48'	-43'	138°	54°03'	-44'	138°	53°18'	-45'	139°	52°32'	-46'	140°	51°46'	-46'	141°	17
18	55°33'	-42'	137°	54°49'	-43'	138°	54°05'	-44'	139°	53°19'	-45'	140°	52°33'	-46'	140°	51°47'	-46'	141°	50°59'	-47'	142°	18
19	54°51'	-43'	138°	54°06'	-44'	139°	53°20'	-45'	140°	52°34'	-45'	141°	51°48'	-46'	142°	51°00'	-47'	142°	50°13'	-47'	143°	19
20	54°08'	-44'	139°	53°22'	-45'	140°	52°36'	-45'	141°	51°49'	-46'	142°	51°01'	-47'	143°	50°14'	-47'	143°	49°25'	-48'	144°	20
21	53°24'	-44'	140°	52°38'	-45'	141°	51°51'	-46'	142°	51°03'	-47'	143°	50°15'	-47'	144°	49°26'	-48'	144°	48°37'	-48'	145°	21
22	52°40'	-45'	142°	51°52'	-46'	142°	51°05'	-46'	143°	50°16'	-47'	144°	49°28'	-48'	145°	48°39'	-48'	145°	47°49'	-49'	146°	22
23	51°55'	-46'	143°	51°07'	-46'	143°	50°18'	-47'	144°	49°29'	-47'	145°	48°40'	-48'	145°	47°51'	-49'	146°	47°01'	-49'	147°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**24° 336° LHA**

**Latitude CONTRARY to 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

**23° 337° LHA**

**Latitude CONTRARY to Declination**

**23° 337° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°01'	-19'	106°	65°43'	-21'	108°	65°23'	-24'	110°	65°02'	-26'	112°	64°38'	-28'	114°	64°13'	-29'	116°	63°45'	-31'	118°	0
1	65°42'	-21'	108°	65°22'	-23'	110°	65°00'	-25'	112°	64°36'	-27'	114°	64°10'	-29'	116°	63°43'	-31'	118°	63°14'	-33'	120°	1
2	65°21'	-23'	111°	64°59'	-25'	113°	64°35'	-27'	115°	64°09'	-29'	116°	63°41'	-31'	118°	63°12'	-33'	120°	62°41'	-34'	122°	2
3	64°58'	-25'	113°	64°33'	-27'	115°	64°07'	-29'	117°	63°40'	-31'	118°	63°10'	-32'	120°	62°39'	-34'	122°	62°07'	-35'	123°	3
4	64°33'	-27'	115°	64°06'	-29'	117°	63°39'	-30'	119°	63°09'	-32'	120°	62°38'	-34'	122°	62°05'	-35'	124°	61°32'	-37'	125°	4
5	64°06'	-28'	117°	63°38'	-30'	119°	63°08'	-32'	121°	62°37'	-34'	122°	62°04'	-35'	124°	61°30'	-37'	125°	60°55'	-38'	127°	5
6	63°37'	-30'	119°	63°08'	-32'	121°	62°36'	-33'	122°	62°03'	-35'	124°	61°29'	-36'	126°	60°54'	-38'	127°	60°17'	-39'	128°	6
7	63°07'	-32'	121°	62°36'	-33'	123°	62°03'	-35'	124°	61°28'	-36'	126°	60°53'	-37'	127°	60°16'	-39'	129°	59°38'	-40'	130°	7
8	62°36'	-33'	123°	62°03'	-35'	124°	61°28'	-36'	126°	60°52'	-37'	127°	60°15'	-39'	129°	59°37'	-40'	130°	58°58'	-41'	131°	8
9	62°03'	-34'	125°	61°28'	-36'	126°	60°52'	-37'	128°	60°15'	-38'	129°	59°37'	-40'	130°	58°57'	-41'	132°	58°17'	-42'	133°	9
10	61°28'	-36'	126°	60°52'	-37'	128°	60°15'	-38'	129°	59°37'	-39'	130°	58°57'	-41'	132°	58°17'	-42'	133°	57°35'	-43'	134°	10
11	60°53'	-37'	128°	60°15'	-38'	129°	59°37'	-39'	131°	58°57'	-40'	132°	58°17'	-41'	133°	57°35'	-42'	134°	56°53'	-43'	135°	11
12	60°16'	-38'	130°	59°37'	-39'	131°	58°57'	-40'	132°	58°17'	-41'	133°	57°35'	-42'	135°	56°53'	-43'	136°	56°09'	-44'	137°	12
13	59°38'	-39'	131°	58°58'	-40'	132°	58°17'	-41'	134°	57°35'	-42'	135°	56°53'	-43'	136°	56°09'	-44'	137°	55°25'	-45'	138°	13
14	58°59'	-40'	133°	58°18'	-41'	134°	57°36'	-42'	135°	56°53'	-43'	136°	56°10'	-44'	137°	55°25'	-45'	138°	54°40'	-45'	139°	14
15	58°19'	-41'	134°	57°37'	-42'	135°	56°54'	-43'	136°	56°10'	-44'	137°	55°26'	-45'	138°	54°41'	-45'	139°	53°55'	-46'	140°	15
16	57°38'	-42'	135°	56°55'	-43'	137°	56°11'	-44'	138°	55°26'	-44'	139°	54°41'	-45'	139°	53°55'	-46'	140°	53°09'	-47'	141°	16
17	56°56'	-43'	137°	56°12'	-43'	138°	55°27'	-44'	139°	54°42'	-45'	140°	53°56'	-46'	141°	53°09'	-47'	141°	52°22'	-47'	142°	17
18	56°14'	-43'	138°	55°29'	-44'	139°	54°43'	-45'	140°	53°57'	-46'	141°	53°10'	-46'	142°	52°23'	-47'	142°	51°35'	-48'	143°	18
19	55°30'	-44'	139°	54°45'	-45'	140°	53°58'	-46'	141°	53°11'	-46'	142°	52°24'	-47'	143°	51°36'	-48'	144°	50°47'	-48'	144°	19
20	54°46'	-45'	140°	54°00'	-45'	141°	53°13'	-46'	142°	52°25'	-47'	143°	51°37'	-47'	144°	50°48'	-48'	144°	49°59'	-49'	145°	20
21	54°02'	-45'	142°	53°14'	-46'	142°	52°26'	-47'	143°	51°38'	-47'	144°	50°49'	-48'	145°	50°00'	-48'	145°	49°11'	-49'	146°	21
22	53°16'	-46'	143°	52°28'	-47'	144°	51°40'	-47'	144°	50°51'	-48'	145°	50°01'	-48'	146°	49°12'	-49'	146°	48°22'	-49'	147°	22
23	52°30'	-47'	144°	51°42'	-47'	145°	50°53'	-48'	145°	50°03'	-48'	146°	49°13'	-49'	147°	48°23'	-49'	147°	47°32'	-50'	148°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**23° 337° LHA**

**Latitude CONTRARY to DECLINATION**

**23° 337° LHA**

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

22° 338° LHA

**Latitude CONTRARY to Declination**

22° 338° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°58'	-20'	107°	66°40'	-22'	109°	66°19'	-24'	111°	65°56'	-26'	113°	65°32'	-29'	115°	65°05'	-30'	117°	64°37'	-32'	119°	0
1	66°38'	-22'	109°	66°17'	-24'	111°	65°55'	-26'	113°	65°30'	-28'	115°	65°03'	-30'	117°	64°35'	-32'	119°	64°04'	-34'	121°	1
2	66°16'	-24'	112°	65°53'	-26'	114°	65°28'	-28'	116°	65°01'	-30'	118°	64°33'	-32'	119°	64°03'	-34'	121°	63°31'	-35'	123°	2
3	65°52'	-26'	114°	65°27'	-28'	116°	65°00'	-30'	118°	64°31'	-32'	120°	64°01'	-33'	121°	63°29'	-35'	123°	62°55'	-36'	125°	3
4	65°26'	-28'	116°	64°59'	-30'	118°	64°30'	-31'	120°	64°00'	-33'	122°	63°28'	-35'	123°	62°54'	-36'	125°	62°19'	-38'	126°	4
5	64°59'	-29'	118°	64°30'	-31'	120°	63°59'	-33'	122°	63°27'	-35'	123°	62°53'	-36'	125°	62°18'	-38'	127°	61°41'	-39'	128°	5
6	64°29'	-31'	120°	63°58'	-33'	122°	63°26'	-34'	124°	62°52'	-36'	125°	62°17'	-37'	127°	61°40'	-39'	128°	61°02'	-40'	130°	6
7	63°58'	-33'	122°	63°26'	-34'	124°	62°51'	-36'	125°	62°16'	-37'	127°	61°39'	-39'	128°	61°01'	-40'	130°	60°22'	-41'	131°	7
8	63°26'	-34'	124°	62°51'	-36'	126°	62°16'	-37'	127°	61°39'	-38'	129°	61°01'	-40'	130°	60°22'	-41'	131°	59°41'	-42'	133°	8
9	62°51'	-35'	126°	62°16'	-37'	127°	61°39'	-38'	129°	61°01'	-39'	130°	60°21'	-41'	132°	59°41'	-42'	133°	59°00'	-43'	134°	9
10	62°16'	-37'	128°	61°39'	-38'	129°	61°01'	-39'	130°	60°21'	-40'	132°	59°41'	-42'	133°	58°59'	-43'	134°	58°17'	-44'	135°	10
11	61°39'	-38'	129°	61°01'	-39'	131°	60°21'	-40'	132°	59°41'	-41'	133°	58°59'	-42'	134°	58°17'	-43'	136°	57°33'	-44'	137°	11
12	61°01'	-39'	131°	60°22'	-40'	132°	59°41'	-41'	133°	58°59'	-42'	135°	58°17'	-43'	136°	57°33'	-44'	137°	56°49'	-45'	138°	12
13	60°22'	-40'	132°	59°41'	-41'	134°	59°00'	-42'	135°	58°17'	-43'	136°	57°33'	-44'	137°	56°49'	-45'	138°	56°04'	-46'	139°	13
14	59°42'	-41'	134°	59°00'	-42'	135°	58°17'	-43'	136°	57°34'	-44'	137°	56°49'	-45'	138°	56°04'	-46'	139°	55°18'	-46'	140°	14
15	59°01'	-42'	135°	58°18'	-43'	136°	57°34'	-44'	138°	56°50'	-45'	139°	56°04'	-45'	140°	55°18'	-46'	141°	54°32'	-47'	141°	15
16	58°19'	-43'	137°	57°35'	-44'	138°	56°51'	-45'	139°	56°05'	-45'	140°	55°19'	-46'	141°	54°32'	-47'	142°	53°45'	-47'	142°	16
17	57°37'	-44'	138°	56°52'	-44'	139°	56°06'	-45'	140°	55°20'	-46'	141°	54°33'	-47'	142°	53°45'	-47'	143°	52°57'	-48'	144°	17
18	56°53'	-44'	139°	56°07'	-45'	140°	55°21'	-46'	141°	54°34'	-47'	142°	53°46'	-47'	143°	52°58'	-48'	144°	52°09'	-48'	144°	18
19	56°09'	-45'	141°	55°22'	-46'	141°	54°35'	-46'	142°	53°47'	-47'	143°	52°59'	-48'	144°	52°10'	-48'	145°	51°21'	-49'	145°	19
20	55°24'	-46'	142°	54°36'	-46'	143°	53°48'	-47'	143°	53°00'	-48'	144°	52°11'	-48'	145°	51°22'	-49'	146°	50°32'	-49'	146°	20
21	54°38'	-46'	143°	53°50'	-47'	144°	53°01'	-48'	144°	52°12'	-48'	145°	51°23'	-49'	146°	50°33'	-49'	147°	49°43'	-50'	147°	21
22	53°52'	-47'	144°	53°03'	-47'	145°	52°14'	-48'	145°	51°24'	-49'	146°	50°34'	-49'	147°	49°44'	-50'	147°	48°53'	-50'	148°	22
23	53°05'	-47'	145°	52°16'	-48'	146°	51°26'	-49'	146°	50°36'	-49'	147°	49°45'	-50'	148°	48°54'	-50'	148°	48°03'	-50'	149°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

22° 338° LHA

**Latitude CONTRARY to DECLINATION**

22° 338° LHA

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

21° 339° LHA

**Latitude CONTRARY to Declination**

21° 339° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	67°55'	-21'	108°	67°36'	-23'	110°	67°14'	-25'	112°	66°50'	-27'	114°	66°25'	-30'	116°	65°57'	-31'	118°	65°27'	-33'	120°	0
1	67°34'	-23'	110°	67°13'	-25'	112°	66°49'	-27'	114°	66°23'	-29'	117°	65°55'	-31'	119°	65°25'	-33'	121°	64°54'	-35'	122°	1
2	67°11'	-25'	112°	66°47'	-27'	115°	66°21'	-29'	117°	65°54'	-31'	119°	65°24'	-33'	121°	64°52'	-35'	122°	64°19'	-36'	124°	2
3	66°47'	-27'	115°	66°20'	-29'	117°	65°52'	-31'	119°	65°22'	-33'	121°	64°51'	-34'	123°	64°18'	-36'	124°	63°43'	-38'	126°	3
4	66°20'	-29'	117°	65°51'	-31'	119°	65°21'	-33'	121°	64°50'	-34'	123°	64°16'	-36'	125°	63°42'	-37'	126°	63°06'	-39'	128°	4
5	65°51'	-31'	119°	65°21'	-32'	121°	64°49'	-34'	123°	64°16'	-36'	125°	63°41'	-37'	126°	63°04'	-39'	128°	62°27'	-40'	129°	5
6	65°20'	-32'	121°	64°48'	-34'	123°	64°15'	-35'	125°	63°40'	-37'	127°	63°03'	-38'	128°	62°26'	-40'	130°	61°47'	-41'	131°	6
7	64°48'	-34'	123°	64°15'	-35'	125°	63°39'	-37'	127°	63°03'	-38'	128°	62°25'	-40'	130°	61°46'	-41'	131°	61°06'	-42'	133°	7
8	64°15'	-35'	125°	63°39'	-37'	127°	63°03'	-38'	128°	62°25'	-39'	130°	61°45'	-41'	132°	61°05'	-42'	133°	60°24'	-43'	134°	8
9	63°39'	-37'	127°	63°03'	-38'	129°	62°24'	-39'	130°	61°45'	-41'	132°	61°05'	-42'	133°	60°23'	-43'	134°	59°41'	-44'	135°	9
10	63°03'	-38'	129°	62°25'	-39'	130°	61°45'	-40'	132°	61°05'	-42'	133°	60°23'	-43'	134°	59°41'	-44'	136°	58°57'	-45'	137°	10
11	62°25'	-39'	131°	61°45'	-40'	132°	61°05'	-41'	133°	60°23'	-42'	135°	59°41'	-43'	136°	58°57'	-44'	137°	58°13'	-45'	138°	11
12	61°46'	-40'	132°	61°05'	-41'	134°	60°23'	-42'	135°	59°41'	-43'	136°	58°57'	-44'	137°	58°13'	-45'	138°	57°28'	-46'	139°	12
13	61°06'	-41'	134°	60°24'	-42'	135°	59°41'	-43'	136°	58°57'	-44'	137°	58°13'	-45'	138°	57°28'	-46'	140°	56°42'	-47'	141°	13
14	60°25'	-42'	135°	59°42'	-43'	136°	58°58'	-44'	138°	58°13'	-45'	139°	57°28'	-46'	140°	56°42'	-47'	141°	55°55'	-47'	142°	14
15	59°43'	-43'	137°	58°59'	-44'	138°	58°14'	-45'	139°	57°28'	-46'	140°	56°42'	-46'	141°	55°55'	-47'	142°	55°08'	-48'	143°	15
16	59°00'	-44'	138°	58°15'	-45'	139°	57°29'	-46'	140°	56°43'	-46'	141°	55°56'	-47'	142°	55°08'	-48'	143°	54°20'	-48'	144°	16
17	58°16'	-45'	139°	57°30'	-45'	140°	56°44'	-46'	141°	55°56'	-47'	142°	55°09'	-48'	143°	54°20'	-48'	144°	53°32'	-49'	145°	17
18	57°31'	-45'	141°	56°45'	-46'	142°	55°57'	-47'	142°	55°10'	-47'	143°	54°21'	-48'	144°	53°32'	-49'	145°	52°43'	-49'	146°	18
19	56°46'	-46'	142°	55°59'	-47'	143°	55°11'	-47'	144°	54°22'	-48'	144°	53°33'	-49'	145°	52°44'	-49'	146°	51°54'	-50'	147°	19
20	56°00'	-47'	143°	55°12'	-47'	144°	54°23'	-48'	145°	53°34'	-49'	145°	52°44'	-49'	146°	51°54'	-50'	147°	51°04'	-50'	148°	20
21	55°14'	-47'	144°	54°25'	-48'	145°	53°35'	-48'	146°	52°46'	-49'	146°	51°55'	-49'	147°	51°05'	-50'	148°	50°14'	-50'	148°	21
22	54°26'	-48'	145°	53°37'	-48'	146°	52°47'	-49'	147°	51°57'	-49'	147°	51°06'	-50'	148°	50°15'	-50'	149°	49°23'	-51'	149°	22
23	53°39'	-48'	146°	52°49'	-49'	147°	51°58'	-49'	148°	51°07'	-50'	148°	50°16'	-50'	149°	49°24'	-51'	150°	48°33'	-51'	150°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

21° 339° LHA

**Latitude CONTRARY to 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

**20° 340° LHA**

**Latitude CONTRARY to Declination**

**20° 340° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	68°51'	-21'	109°	68°31'	-24'	111°	68°09'	-26'	113°	67°44'	-28'	116°	67°17'	-31'	118°	66°48'	-33'	120°	66°18'	-34'	122°	0
1	68°30'	-24'	111°	68°07'	-26'	113°	67°42'	-28'	116°	67°15'	-30'	118°	66°46'	-32'	120°	66°16'	-34'	122°	65°43'	-36'	124°	1
2	68°06'	-26'	114°	67°41'	-28'	116°	67°14'	-30'	118°	66°45'	-32'	120°	66°14'	-34'	122°	65°41'	-36'	124°	65°07'	-37'	126°	2
3	67°40'	-28'	116°	67°13'	-30'	118°	66°44'	-32'	120°	66°13'	-34'	122°	65°40'	-36'	124°	65°06'	-37'	126°	64°30'	-39'	128°	3
4	67°12'	-30'	118°	66°43'	-32'	120°	66°12'	-34'	122°	65°39'	-35'	124°	65°05'	-37'	126°	64°29'	-38'	128°	63°51'	-40'	129°	4
5	66°43'	-32'	120°	66°11'	-33'	122°	65°38'	-35'	124°	65°04'	-37'	126°	64°28'	-38'	128°	63°50'	-40'	129°	63°11'	-41'	131°	5
6	66°11'	-33'	123°	65°38'	-35'	124°	65°03'	-37'	126°	64°27'	-38'	128°	63°49'	-40'	130°	63°11'	-41'	131°	62°31'	-42'	133°	6
7	65°38'	-35'	125°	65°03'	-36'	126°	64°26'	-38'	128°	63°49'	-39'	130°	63°10'	-41'	131°	62°30'	-42'	133°	61°48'	-43'	134°	7
8	65°03'	-36'	127°	64°26'	-38'	128°	63°48'	-39'	130°	63°09'	-41'	131°	62°29'	-42'	133°	61°48'	-43'	134°	61°05'	-44'	136°	8
9	64°26'	-38'	128°	63°48'	-39'	130°	63°09'	-40'	132°	62°29'	-42'	133°	61°47'	-43'	134°	61°05'	-44'	136°	60°22'	-45'	137°	9
10	63°49'	-39'	130°	63°09'	-40'	132°	62°29'	-41'	133°	61°47'	-43'	135°	61°05'	-44'	136°	60°21'	-45'	137°	59°37'	-46'	138°	10
11	63°10'	-40'	132°	62°29'	-41'	133°	61°47'	-42'	135°	61°05'	-44'	136°	60°21'	-44'	137°	59°37'	-45'	138°	58°51'	-46'	140°	11
12	62°30'	-41'	134°	61°48'	-42'	135°	61°05'	-43'	136°	60°21'	-44'	137°	59°37'	-45'	139°	58°51'	-46'	140°	58°05'	-47'	141°	12
13	61°48'	-42'	135°	61°05'	-43'	136°	60°22'	-44'	138°	59°37'	-45'	139°	58°51'	-46'	140°	58°05'	-47'	141°	57°18'	-48'	142°	13
14	61°06'	-43'	137°	60°22'	-44'	138°	59°37'	-45'	139°	58°52'	-46'	140°	58°05'	-47'	141°	57°18'	-47'	142°	56°31'	-48'	143°	14
15	60°23'	-44'	138°	59°38'	-45'	139°	58°52'	-46'	140°	58°06'	-47'	141°	57°19'	-47'	142°	56°31'	-48'	143°	55°43'	-49'	144°	15
16	59°39'	-45'	139°	58°53'	-46'	140°	58°07'	-46'	142°	57°19'	-47'	142°	56°31'	-48'	143°	55°43'	-49'	144°	54°54'	-49'	145°	16
17	58°54'	-46'	141°	58°07'	-46'	142°	57°20'	-47'	143°	56°32'	-48'	144°	55°43'	-48'	144°	54°54'	-49'	145°	54°05'	-50'	146°	17
18	58°09'	-46'	142°	57°21'	-47'	143°	56°33'	-48'	144°	55°44'	-48'	145°	54°55'	-49'	146°	54°05'	-50'	146°	53°15'	-50'	147°	18
19	57°22'	-47'	143°	56°34'	-48'	144°	55°45'	-48'	145°	54°56'	-49'	146°	54°06'	-49'	147°	53°16'	-50'	147°	52°25'	-50'	148°	19
20	56°35'	-48'	144°	55°46'	-48'	145°	54°57'	-49'	146°	54°07'	-49'	147°	53°17'	-50'	147°	52°26'	-50'	148°	51°35'	-51'	149°	20
21	55°48'	-48'	145°	54°58'	-49'	146°	54°08'	-49'	147°	53°18'	-50'	148°	52°27'	-50'	148°	51°35'	-51'	149°	50°44'	-51'	150°	21
22	55°00'	-49'	146°	54°10'	-49'	147°	53°19'	-50'	148°	52°28'	-50'	149°	51°36'	-51'	149°	50°45'	-51'	150°	49°53'	-52'	151°	22
23	54°11'	-49'	147°	53°20'	-50'	148°	52°29'	-50'	149°	51°38'	-51'	150°	50°46'	-51'	150°	49°54'	-51'	151°	49°01'	-52'	151°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**20° 340° LHA**

**Latitude CONTRARY to 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

**19° 341° LHA**

**Latitude CONTRARY to Declination**

**19° 341° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	69°48'	-22'	109°	69°27'	-25'	112°	69°03'	-27'	114°	68°37'	-30'	117°	68°09'	-32'	119°	67°39'	-34'	121°	67°07'	-36'	123°	0
1	69°25'	-25'	112°	69°02'	-27'	115°	68°36'	-29'	117°	68°07'	-32'	119°	67°37'	-33'	121°	67°05'	-35'	123°	66°31'	-37'	125°	1
2	69°01'	-27'	115°	68°34'	-29'	117°	68°06'	-31'	119°	67°36'	-33'	121°	67°04'	-35'	123°	66°30'	-37'	125°	65°54'	-38'	127°	2
3	68°34'	-29'	117°	68°05'	-31'	119°	67°35'	-33'	122°	67°03'	-35'	124°	66°29'	-37'	125°	65°53'	-38'	127°	65°16'	-40'	129°	3
4	68°05'	-31'	120°	67°34'	-33'	122°	67°02'	-35'	124°	66°28'	-37'	126°	65°52'	-38'	127°	65°15'	-40'	129°	64°36'	-41'	131°	4
5	67°34'	-33'	122°	67°01'	-35'	124°	66°27'	-36'	126°	65°51'	-38'	128°	65°14'	-39'	129°	64°35'	-41'	131°	63°55'	-42'	132°	5
6	67°01'	-35'	124°	66°26'	-36'	126°	65°50'	-38'	128°	65°13'	-39'	129°	64°34'	-41'	131°	63°54'	-42'	133°	63°13'	-43'	134°	6
7	66°26'	-36'	126°	65°50'	-38'	128°	65°13'	-39'	130°	64°34'	-41'	131°	63°54'	-42'	133°	63°12'	-43'	134°	62°30'	-44'	136°	7
8	65°50'	-38'	128°	65°12'	-39'	130°	64°33'	-40'	131°	63°53'	-42'	133°	63°12'	-43'	134°	62°29'	-44'	136°	61°46'	-45'	137°	8
9	65°13'	-39'	130°	64°33'	-40'	132°	63°53'	-42'	133°	63°12'	-43'	135°	62°29'	-44'	136°	61°45'	-45'	137°	61°01'	-46'	138°	9
10	64°34'	-40'	132°	63°53'	-41'	133°	63°12'	-43'	135°	62°29'	-44'	136°	61°45'	-45'	137°	61°01'	-46'	139°	60°15'	-47'	140°	10
11	63°54'	-41'	133°	63°12'	-42'	135°	62°29'	-44'	136°	61°45'	-45'	138°	61°00'	-46'	139°	60°15'	-46'	140°	59°29'	-47'	141°	11
12	63°12'	-42'	135°	62°29'	-43'	136°	61°45'	-44'	138°	61°01'	-45'	139°	60°15'	-46'	140°	59°29'	-47'	141°	58°41'	-48'	142°	12
13	62°30'	-43'	137°	61°46'	-44'	138°	61°01'	-45'	139°	60°15'	-46'	140°	59°29'	-47'	141°	58°41'	-48'	142°	57°54'	-48'	143°	13
14	61°47'	-44'	138°	61°02'	-45'	139°	60°16'	-46'	140°	59°29'	-47'	142°	58°42'	-48'	143°	57°54'	-48'	144°	57°05'	-49'	144°	14
15	61°02'	-45'	139°	60°16'	-46'	141°	59°30'	-47'	142°	58°42'	-48'	143°	57°54'	-48'	144°	57°05'	-49'	145°	56°16'	-49'	146°	15
16	60°17'	-46'	141°	59°30'	-47'	142°	58°43'	-47'	143°	57°55'	-48'	144°	57°06'	-49'	145°	56°17'	-49'	146°	55°27'	-50'	147°	16
17	59°31'	-47'	142°	58°44'	-47'	143°	57°55'	-48'	144°	57°06'	-49'	145°	56°17'	-49'	146°	55°27'	-50'	147°	54°37'	-50'	147°	17
18	58°45'	-47'	143°	57°56'	-48'	144°	57°07'	-49'	145°	56°18'	-49'	146°	55°28'	-50'	147°	54°37'	-50'	148°	53°46'	-51'	148°	18
19	57°58'	-48'	145°	57°08'	-49'	145°	56°19'	-49'	146°	55°29'	-50'	147°	54°38'	-50'	148°	53°47'	-51'	149°	52°56'	-51'	149°	19
20	57°10'	-48'	146°	56°20'	-49'	147°	55°30'	-50'	147°	54°39'	-50'	148°	53°48'	-51'	149°	52°56'	-51'	149°	52°04'	-52'	150°	20
21	56°21'	-49'	147°	55°31'	-50'	148°	54°40'	-50'	148°	53°49'	-51'	149°	52°57'	-51'	150°	52°05'	-51'	150°	51°13'	-52'	151°	21
22	55°32'	-49'	148°	54°41'	-50'	149°	53°50'	-51'	149°	52°58'	-51'	150°	52°06'	-51'	151°	51°14'	-52'	151°	50°21'	-52'	152°	22
23	54°43'	-50'	149°	53°51'	-50'	149°	52°59'	-51'	150°	52°07'	-51'	151°	51°15'	-52'	151°	50°22'	-52'	152°	49°29'	-53'	153°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**19° 341° LHA**

**Latitude CONTRARY to 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

18° 342° LHA

**Latitude CONTRARY to Declination**

18° 342° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	70°44'	-23'	111°	70°21'	-26'	113°	69°57'	-28'	116°	69°29'	-31'	118°	69°00'	-33'	120°	68°29'	-35'	123°	67°55'	-37'	125°	0
1	70°20'	-26'	113°	69°55'	-28'	116°	69°28'	-31'	118°	68°59'	-33'	121°	68°27'	-35'	123°	67°54'	-37'	125°	67°19'	-38'	127°	1
2	69°54'	-28'	116°	69°27'	-30'	118°	68°57'	-33'	121°	68°26'	-35'	123°	67°52'	-36'	125°	67°17'	-38'	127°	66°40'	-40'	129°	2
3	69°26'	-30'	119°	68°57'	-32'	121°	68°25'	-34'	123°	67°51'	-36'	125°	67°16'	-38'	127°	66°39'	-39'	129°	66°01'	-41'	131°	3
4	68°56'	-32'	121°	68°24'	-34'	123°	67°51'	-36'	125°	67°15'	-38'	127°	66°38'	-39'	129°	66°00'	-41'	131°	65°20'	-42'	132°	4
5	68°24'	-34'	123°	67°50'	-36'	125°	67°14'	-38'	127°	66°37'	-39'	129°	65°59'	-41'	131°	65°19'	-42'	133°	64°38'	-43'	134°	5
6	67°50'	-36'	125°	67°14'	-37'	127°	66°37'	-39'	129°	65°58'	-41'	131°	65°18'	-42'	133°	64°37'	-43'	134°	63°54'	-44'	136°	6
7	67°14'	-37'	128°	66°37'	-39'	129°	65°58'	-40'	131°	65°18'	-42'	133°	64°36'	-43'	134°	63°54'	-44'	136°	63°10'	-45'	137°	7
8	66°37'	-39'	130°	65°58'	-40'	131°	65°17'	-42'	133°	64°36'	-43'	134°	63°53'	-44'	136°	63°10'	-45'	137°	62°25'	-46'	139°	8
9	65°58'	-40'	131°	65°17'	-41'	133°	64°36'	-43'	135°	63°53'	-44'	136°	63°09'	-45'	137°	62°25'	-46'	139°	61°39'	-47'	140°	9
10	65°18'	-41'	133°	64°36'	-43'	135°	63°53'	-44'	136°	63°09'	-45'	138°	62°24'	-46'	139°	61°39'	-47'	140°	60°52'	-47'	141°	10
11	64°36'	-42'	135°	63°53'	-44'	136°	63°09'	-45'	138°	62°24'	-46'	139°	61°39'	-47'	140°	60°52'	-47'	141°	60°05'	-48'	143°	11
12	63°54'	-44'	137°	63°10'	-45'	138°	62°25'	-46'	139°	61°39'	-46'	140°	60°52'	-47'	142°	60°05'	-48'	143°	59°17'	-49'	144°	12
13	63°10'	-44'	138°	62°25'	-45'	139°	61°39'	-46'	141°	60°52'	-47'	142°	60°05'	-48'	143°	59°17'	-49'	144°	58°28'	-49'	145°	13
14	62°26'	-45'	140°	61°40'	-46'	141°	60°53'	-47'	142°	60°05'	-48'	143°	59°17'	-49'	144°	58°28'	-49'	145°	57°39'	-50'	146°	14
15	61°40'	-46'	141°	60°53'	-47'	142°	60°06'	-48'	143°	59°17'	-48'	144°	58°28'	-49'	145°	57°39'	-50'	146°	56°49'	-50'	147°	15
16	60°54'	-47'	142°	60°06'	-48'	143°	59°18'	-48'	144°	58°29'	-49'	145°	57°39'	-50'	146°	56°49'	-50'	147°	55°58'	-51'	148°	16
17	60°07'	-48'	144°	59°19'	-48'	145°	58°30'	-49'	146°	57°40'	-50'	146°	56°49'	-50'	147°	55°59'	-51'	148°	55°08'	-51'	149°	17
18	59°20'	-48'	145°	58°30'	-49'	146°	57°41'	-50'	147°	56°50'	-50'	148°	55°59'	-51'	148°	55°08'	-51'	149°	54°16'	-52'	150°	18
19	58°31'	-49'	146°	57°41'	-49'	147°	56°51'	-50'	148°	56°00'	-51'	148°	55°09'	-51'	149°	54°17'	-52'	150°	53°25'	-52'	151°	19
20	57°43'	-49'	147°	56°52'	-50'	148°	56°01'	-50'	149°	55°09'	-51'	149°	54°18'	-51'	150°	53°25'	-52'	151°	52°33'	-52'	151°	20
21	56°53'	-50'	148°	56°02'	-50'	149°	55°10'	-51'	150°	54°19'	-51'	150°	53°26'	-52'	151°	52°34'	-52'	152°	51°41'	-53'	152°	21
22	56°03'	-50'	149°	55°12'	-51'	150°	54°20'	-51'	151°	53°27'	-52'	151°	52°34'	-52'	152°	51°41'	-53'	152°	50°48'	-53'	153°	22
23	55°13'	-51'	150°	54°21'	-51'	151°	53°28'	-52'	151°	52°35'	-52'	152°	51°42'	-52'	153°	50°49'	-53'	153°	49°55'	-53'	154°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

18° 342° LHA

**Latitude CONTRARY to 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

17° 343° LHA

**Latitude CONTRARY to Declination**

17° 343° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	71°39'	-25'	112°	71°16'	-27'	114°	70°50'	-30'	117°	70°21'	-32'	120°	69°50'	-34'	122°	69°18'	-36'	124°	68°43'	-38'	126°	0
1	71°15'	-27'	115°	70°49'	-30'	117°	70°20'	-32'	120°	69°49'	-34'	122°	69°16'	-36'	124°	68°41'	-38'	126°	68°05'	-40'	128°	1
2	70°48'	-29'	117°	70°19'	-32'	120°	69°48'	-34'	122°	69°15'	-36'	124°	68°40'	-38'	127°	68°04'	-39'	129°	67°25'	-41'	130°	2
3	70°18'	-32'	120°	69°47'	-34'	122°	69°14'	-36'	125°	68°39'	-38'	127°	68°03'	-39'	129°	67°24'	-41'	131°	66°45'	-42'	132°	3
4	69°47'	-34'	122°	69°14'	-36'	125°	68°38'	-37'	127°	68°02'	-39'	129°	67°23'	-41'	131°	66°44'	-42'	132°	66°02'	-43'	134°	4
5	69°13'	-35'	125°	68°38'	-37'	127°	68°01'	-39'	129°	67°23'	-40'	131°	66°43'	-42'	133°	66°02'	-43'	134°	65°19'	-44'	136°	5
6	68°38'	-37'	127°	68°01'	-39'	129°	67°22'	-40'	131°	66°42'	-42'	133°	66°01'	-43'	134°	65°18'	-44'	136°	64°35'	-45'	137°	6
7	68°01'	-39'	129°	67°22'	-40'	131°	66°42'	-42'	133°	66°00'	-43'	134°	65°18'	-44'	136°	64°34'	-45'	137°	63°49'	-46'	139°	7
8	67°22'	-40'	131°	66°42'	-42'	133°	66°00'	-43'	135°	65°17'	-44'	136°	64°34'	-45'	138°	63°49'	-46'	139°	63°03'	-47'	140°	8
9	66°42'	-41'	133°	66°00'	-43'	135°	65°17'	-44'	136°	64°33'	-45'	138°	63°49'	-46'	139°	63°03'	-47'	140°	62°16'	-48'	142°	9
10	66°00'	-43'	135°	65°17'	-44'	136°	64°33'	-45'	138°	63°48'	-46'	139°	63°03'	-47'	141°	62°16'	-48'	142°	61°28'	-48'	143°	10
11	65°18'	-44'	137°	64°34'	-45'	138°	63°49'	-46'	139°	63°03'	-47'	141°	62°16'	-48'	142°	61°28'	-48'	143°	60°40'	-49'	144°	11
12	64°34'	-45'	138°	63°49'	-46'	140°	63°03'	-47'	141°	62°16'	-48'	142°	61°28'	-48'	143°	60°40'	-49'	144°	59°51'	-50'	145°	12
13	63°49'	-46'	140°	63°03'	-47'	141°	62°16'	-47'	142°	61°28'	-48'	143°	60°40'	-49'	144°	59°51'	-50'	145°	59°01'	-50'	146°	13
14	63°04'	-46'	141°	62°17'	-47'	142°	61°29'	-48'	144°	60°40'	-49'	145°	59°51'	-50'	146°	59°01'	-50'	147°	58°11'	-51'	147°	14
15	62°17'	-47'	143°	61°29'	-48'	144°	60°41'	-49'	145°	59°51'	-49'	146°	59°01'	-50'	147°	58°11'	-51'	148°	57°20'	-51'	148°	15
16	61°30'	-48'	144°	60°41'	-49'	145°	59°52'	-49'	146°	59°02'	-50'	147°	58°11'	-51'	148°	57°20'	-51'	149°	56°29'	-52'	149°	16
17	60°42'	-49'	145°	59°52'	-49'	146°	59°02'	-50'	147°	58°12'	-50'	148°	57°21'	-51'	149°	56°29'	-52'	150°	55°37'	-52'	150°	17
18	59°53'	-49'	146°	59°03'	-50'	147°	58°12'	-50'	148°	57°21'	-51'	149°	56°30'	-51'	150°	55°38'	-52'	150°	54°45'	-52'	151°	18
19	59°04'	-50'	147°	58°13'	-50'	148°	57°22'	-51'	149°	56°30'	-51'	150°	55°38'	-52'	151°	54°46'	-52'	151°	53°53'	-53'	152°	19
20	58°14'	-50'	149°	57°23'	-51'	149°	56°31'	-51'	150°	55°39'	-52'	151°	54°46'	-52'	152°	53°53'	-53'	152°	53°00'	-53'	153°	20
21	57°24'	-51'	150°	56°32'	-51'	150°	55°40'	-52'	151°	54°47'	-52'	152°	53°54'	-53'	152°	53°01'	-53'	153°	52°07'	-53'	154°	21
22	56°33'	-51'	151°	55°41'	-52'	151°	54°48'	-52'	152°	53°55'	-53'	153°	53°02'	-53'	153°	52°08'	-53'	154°	51°14'	-54'	154°	22
23	55°42'	-52'	151°	54°49'	-52'	152°	53°56'	-52'	153°	53°02'	-53'	153°	52°09'	-53'	154°	51°15'	-54'	155°	50°20'	-54'	155°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

17° 343° LHA

**Latitude CONTRARY to 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

**16° 344° LHA**

**Latitude CONTRARY to Declination**

**16° 344° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	72°34'	-26'	113°	72°09'	-29'	116°	71°42'	-31'	119°	71°12'	-33'	121°	70°40'	-36'	124°	70°06'	-38'	126°	69°30'	-39'	128°	0
1	72°09'	-28'	116°	71°41'	-31'	119°	71°11'	-33'	121°	70°39'	-35'	124°	70°04'	-37'	126°	69°28'	-39'	128°	68°50'	-41'	130°	1
2	71°40'	-31'	119°	71°10'	-33'	121°	70°38'	-35'	124°	70°03'	-37'	126°	69°27'	-39'	128°	68°49'	-41'	130°	68°09'	-42'	132°	2
3	71°09'	-33'	122°	70°37'	-35'	124°	70°02'	-37'	126°	69°26'	-39'	128°	68°48'	-41'	130°	68°08'	-42'	132°	67°27'	-43'	134°	3
4	70°37'	-35'	124°	70°02'	-37'	126°	69°25'	-39'	129°	68°47'	-40'	131°	68°07'	-42'	132°	67°26'	-43'	134°	66°44'	-45'	136°	4
5	70°02'	-37'	127°	69°25'	-39'	129°	68°47'	-40'	131°	68°07'	-42'	133°	67°26'	-43'	134°	66°43'	-44'	136°	65°59'	-46'	138°	5
6	69°25'	-39'	129°	68°46'	-40'	131°	68°06'	-42'	133°	67°25'	-43'	134°	66°42'	-44'	136°	65°59'	-45'	138°	65°14'	-47'	139°	6
7	68°46'	-40'	131°	68°06'	-42'	133°	67°25'	-43'	135°	66°42'	-44'	136°	65°58'	-45'	138°	65°13'	-46'	139°	64°27'	-47'	141°	7
8	68°06'	-41'	133°	67°25'	-43'	135°	66°42'	-44'	136°	65°58'	-45'	138°	65°13'	-46'	139°	64°27'	-47'	141°	63°40'	-48'	142°	8
9	67°25'	-43'	135°	66°42'	-44'	137°	65°58'	-45'	138°	65°13'	-46'	140°	64°26'	-47'	141°	63°39'	-48'	142°	62°52'	-49'	143°	9
10	66°42'	-44'	137°	65°58'	-45'	138°	65°13'	-46'	140°	64°26'	-47'	141°	63°39'	-48'	142°	62°51'	-49'	143°	62°03'	-49'	145°	10
11	65°58'	-45'	138°	65°13'	-46'	140°	64°26'	-47'	141°	63°39'	-48'	142°	62°51'	-49'	144°	62°03'	-49'	145°	61°13'	-50'	146°	11
12	65°13'	-46'	140°	64°27'	-47'	141°	63°39'	-48'	143°	62°51'	-49'	144°	62°03'	-49'	145°	61°13'	-50'	146°	60°23'	-51'	147°	12
13	64°27'	-47'	141°	63°40'	-48'	143°	62°52'	-48'	144°	62°03'	-49'	145°	61°13'	-50'	146°	60°23'	-51'	147°	59°33'	-51'	148°	13
14	63°40'	-48'	143°	62°52'	-48'	144°	62°03'	-49'	145°	61°14'	-50'	146°	60°23'	-50'	147°	59°33'	-51'	148°	58°41'	-52'	149°	14
15	62°53'	-48'	144°	62°04'	-49'	145°	61°14'	-50'	146°	60°24'	-50'	147°	59°33'	-51'	148°	58°42'	-52'	149°	57°50'	-52'	150°	15
16	62°04'	-49'	146°	61°15'	-50'	147°	60°24'	-50'	148°	59°33'	-51'	148°	58°42'	-51'	149°	57°50'	-52'	150°	56°58'	-52'	151°	16
17	61°15'	-50'	147°	60°25'	-50'	148°	59°34'	-51'	149°	58°42'	-51'	150°	57°51'	-52'	150°	56°58'	-52'	151°	56°05'	-53'	152°	17
18	60°26'	-50'	148°	59°35'	-51'	149°	58°43'	-51'	150°	57°51'	-52'	150°	56°59'	-52'	151°	56°06'	-53'	152°	55°13'	-53'	153°	18
19	59°35'	-51'	149°	58°44'	-51'	150°	57°52'	-52'	151°	56°59'	-52'	151°	56°06'	-53'	152°	55°13'	-53'	153°	54°20'	-53'	153°	19
20	58°45'	-51'	150°	57°53'	-52'	151°	57°00'	-52'	152°	56°07'	-53'	152°	55°14'	-53'	153°	54°20'	-53'	154°	53°26'	-54'	154°	20
21	57°54'	-52'	151°	57°01'	-52'	152°	56°08'	-53'	153°	55°14'	-53'	153°	54°21'	-53'	154°	53°27'	-54'	154°	52°33'	-54'	155°	21
22	57°02'	-52'	152°	56°09'	-52'	153°	55°15'	-53'	153°	54°21'	-53'	154°	53°27'	-54'	155°	52°33'	-54'	155°	51°39'	-54'	156°	22
23	56°10'	-52'	153°	55°16'	-53'	154°	54°22'	-53'	154°	53°28'	-54'	155°	52°34'	-54'	155°	51°39'	-54'	156°	50°44'	-54'	156°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**16° 344° LHA**

**Latitude CONTRARY to 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

**15° 345° LHA**

**Latitude CONTRARY to Declination**

**15° 345° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	73°29'	-27'	114°	73°03'	-30'	117°	72°34'	-32'	120°	72°02'	-35'	123°	71°28'	-37'	125°	70°53'	-39'	128°	70°15'	-41'	130°	0
1	73°02'	-30'	118°	72°33'	-32'	120°	72°01'	-35'	123°	71°27'	-37'	126°	70°51'	-39'	128°	70°14'	-41'	130°	69°34'	-42'	132°	1
2	72°32'	-32'	120°	72°00'	-35'	123°	71°26'	-37'	126°	70°50'	-39'	128°	70°13'	-40'	130°	69°33'	-42'	132°	68°52'	-44'	134°	2
3	72°00'	-34'	123°	71°26'	-37'	126°	70°50'	-39'	128°	70°12'	-40'	130°	69°32'	-42'	132°	68°51'	-43'	134°	68°08'	-45'	136°	3
4	71°25'	-36'	126°	70°49'	-38'	128°	70°11'	-40'	130°	69°31'	-42'	132°	68°50'	-43'	134°	68°08'	-45'	136°	67°24'	-46'	138°	4
5	70°49'	-38'	128°	70°11'	-40'	131°	69°31'	-42'	133°	68°50'	-43'	134°	68°07'	-44'	136°	67°23'	-46'	138°	66°38'	-47'	139°	5
6	70°11'	-40'	131°	69°31'	-42'	133°	68°49'	-43'	135°	68°06'	-44'	136°	67°22'	-46'	138°	66°37'	-47'	140°	65°51'	-48'	141°	6
7	69°31'	-41'	133°	68°49'	-43'	135°	68°06'	-44'	136°	67°22'	-45'	138°	66°37'	-47'	140°	65°51'	-48'	141°	65°04'	-48'	142°	7
8	68°49'	-43'	135°	68°06'	-44'	137°	67°22'	-45'	138°	66°37'	-46'	140°	65°50'	-47'	141°	65°03'	-48'	143°	64°15'	-49'	144°	8
9	68°06'	-44'	137°	67°22'	-45'	138°	66°37'	-46'	140°	65°50'	-47'	141°	65°03'	-48'	143°	64°15'	-49'	144°	63°26'	-50'	145°	9
10	67°22'	-45'	139°	66°37'	-46'	140°	65°50'	-47'	141°	65°03'	-48'	143°	64°15'	-49'	144°	63°26'	-50'	145°	62°36'	-50'	146°	10
11	66°37'	-46'	140°	65°50'	-47'	142°	65°03'	-48'	143°	64°15'	-49'	144°	63°26'	-50'	145°	62°36'	-50'	146°	61°45'	-51'	148°	11
12	65°51'	-47'	142°	65°03'	-48'	143°	64°15'	-49'	144°	63°26'	-50'	146°	62°36'	-50'	147°	61°45'	-51'	148°	60°54'	-52'	149°	12
13	65°04'	-48'	143°	64°15'	-49'	145°	63°26'	-50'	146°	62°36'	-50'	147°	61°45'	-51'	148°	60°54'	-51'	149°	60°03'	-52'	150°	13
14	64°16'	-49'	145°	63°26'	-50'	146°	62°36'	-50'	147°	61°46'	-51'	148°	60°55'	-51'	149°	60°03'	-52'	150°	59°11'	-52'	151°	14
15	63°27'	-49'	146°	62°37'	-50'	147°	61°46'	-51'	148°	60°55'	-51'	149°	60°03'	-52'	150°	59°11'	-52'	151°	58°18'	-53'	152°	15
16	62°37'	-50'	147°	61°47'	-51'	148°	60°55'	-51'	149°	60°04'	-52'	150°	59°11'	-52'	151°	58°19'	-53'	152°	57°26'	-53'	152°	16
17	61°47'	-51'	148°	60°56'	-51'	149°	60°04'	-52'	150°	59°12'	-52'	151°	58°19'	-53'	152°	57°26'	-53'	153°	56°32'	-54'	153°	17
18	60°57'	-51'	150°	60°05'	-52'	150°	59°12'	-52'	151°	58°19'	-53'	152°	57°26'	-53'	153°	56°33'	-53'	153°	55°39'	-54'	154°	18
19	60°05'	-52'	151°	59°13'	-52'	151°	58°20'	-53'	152°	57°27'	-53'	153°	56°33'	-53'	154°	55°39'	-54'	154°	54°45'	-54'	155°	19
20	59°14'	-52'	152°	58°21'	-53'	152°	57°27'	-53'	153°	56°34'	-53'	154°	55°40'	-54'	154°	54°46'	-54'	155°	53°51'	-54'	156°	20
21	58°22'	-53'	153°	57°28'	-53'	153°	56°34'	-53'	154°	55°40'	-54'	155°	54°46'	-54'	155°	53°51'	-54'	156°	52°57'	-55'	156°	21
22	57°29'	-53'	153°	56°35'	-53'	154°	55°41'	-54'	155°	54°47'	-54'	155°	53°52'	-54'	156°	52°57'	-55'	157°	52°02'	-55'	157°	22
23	56°36'	-53'	154°	55°42'	-54'	155°	54°48'	-54'	156°	53°53'	-54'	156°	52°58'	-55'	157°	52°03'	-55'	157°	51°07'	-55'	158°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**15° 345° LHA**

**Latitude CONTRARY to 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

14° 346° LHA

**Latitude CONTRARY to Declination**

14° 346° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	74°23'	-29'	116°	73°55'	-31'	119°	73°24'	-34'	122°	72°51'	-36'	125°	72°16'	-39'	127°	71°38'	-40'	130°	70°59'	-42'	132°	0
1	73°54'	-31'	119°	73°23'	-34'	122°	72°50'	-36'	125°	72°15'	-38'	128°	71°37'	-40'	130°	70°58'	-42'	132°	70°17'	-44'	134°	1
2	73°23'	-34'	122°	72°50'	-36'	125°	72°14'	-38'	128°	71°36'	-40'	130°	70°57'	-42'	132°	70°16'	-43'	134°	69°33'	-45'	136°	2
3	72°49'	-36'	125°	72°13'	-38'	128°	71°36'	-40'	130°	70°56'	-42'	132°	70°15'	-43'	134°	69°32'	-45'	136°	68°48'	-46'	138°	3
4	72°13'	-38'	128°	71°35'	-40'	130°	70°56'	-42'	132°	70°14'	-43'	134°	69°32'	-45'	136°	68°48'	-46'	138°	68°02'	-47'	140°	4
5	71°35'	-40'	130°	70°55'	-42'	132°	70°14'	-43'	135°	69°31'	-45'	136°	68°47'	-46'	138°	68°02'	-47'	140°	67°15'	-48'	141°	5
6	70°55'	-42'	133°	70°14'	-43'	135°	69°31'	-44'	137°	68°47'	-46'	138°	68°01'	-47'	140°	67°15'	-48'	142°	66°27'	-49'	143°	6
7	70°14'	-43'	135°	69°31'	-44'	137°	68°46'	-46'	138°	68°01'	-47'	140°	67°14'	-48'	142°	66°27'	-49'	143°	65°38'	-50'	144°	7
8	69°31'	-44'	137°	68°46'	-46'	139°	68°01'	-47'	140°	67°14'	-48'	142°	66°26'	-49'	143°	65°38'	-49'	145°	64°49'	-50'	146°	8
9	68°46'	-45'	139°	68°01'	-47'	140°	67°14'	-48'	142°	66°26'	-49'	143°	65°38'	-49'	145°	64°48'	-50'	146°	63°58'	-51'	147°	9
10	68°01'	-47'	140°	67°14'	-48'	142°	66°26'	-49'	143°	65°38'	-49'	145°	64°48'	-50'	146°	63°58'	-51'	147°	63°08'	-51'	148°	10
11	67°14'	-48'	142°	66°26'	-48'	144°	65°38'	-49'	145°	64°48'	-50'	146°	63°58'	-51'	147°	63°07'	-51'	148°	62°16'	-52'	149°	11
12	66°27'	-48'	144°	65°38'	-49'	145°	64°48'	-50'	146°	63°58'	-51'	147°	63°07'	-51'	148°	62°16'	-52'	149°	61°24'	-52'	150°	12
13	65°38'	-49'	145°	64°49'	-50'	146°	63°58'	-51'	148°	63°08'	-51'	149°	62°16'	-52'	150°	61°24'	-52'	150°	60°32'	-53'	151°	13
14	64°49'	-50'	147°	63°59'	-51'	148°	63°08'	-51'	149°	62°16'	-52'	150°	61°24'	-52'	151°	60°32'	-53'	152°	59°39'	-53'	152°	14
15	63°59'	-51'	148°	63°08'	-51'	149°	62°17'	-52'	150°	61°24'	-52'	151°	60°32'	-53'	152°	59°39'	-53'	152°	58°46'	-54'	153°	15
16	63°09'	-51'	149°	62°17'	-52'	150°	61°25'	-52'	151°	60°32'	-53'	152°	59°39'	-53'	153°	58°46'	-54'	153°	57°52'	-54'	154°	16
17	62°18'	-52'	150°	61°25'	-52'	151°	60°33'	-53'	152°	59°40'	-53'	153°	58°46'	-54'	154°	57°52'	-54'	154°	56°58'	-54'	155°	17
18	61°26'	-52'	151°	60°33'	-53'	152°	59°40'	-53'	153°	58°46'	-53'	154°	57°52'	-54'	154°	56°58'	-54'	155°	56°04'	-55'	156°	18
19	60°34'	-53'	152°	59°41'	-53'	153°	58°47'	-53'	154°	57°53'	-54'	155°	56°59'	-54'	155°	56°04'	-54'	156°	55°09'	-55'	156°	19
20	59°41'	-53'	153°	58°48'	-53'	154°	57°54'	-54'	155°	56°59'	-54'	155°	56°04'	-54'	156°	55°10'	-55'	157°	54°14'	-55'	157°	20
21	58°48'	-53'	154°	57°54'	-54'	155°	57°00'	-54'	156°	56°05'	-54'	156°	55°10'	-55'	157°	54°15'	-55'	157°	53°19'	-55'	158°	21
22	57°55'	-54'	155°	57°01'	-54'	156°	56°06'	-54'	156°	55°11'	-55'	157°	54°15'	-55'	157°	53°20'	-55'	158°	52°24'	-55'	158°	22
23	57°01'	-54'	156°	56°06'	-54'	156°	55°11'	-55'	157°	54°16'	-55'	158°	53°20'	-55'	158°	52°25'	-55'	159°	51°29'	-56'	159°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

14° 346° LHA

**Latitude CONTRARY to 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

13° 347° LHA

**Latitude CONTRARY to Declination**

13° 347° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	75°16'	-30'	118°	74°46'	-33'	121°	74°14'	-36'	124°	73°39'	-38'	127°	73°02'	-40'	130°	72°23'	-42'	132°	71°42'	-44'	134°	0
1	74°46'	-33'	121°	74°13'	-36'	124°	73°38'	-38'	127°	73°01'	-40'	130°	72°22'	-42'	132°	71°41'	-44'	134°	70°58'	-45'	136°	1
2	74°13'	-35'	124°	73°38'	-38'	127°	73°00'	-40'	130°	72°21'	-42'	132°	71°40'	-43'	134°	70°57'	-45'	136°	70°13'	-46'	138°	2
3	73°37'	-38'	127°	73°00'	-40'	130°	72°20'	-42'	132°	71°39'	-43'	134°	70°56'	-45'	137°	70°12'	-46'	138°	69°27'	-47'	140°	3
4	72°59'	-40'	130°	72°20'	-42'	132°	71°39'	-43'	135°	70°56'	-45'	137°	70°11'	-46'	139°	69°26'	-47'	140°	68°39'	-48'	142°	4
5	72°20'	-42'	132°	71°38'	-43'	135°	70°55'	-45'	137°	70°11'	-46'	139°	69°25'	-47'	140°	68°39'	-48'	142°	67°51'	-49'	144°	5
6	71°38'	-43'	135°	70°55'	-45'	137°	70°11'	-46'	139°	69°25'	-47'	140°	68°38'	-48'	142°	67°50'	-49'	144°	67°02'	-50'	145°	6
7	70°55'	-45'	137°	70°11'	-46'	139°	69°25'	-47'	141°	68°38'	-48'	142°	67°50'	-49'	144°	67°01'	-50'	145°	66°12'	-51'	146°	7
8	70°11'	-46'	139°	69°25'	-47'	141°	68°38'	-48'	142°	67°50'	-49'	144°	67°01'	-50'	145°	66°11'	-51'	147°	65°21'	-51'	148°	8
9	69°25'	-47'	141°	68°38'	-48'	142°	67°50'	-49'	144°	67°01'	-50'	145°	66°11'	-51'	147°	65°21'	-51'	148°	64°29'	-52'	149°	9
10	68°38'	-48'	143°	67°50'	-49'	144°	67°01'	-50'	145°	66°11'	-51'	147°	65°20'	-51'	148°	64°29'	-52'	149°	63°38'	-52'	150°	10
11	67°50'	-49'	144°	67°01'	-50'	146°	66°11'	-50'	147°	65°20'	-51'	148°	64°29'	-52'	149°	63°37'	-52'	150°	62°45'	-53'	151°	11
12	67°01'	-50'	146°	66°11'	-50'	147°	65°21'	-51'	148°	64°29'	-52'	149°	63°37'	-52'	150°	62°45'	-53'	151°	61°52'	-53'	152°	12
13	66°12'	-50'	147°	65°21'	-51'	148°	64°29'	-52'	149°	63°38'	-52'	150°	62°45'	-53'	151°	61°52'	-53'	152°	60°59'	-54'	153°	13
14	65°21'	-51'	148°	64°30'	-52'	150°	63°38'	-52'	151°	62°45'	-53'	152°	61°52'	-53'	152°	60°59'	-54'	153°	60°05'	-54'	154°	14
15	64°30'	-52'	150°	63°38'	-52'	151°	62°46'	-53'	152°	61°53'	-53'	153°	60°59'	-54'	153°	60°05'	-54'	154°	59°11'	-54'	155°	15
16	63°39'	-52'	151°	62°46'	-53'	152°	61°53'	-53'	153°	60°59'	-54'	154°	60°05'	-54'	154°	59°11'	-54'	155°	58°17'	-55'	156°	16
17	62°47'	-53'	152°	61°53'	-53'	153°	61°00'	-54'	154°	60°06'	-54'	154°	59°12'	-54'	155°	58°17'	-55'	156°	57°22'	-55'	156°	17
18	61°54'	-53'	153°	61°00'	-53'	154°	60°06'	-54'	155°	59°12'	-54'	155°	58°17'	-55'	156°	57°22'	-55'	157°	56°27'	-55'	157°	18
19	61°01'	-53'	154°	60°07'	-54'	155°	59°12'	-54'	155°	58°18'	-55'	156°	57°23'	-55'	157°	56°27'	-55'	157°	55°32'	-55'	158°	19
20	60°07'	-54'	155°	59°13'	-54'	156°	58°18'	-55'	156°	57°23'	-55'	157°	56°28'	-55'	158°	55°32'	-55'	158°	54°36'	-56'	159°	20
21	59°14'	-54'	156°	58°19'	-54'	156°	57°24'	-55'	157°	56°28'	-55'	158°	55°33'	-55'	158°	54°37'	-56'	159°	53°41'	-56'	159°	21
22	58°19'	-54'	157°	57°24'	-55'	157°	56°29'	-55'	158°	55°33'	-55'	158°	54°37'	-56'	159°	53°41'	-56'	159°	52°45'	-56'	160°	22
23	57°25'	-55'	157°	56°29'	-55'	158°	55°34'	-55'	159°	54°38'	-56'	159°	53°42'	-56'	160°	52°45'	-56'	160°	51°49'	-56'	160°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

13° 347° LHA

**Latitude CONTRARY to 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

12° 348° LHA

**Latitude CONTRARY to Declination**

12° 348° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	76°08'	-32'	120°	75°37'	-35'	123°	75°02'	-38'	126°	74°26'	-40'	129°	73°47'	-42'	132°	73°06'	-44'	134°	72°23'	-45'	137°	0
1	75°36'	-35'	123°	75°02'	-37'	126°	74°25'	-40'	129°	73°46'	-42'	132°	73°05'	-44'	134°	72°22'	-45'	137°	71°37'	-47'	139°	1
2	75°01'	-37'	127°	74°24'	-40'	129°	73°45'	-42'	132°	73°04'	-43'	134°	72°21'	-45'	137°	71°37'	-46'	139°	70°51'	-48'	141°	2
3	74°24'	-40'	129°	73°45'	-42'	132°	73°03'	-43'	135°	72°20'	-45'	137°	71°36'	-46'	139°	70°50'	-48'	141°	70°03'	-49'	143°	3
4	73°44'	-41'	132°	73°03'	-43'	135°	72°20'	-45'	137°	71°35'	-46'	139°	70°50'	-48'	141°	70°02'	-49'	143°	69°14'	-50'	144°	4
5	73°03'	-43'	135°	72°20'	-45'	137°	71°35'	-46'	139°	70°49'	-47'	141°	70°02'	-49'	143°	69°14'	-50'	144°	68°25'	-50'	146°	5
6	72°20'	-45'	137°	71°35'	-46'	139°	70°49'	-47'	141°	70°02'	-49'	143°	69°13'	-50'	144°	68°24'	-50'	146°	67°34'	-51'	147°	6
7	71°35'	-46'	139°	70°49'	-47'	141°	70°01'	-48'	143°	69°13'	-49'	144°	68°24'	-50'	146°	67°34'	-51'	147°	66°43'	-52'	149°	7
8	70°49'	-47'	141°	70°01'	-48'	143°	69°13'	-49'	145°	68°24'	-50'	146°	67°34'	-51'	147°	66°43'	-52'	149°	65°51'	-52'	150°	8
9	70°01'	-48'	143°	69°13'	-49'	145°	68°24'	-50'	146°	67°33'	-51'	147°	66°43'	-52'	149°	65°51'	-52'	150°	64°59'	-53'	151°	9
10	69°13'	-49'	145°	68°24'	-50'	146°	67°33'	-51'	148°	66°42'	-52'	149°	65°51'	-52'	150°	64°59'	-53'	151°	64°06'	-53'	152°	10
11	68°24'	-50'	146°	67°34'	-51'	148°	66°43'	-52'	149°	65°51'	-52'	150°	64°59'	-53'	151°	64°06'	-53'	152°	63°12'	-54'	153°	11
12	67°34'	-51'	148°	66°43'	-52'	149°	65°51'	-52'	150°	64°59'	-53'	151°	64°06'	-53'	152°	63°12'	-54'	153°	62°19'	-54'	154°	12
13	66°43'	-51'	149°	65°51'	-52'	150°	64°59'	-53'	151°	64°06'	-53'	152°	63°12'	-54'	153°	62°19'	-54'	154°	61°24'	-55'	155°	13
14	65°51'	-52'	150°	64°59'	-53'	152°	64°06'	-53'	152°	63°13'	-54'	153°	62°19'	-54'	154°	61°25'	-54'	155°	60°30'	-55'	156°	14
15	64°59'	-53'	152°	64°06'	-53'	153°	63°13'	-54'	154°	62°19'	-54'	154°	61°25'	-54'	155°	60°30'	-55'	156°	59°35'	-55'	157°	15
16	64°07'	-53'	153°	63°13'	-54'	154°	62°19'	-54'	155°	61°25'	-54'	155°	60°30'	-55'	156°	59°35'	-55'	157°	58°40'	-55'	157°	16
17	63°14'	-54'	154°	62°20'	-54'	155°	61°25'	-54'	155°	60°30'	-55'	156°	59°35'	-55'	157°	58°40'	-55'	158°	57°45'	-56'	158°	17
18	62°20'	-54'	155°	61°26'	-54'	156°	60°31'	-55'	156°	59°36'	-55'	157°	58°40'	-55'	158°	57°45'	-56'	158°	56°49'	-56'	159°	18
19	61°26'	-54'	156°	60°31'	-55'	156°	59°36'	-55'	157°	58°41'	-55'	158°	57°45'	-56'	158°	56°49'	-56'	159°	55°53'	-56'	159°	19
20	60°32'	-55'	157°	59°37'	-55'	157°	58°41'	-55'	158°	57°45'	-56'	159°	56°50'	-56'	159°	55°53'	-56'	160°	54°57'	-56'	160°	20
21	59°37'	-55'	157°	58°42'	-55'	158°	57°46'	-55'	159°	56°50'	-56'	159°	55°54'	-56'	160°	54°57'	-56'	160°	54°01'	-56'	161°	21
22	58°42'	-55'	158°	57°47'	-55'	159°	56°50'	-56'	159°	55°54'	-56'	160°	54°58'	-56'	160°	54°01'	-56'	161°	53°04'	-57'	161°	22
23	57°47'	-55'	159°	56°51'	-56'	160°	55°55'	-56'	160°	54°58'	-56'	161°	54°02'	-56'	161°	53°05'	-57'	161°	52°08'	-57'	162°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

12° 348° LHA

**Latitude CONTRARY to 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

11° 349° LHA

**Latitude CONTRARY to Declination**

11° 349° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	76°59'	-34'	122°	76°26'	-37'	126°	75°49'	-39'	129°	75°11'	-42'	132°	74°30'	-44'	134°	73°47'	-45'	137°	73°02'	-47'	139°	0
1	76°25'	-37'	126°	75°49'	-39'	129°	75°10'	-42'	132°	74°29'	-44'	135°	73°46'	-45'	137°	73°01'	-47'	139°	72°15'	-48'	141°	1
2	75°48'	-39'	129°	75°09'	-42'	132°	74°28'	-44'	135°	73°45'	-45'	137°	73°00'	-47'	139°	72°14'	-48'	141°	71°27'	-49'	143°	2
3	75°09'	-41'	132°	74°28'	-43'	135°	73°45'	-45'	137°	73°00'	-47'	139°	72°14'	-48'	141°	71°26'	-49'	143°	70°38'	-50'	145°	3
4	74°27'	-43'	135°	73°44'	-45'	137°	73°00'	-47'	139°	72°13'	-48'	141°	71°26'	-49'	143°	70°37'	-50'	145°	69°48'	-51'	147°	4
5	73°44'	-45'	137°	72°59'	-46'	139°	72°13'	-48'	142°	71°25'	-49'	143°	70°37'	-50'	145°	69°47'	-51'	147°	68°57'	-52'	148°	5
6	72°59'	-46'	140°	72°13'	-48'	142°	71°25'	-49'	143°	70°36'	-50'	145°	69°47'	-51'	147°	68°56'	-52'	148°	68°05'	-52'	149°	6
7	72°13'	-48'	142°	71°25'	-49'	144°	70°36'	-50'	145°	69°47'	-51'	147°	68°56'	-52'	148°	68°05'	-52'	150°	67°13'	-53'	151°	7
8	71°25'	-49'	144°	70°36'	-50'	145°	69°46'	-51'	147°	68°56'	-52'	148°	68°04'	-52'	150°	67°12'	-53'	151°	66°20'	-53'	152°	8
9	70°36'	-50'	145°	69°46'	-51'	147°	68°56'	-51'	148°	68°04'	-52'	150°	67°12'	-53'	151°	66°19'	-53'	152°	65°26'	-54'	153°	9
10	69°47'	-51'	147°	68°56'	-51'	148°	68°04'	-52'	150°	67°12'	-53'	151°	66°19'	-53'	152°	65°26'	-54'	153°	64°32'	-54'	154°	10
11	68°56'	-51'	149°	68°04'	-52'	150°	67°12'	-53'	151°	66°19'	-53'	152°	65°26'	-54'	153°	64°32'	-54'	154°	63°38'	-55'	155°	11
12	68°05'	-52'	150°	67°12'	-53'	151°	66°19'	-53'	152°	65°26'	-54'	153°	64°32'	-54'	154°	63°38'	-55'	155°	62°43'	-55'	156°	12
13	67°13'	-53'	151°	66°20'	-53'	152°	65°26'	-54'	153°	64°32'	-54'	154°	63°38'	-55'	155°	62°43'	-55'	156°	61°48'	-55'	157°	13
14	66°20'	-53'	153°	65°26'	-54'	154°	64°32'	-54'	154°	63°38'	-55'	155°	62°43'	-55'	156°	61°48'	-55'	157°	60°53'	-56'	158°	14
15	65°27'	-54'	154°	64°33'	-54'	155°	63°38'	-55'	155°	62°44'	-55'	156°	61°49'	-55'	157°	60°53'	-56'	158°	59°57'	-56'	158°	15
16	64°33'	-54'	155°	63°39'	-54'	156°	62°44'	-55'	156°	61°49'	-55'	157°	60°53'	-56'	158°	59°58'	-56'	159°	59°02'	-56'	159°	16
17	63°39'	-54'	156°	62°44'	-55'	157°	61°49'	-55'	157°	60°54'	-55'	158°	59°58'	-56'	159°	59°02'	-56'	159°	58°06'	-56'	160°	17
18	62°45'	-55'	157°	61°49'	-55'	157°	60°54'	-55'	158°	59°58'	-56'	159°	59°02'	-56'	159°	58°06'	-56'	160°	57°09'	-56'	160°	18
19	61°50'	-55'	158°	60°54'	-55'	158°	59°58'	-56'	159°	59°02'	-56'	159°	58°06'	-56'	160°	57°10'	-56'	161°	56°13'	-57'	161°	19
20	60°55'	-55'	158°	59°59'	-56'	159°	59°03'	-56'	160°	58°06'	-56'	160°	57°10'	-56'	161°	56°13'	-57'	161°	55°16'	-57'	162°	20
21	59°59'	-56'	159°	59°03'	-56'	160°	58°07'	-56'	160°	57°10'	-56'	161°	56°13'	-57'	161°	55°16'	-57'	162°	54°19'	-57'	162°	21
22	59°04'	-56'	160°	58°07'	-56'	160°	57°11'	-56'	161°	56°14'	-57'	161°	55°17'	-57'	162°	54°20'	-57'	162°	53°22'	-57'	163°	22
23	58°08'	-56'	161°	57°11'	-56'	161°	56°14'	-57'	162°	55°17'	-57'	162°	54°20'	-57'	162°	53°23'	-57'	163°	52°25'	-57'	163°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

11° 349° LHA

**Latitude CONTRARY to 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

10° 350° LHA

Latitude CONTRARY to Declination

10° 350° LHA

Table with 13 columns (Dec, 7, 8, 9, 10, 11, 12, 13, Dec) and 24 rows (0-23). Each cell contains three values (Hc, d, Z) for a given declination and LHA.

10° 350° LHA

Latitude CONTRARY to 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

9° 351° LHA

Latitude CONTRARY to Declination

9° 351° LHA

Table with 13 columns (Dec, 7, 8, 9, 10, 11, 12, 13, Dec) and 24 rows (0-23). Each cell contains three values (Hc, d, Z) for a given declination and LHA.

9° 351° LHA

Latitude CONTRARY to 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

**8° 352° LHA**

**Latitude CONTRARY to Declination**

**8° 352° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	79°23'	-41'	131°	78°42'	-44'	135°	77°59'	-46'	138°	77°13'	-48'	141°	76°26'	-49'	144°	75°37'	-51'	146°	74°46'	-52'	148°	0
1	78°42'	-44'	135°	77°58'	-46'	138°	77°13'	-48'	141°	76°25'	-49'	144°	75°36'	-51'	146°	74°46'	-52'	148°	73°54'	-53'	150°	1
2	77°58'	-46'	138°	77°12'	-48'	141°	76°25'	-49'	144°	75°36'	-51'	146°	74°45'	-52'	148°	73°54'	-53'	150°	73°02'	-53'	152°	2
3	77°12'	-48'	141°	76°25'	-49'	144°	75°36'	-51'	146°	74°45'	-52'	148°	73°54'	-53'	150°	73°01'	-53'	152°	72°08'	-54'	153°	3
4	76°24'	-49'	144°	75°35'	-51'	146°	74°45'	-52'	148°	73°53'	-53'	150°	73°01'	-53'	152°	72°08'	-54'	153°	71°14'	-55'	154°	4
5	75°35'	-51'	146°	74°45'	-52'	148°	73°53'	-53'	150°	73°01'	-53'	152°	72°08'	-54'	153°	71°14'	-55'	154°	70°19'	-55'	156°	5
6	74°45'	-52'	148°	73°53'	-53'	150°	73°01'	-53'	152°	72°08'	-54'	153°	71°14'	-55'	155°	70°19'	-55'	156°	69°24'	-56'	157°	6
7	73°53'	-52'	150°	73°01'	-53'	152°	72°07'	-54'	153°	71°14'	-55'	155°	70°19'	-55'	156°	69°24'	-56'	157°	68°29'	-56'	158°	7
8	73°01'	-53'	152°	72°07'	-54'	153°	71°13'	-55'	155°	70°19'	-55'	156°	69°24'	-55'	157°	68°28'	-56'	158°	67°33'	-56'	159°	8
9	72°07'	-54'	153°	71°13'	-54'	155°	70°19'	-55'	156°	69°24'	-55'	157°	68°28'	-56'	158°	67°33'	-56'	159°	66°37'	-57'	160°	9
10	71°14'	-54'	155°	70°19'	-55'	156°	69°24'	-55'	157°	68°28'	-56'	158°	67°33'	-56'	159°	66°36'	-56'	160°	65°40'	-57'	161°	10
11	70°19'	-55'	156°	69°24'	-55'	157°	68°28'	-56'	158°	67°33'	-56'	159°	66°36'	-56'	160°	65°40'	-57'	161°	64°43'	-57'	161°	11
12	69°24'	-55'	157°	68°29'	-56'	158°	67°33'	-56'	159°	66°36'	-56'	160°	65°40'	-57'	161°	64°43'	-57'	161°	63°46'	-57'	162°	12
13	68°29'	-56'	158°	67°33'	-56'	159°	66°37'	-56'	160°	65°40'	-57'	161°	64°43'	-57'	161°	63°46'	-57'	162°	62°49'	-57'	163°	13
14	67°33'	-56'	159°	66°37'	-56'	160°	65°40'	-57'	161°	64°43'	-57'	162°	63°46'	-57'	162°	62°49'	-57'	163°	61°52'	-58'	163°	14
15	66°37'	-56'	160°	65°40'	-57'	161°	64°43'	-57'	162°	63°46'	-57'	162°	62°49'	-57'	163°	61°52'	-58'	163°	60°54'	-58'	164°	15
16	65°40'	-57'	161°	64°44'	-57'	162°	63°47'	-57'	162°	62°49'	-57'	163°	61°52'	-58'	164°	60°54'	-58'	164°	59°56'	-58'	165°	16
17	64°44'	-57'	162°	63°47'	-57'	162°	62°49'	-57'	163°	61°52'	-57'	164°	60°54'	-58'	164°	59°57'	-58'	165°	58°59'	-58'	165°	17
18	63°47'	-57'	163°	62°50'	-57'	163°	61°52'	-57'	164°	60°54'	-58'	164°	59°57'	-58'	165°	58°59'	-58'	165°	58°01'	-58'	166°	18
19	62°50'	-57'	163°	61°52'	-57'	164°	60°55'	-58'	164°	59°57'	-58'	165°	58°59'	-58'	165°	58°01'	-58'	166°	57°03'	-58'	166°	19
20	61°53'	-57'	164°	60°55'	-58'	164°	59°57'	-58'	165°	58°59'	-58'	165°	58°01'	-58'	166°	57°03'	-58'	166°	56°04'	-58'	166°	20
21	60°55'	-58'	164°	59°57'	-58'	165°	58°59'	-58'	165°	58°01'	-58'	166°	57°03'	-58'	166°	56°05'	-58'	167°	55°06'	-58'	167°	21
22	59°58'	-58'	165°	58°59'	-58'	165°	58°01'	-58'	166°	57°03'	-58'	166°	56°05'	-58'	167°	55°06'	-58'	167°	54°08'	-58'	167°	22
23	59°00'	-58'	166°	58°02'	-58'	166°	57°03'	-58'	166°	56°05'	-58'	167°	55°07'	-58'	167°	54°08'	-58'	167°	53°09'	-58'	168°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**8° 352° LHA**

**Latitude CONTRARY to 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

**7° 353° LHA**

**Latitude CONTRARY to Declination**

**7° 353° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	80°07'	-44'	135°	79°23'	-46'	139°	78°37'	-48'	142°	77°49'	-50'	145°	76°59'	-51'	147°	76°08'	-53'	149°	75°16'	-53'	151°	0
1	79°23'	-46'	139°	78°37'	-48'	142°	77°49'	-50'	145°	76°59'	-51'	147°	76°08'	-52'	149°	75°15'	-53'	151°	74°22'	-54'	153°	1
2	78°36'	-48'	142°	77°48'	-50'	145°	76°58'	-51'	147°	76°07'	-52'	149°	75°15'	-53'	151°	74°22'	-54'	153°	73°28'	-55'	155°	2
3	77°48'	-50'	145°	76°58'	-51'	147°	76°07'	-52'	150°	75°15'	-53'	151°	74°22'	-54'	153°	73°28'	-55'	155°	72°33'	-55'	156°	3
4	76°58'	-51'	147°	76°07'	-52'	150°	75°15'	-53'	151°	74°22'	-54'	153°	73°28'	-55'	155°	72°33'	-55'	156°	71°38'	-56'	157°	4
5	76°07'	-52'	150°	75°15'	-53'	152°	74°21'	-54'	153°	73°28'	-55'	155°	72°33'	-55'	156°	71°38'	-56'	157°	70°42'	-56'	158°	5
6	75°15'	-53'	152°	74°21'	-54'	153°	73°27'	-55'	155°	72°33'	-55'	156°	71°38'	-56'	157°	70°42'	-56'	158°	69°46'	-57'	159°	6
7	74°21'	-54'	153°	73°27'	-55'	155°	72°33'	-55'	156°	71°38'	-56'	157°	70°42'	-56'	159°	69°46'	-56'	160°	68°50'	-57'	160°	7
8	73°27'	-55'	155°	72°33'	-55'	156°	71°38'	-56'	157°	70°42'	-56'	159°	69°46'	-56'	160°	68°49'	-57'	160°	67°53'	-57'	161°	8
9	72°33'	-55'	156°	71°38'	-56'	158°	70°42'	-56'	159°	69°46'	-56'	160°	68°49'	-57'	161°	67°53'	-57'	161°	66°56'	-57'	162°	9
10	71°38'	-56'	158°	70°42'	-56'	159°	69°46'	-56'	160°	68°49'	-57'	161°	67°53'	-57'	161°	66°56'	-57'	162°	65°58'	-57'	163°	10
11	70°42'	-56'	159°	69°46'	-56'	160°	68°49'	-57'	161°	67°53'	-57'	161°	66°56'	-57'	162°	65°58'	-57'	163°	65°01'	-58'	164°	11
12	69°46'	-56'	160°	68°49'	-57'	161°	67°53'	-57'	162°	66°56'	-57'	162°	65°58'	-57'	163°	65°01'	-58'	164°	64°03'	-58'	164°	12
13	68°50'	-57'	161°	67°53'	-57'	162°	66°56'	-57'	162°	65°58'	-57'	163°	65°01'	-58'	164°	64°03'	-58'	164°	63°05'	-58'	165°	13
14	67°53'	-57'	162°	66°56'	-57'	162°	65°58'	-57'	163°	65°01'	-58'	164°	64°03'	-58'	164°	63°05'	-58'	165°	62°07'	-58'	165°	14
15	66°56'	-57'	163°	65°59'	-57'	163°	65°01'	-58'	164°	64°03'	-58'	164°	63°05'	-58'	165°	62°07'	-58'	165°	61°09'	-58'	166°	15
16	65°59'	-57'	163°	65°01'	-58'	164°	64°03'	-58'	164°	63°06'	-58'	165°	62°08'	-58'	165°	61°09'	-58'	166°	60°11'	-58'	166°	16
17	65°01'	-58'	164°	64°04'	-58'	165°	63°06'	-58'	165°	62°08'	-58'	166°	61°09'	-58'	166°	60°11'	-58'	166°	59°13'	-58'	167°	17
18	64°04'	-58'	165°	63°06'	-58'	165°	62°08'	-58'	166°	61°10'	-58'	166°	60°11'	-58'	167°	59°13'	-58'	167°	58°14'	-58'	167°	18
19	63°06'	-58'	165°	62°08'	-58'	166°	61°10'	-58'	166°	60°11'	-58'	167°	59°13'	-58'	167°	58°14'	-58'	167°	57°16'	-59'	168°	19
20	62°08'	-58'	166°	61°10'	-58'	166°	60°12'	-58'	167°	59°13'	-58'	167°	58°15'	-58'	168°	57°16'	-59'	168°	56°17'	-59'	168°	20
21	61°10'	-58'	166°	60°12'	-58'	167°	59°13'	-58'	167°	58°15'	-58'	168°	57°16'	-59'	168°	56°17'	-59'	168°	55°19'	-59'	168°	21
22	60°12'	-58'	167°	59°13'	-58'	167°	58°15'	-58'	168°	57°16'	-59'	168°	56°18'	-59'	168°	55°19'	-59'	169°	54°20'	-59'	169°	22
23	59°14'	-58'	167°	58°15'	-58'	168°	57°16'	-59'	168°	56°18'	-59'	168°	55°19'	-59'	169°	54°20'	-59'	169°	53°21'	-59'	169°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**7° 353° LHA**

**Latitude CONTRARY to 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

**6° 354° LHA**

**Latitude CONTRARY to Declination**

**6° 354° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	80°47'	-47'	139°	80°01'	-49'	143°	79°12'	-51'	146°	78°21'	-52'	149°	77°29'	-53'	151°	76°36'	-54'	153°	75°42'	-55'	155°	0
1	80°00'	-49'	143°	79°12'	-51'	146°	78°21'	-52'	149°	77°29'	-53'	151°	76°36'	-54'	153°	75°42'	-55'	155°	74°47'	-56'	157°	1
2	79°11'	-51'	146°	78°21'	-52'	149°	77°29'	-53'	151°	76°36'	-54'	153°	75°42'	-55'	155°	74°47'	-56'	157°	73°52'	-56'	158°	2
3	78°21'	-52'	149°	77°29'	-53'	151°	76°36'	-54'	153°	75°42'	-55'	155°	74°47'	-56'	157°	73°51'	-56'	158°	72°56'	-56'	159°	3
4	77°29'	-53'	151°	76°35'	-54'	153°	75°41'	-55'	155°	74°47'	-55'	157°	73°51'	-56'	158°	72°55'	-56'	159°	71°59'	-57'	160°	4
5	76°35'	-54'	153°	75°41'	-55'	155°	74°47'	-55'	157°	73°51'	-56'	158°	72°55'	-56'	159°	71°59'	-57'	160°	71°02'	-57'	161°	5
6	75°41'	-55'	155°	74°46'	-55'	157°	73°51'	-56'	158°	72°55'	-56'	159°	71°59'	-57'	160°	71°02'	-57'	161°	70°05'	-57'	162°	6
7	74°46'	-55'	157°	73°51'	-56'	158°	72°55'	-56'	159°	71°59'	-57'	160°	71°02'	-57'	161°	70°05'	-57'	162°	69°08'	-58'	163°	7
8	73°51'	-56'	158°	72°55'	-56'	159°	71°59'	-57'	160°	71°02'	-57'	161°	70°05'	-57'	162°	69°08'	-58'	163°	68°10'	-58'	164°	8
9	72°55'	-56'	159°	71°59'	-57'	161°	71°02'	-57'	161°	70°05'	-57'	162°	69°08'	-58'	163°	68°10'	-58'	164°	67°12'	-58'	165°	9
10	71°59'	-57'	161°	71°02'	-57'	162°	70°05'	-57'	162°	69°08'	-58'	163°	68°10'	-58'	164°	67°12'	-58'	165°	66°14'	-58'	165°	10
11	71°02'	-57'	162°	70°05'	-57'	162°	69°08'	-58'	163°	68°10'	-58'	164°	67°12'	-58'	165°	66°14'	-58'	165°	65°16'	-58'	166°	11
12	70°05'	-57'	163°	69°08'	-58'	163°	68°10'	-58'	164°	67°12'	-58'	165°	66°14'	-58'	165°	65°16'	-58'	166°	64°18'	-58'	166°	12
13	69°08'	-58'	163°	68°10'	-58'	164°	67°12'	-58'	165°	66°14'	-58'	165°	65°16'	-58'	166°	64°18'	-58'	166°	63°20'	-58'	167°	13
14	68°10'	-58'	164°	67°13'	-58'	165°	66°15'	-58'	165°	65°16'	-58'	166°	64°18'	-58'	166°	63°20'	-58'	167°	62°21'	-59'	167°	14
15	67°13'	-58'	165°	66°15'	-58'	165°	65°16'	-58'	166°	64°18'	-58'	167°	63°20'	-58'	167°	62°21'	-59'	167°	61°23'	-59'	168°	15
16	66°15'	-58'	166°	65°17'	-58'	166°	64°18'	-58'	167°	63°20'	-58'	167°	62°21'	-59'	168°	61°23'	-59'	168°	60°24'	-59'	168°	16
17	65°17'	-58'	166°	64°18'	-58'	167°	63°20'	-58'	167°	62°21'	-59'	168°	61°23'	-59'	168°	60°24'	-59'	168°	59°25'	-59'	169°	17
18	64°18'	-58'	167°	63°20'	-58'	167°	62°21'	-59'	168°	61°23'	-59'	168°	60°24'	-59'	168°	59°25'	-59'	169°	58°26'	-59'	169°	18
19	63°20'	-58'	167°	62°22'	-59'	168°	61°23'	-59'	168°	60°24'	-59'	168°	59°25'	-59'	169°	58°26'	-59'	169°	57°28'	-59'	169°	19
20	62°22'	-59'	168°	61°23'	-59'	168°	60°24'	-59'	169°	59°25'	-59'	169°	58°27'	-59'	169°	57°28'	-59'	170°	56°29'	-59'	170°	20
21	61°23'	-59'	168°	60°24'	-59'	169°	59°26'	-59'	169°	58°27'	-59'	169°	57°28'	-59'	170°	56°29'	-59'	170°	55°30'	-59'	170°	21
22	60°25'	-59'	169°	59°26'	-59'	169°	58°27'	-59'	169°	57°28'	-59'	170°	56°29'	-59'	170°	55°30'	-59'	170°	54°31'	-59'	170°	22
23	59°26'	-59'	169°	58°27'	-59'	169°	57°28'	-59'	170°	56°29'	-59'	170°	55°30'	-59'	170°	54°31'	-59'	170°	53°31'	-59'	171°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**6° 354° LHA**

**Latitude CONTRARY to 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

**5° 355° LHA**

**Latitude CONTRARY to Declination**

**5° 355° LHA**

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	81°24'	-50'	144°	80°34'	-52'	148°	79°43'	-53'	151°	78°50'	-54'	153°	77°56'	-55'	155°	77°01'	-56'	157°	76°05'	-56'	159°	0
1	80°34'	-52'	148°	79°43'	-53'	151°	78°50'	-54'	153°	77°56'	-55'	155°	77°01'	-56'	157°	76°05'	-56'	159°	75°09'	-57'	160°	1
2	79°43'	-53'	151°	78°50'	-54'	153°	77°55'	-55'	155°	77°00'	-56'	157°	76°05'	-56'	159°	75°09'	-57'	160°	74°12'	-57'	161°	2
3	78°49'	-54'	153°	77°55'	-55'	155°	77°00'	-56'	157°	76°05'	-56'	159°	75°09'	-57'	160°	74°12'	-57'	161°	73°15'	-57'	162°	3
4	77°55'	-55'	155°	77°00'	-56'	157°	76°05'	-56'	159°	75°08'	-57'	160°	74°12'	-57'	161°	73°15'	-57'	162°	72°17'	-58'	163°	4
5	77°00'	-56'	157°	76°05'	-56'	159°	75°08'	-57'	160°	74°12'	-57'	161°	73°15'	-57'	162°	72°17'	-58'	163°	71°20'	-58'	164°	5
6	76°05'	-56'	159°	75°08'	-57'	160°	74°12'	-57'	161°	73°15'	-57'	163°	72°17'	-58'	163°	71°20'	-58'	164°	70°22'	-58'	165°	6
7	75°08'	-57'	160°	74°12'	-57'	161°	73°15'	-57'	163°	72°17'	-58'	163°	71°19'	-58'	164°	70°22'	-58'	165°	69°24'	-58'	166°	7
8	74°12'	-57'	162°	73°15'	-57'	163°	72°17'	-58'	164°	71°19'	-58'	164°	70°22'	-58'	165°	69°23'	-58'	166°	68°25'	-58'	166°	8
9	73°15'	-57'	163°	72°17'	-58'	164°	71°19'	-58'	164°	70°22'	-58'	165°	69°23'	-58'	166°	68°25'	-58'	166°	67°27'	-59'	167°	9
10	72°17'	-58'	164°	71°19'	-58'	164°	70°22'	-58'	165°	69°23'	-58'	166°	68°25'	-58'	167°	67°27'	-59'	167°	66°28'	-59'	168°	10
11	71°19'	-58'	165°	70°22'	-58'	165°	69°23'	-58'	166°	68°25'	-58'	167°	67°27'	-59'	167°	66°28'	-59'	168°	65°30'	-59'	168°	11
12	70°22'	-58'	165°	69°23'	-58'	166°	68°25'	-58'	167°	67°27'	-59'	167°	66°28'	-59'	168°	65°30'	-59'	168°	64°31'	-59'	169°	12
13	69°24'	-58'	166°	68°25'	-58'	167°	67°27'	-59'	167°	66°28'	-59'	168°	65°30'	-59'	168°	64°31'	-59'	169°	63°32'	-59'	169°	13
14	68°25'	-58'	167°	67°27'	-59'	167°	66°28'	-59'	168°	65°30'	-59'	168°	64°31'	-59'	169°	63°32'	-59'	169°	62°33'	-59'	169°	14
15	67°27'	-59'	167°	66°28'	-59'	168°	65°30'	-59'	168°	64°31'	-59'	169°	63°32'	-59'	169°	62°33'	-59'	169°	61°34'	-59'	170°	15
16	66°28'	-59'	168°	65°30'	-59'	168°	64°31'	-59'	169°	63°32'	-59'	169°	62°33'	-59'	170°	61°34'	-59'	170°	60°35'	-59'	170°	16
17	65°30'	-59'	168°	64°31'	-59'	169°	63°32'	-59'	169°	62°33'	-59'	170°	61°34'	-59'	170°	60°35'	-59'	170°	59°36'	-59'	171°	17
18	64°31'	-59'	169°	63°32'	-59'	169°	62°33'	-59'	170°	61°34'	-59'	170°	60°35'	-59'	170°	59°36'	-59'	171°	58°37'	-59'	171°	18
19	63°32'	-59'	169°	62°33'	-59'	170°	61°34'	-59'	170°	60°35'	-59'	170°	59°36'	-59'	171°	58°37'	-59'	171°	57°37'	-59'	171°	19
20	62°33'	-59'	170°	61°34'	-59'	170°	60°35'	-59'	170°	59°36'	-59'	171°	58°37'	-59'	171°	57°37'	-59'	171°	56°38'	-59'	171°	20
21	61°34'	-59'	170°	60°35'	-59'	170°	59°36'	-59'	171°	58°37'	-59'	171°	57°37'	-59'	171°	56°38'	-59'	171°	55°39'	-59'	172°	21
22	60°35'	-59'	171°	59°36'	-59'	171°	58°37'	-59'	171°	57°38'	-59'	171°	56°38'	-59'	172°	55°39'	-59'	172°	54°39'	-59'	172°	22
23	59°36'	-59'	171°	58°37'	-59'	171°	57°38'	-59'	171°	56°38'	-59'	172°	55°39'	-59'	172°	54°40'	-59'	172°	53°40'	-59'	172°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	7			8			9			10			11			12			13			

**5° 355° LHA**

**Latitude CONTRARY to 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

0° 360° LHA

Latitude CONTRARY to Declination

0° 360° LHA

Dec°	7			8			9			10			11			12			13			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	83°00'	-60'	180°	82°00'	-60'	180°	81°00'	-60'	180°	80°00'	-60'	180°	79°00'	-60'	180°	78°00'	-60'	180°	77°00'	-60'	180°	0
1	82°00'	-60'	180°	81°00'	-60'	180°	80°00'	-60'	180°	79°00'	-60'	180°	78°00'	-60'	180°	77°00'	-60'	180°	76°00'	-60'	180°	1
2	81°00'	-60'	180°	80°00'	-60'	180°	79°00'	-60'	180°	78°00'	-60'	180°	77°00'	-60'	180°	76°00'	-60'	180°	75°00'	-60'	180°	2
3	80°00'	-60'	180°	79°00'	-60'	180°	78°00'	-60'	180°	77°00'	-60'	180°	76°00'	-60'	180°	75°00'	-60'	180°	74°00'	-60'	180°	3
4	79°00'	-60'	180°	78°00'	-60'	180°	77°00'	-60'	180°	76°00'	-60'	180°	75°00'	-60'	180°	74°00'	-60'	180°	73°00'	-60'	180°	4
5	78°00'	-60'	180°	77°00'	-60'	180°	76°00'	-60'	180°	75°00'	-60'	180°	74°00'	-60'	180°	73°00'	-60'	180°	72°00'	-60'	180°	5
6	77°00'	-60'	180°	76°00'	-60'	180°	75°00'	-60'	180°	74°00'	-60'	180°	73°00'	-60'	180°	72°00'	-60'	180°	71°00'	-60'	180°	6
7	76°00'	-60'	180°	75°00'	-60'	180°	74°00'	-60'	180°	73°00'	-60'	180°	72°00'	-60'	180°	71°00'	-60'	180°	70°00'	-60'	180°	7
8	75°00'	-60'	180°	74°00'	-60'	180°	73°00'	-60'	180°	72°00'	-60'	180°	71°00'	-60'	180°	70°00'	-60'	180°	69°00'	-60'	180°	8
9	74°00'	-60'	180°	73°00'	-60'	180°	72°00'	-60'	180°	71°00'	-60'	180°	70°00'	-60'	180°	69°00'	-60'	180°	68°00'	-60'	180°	9
10	73°00'	-60'	180°	72°00'	-60'	180°	71°00'	-60'	180°	70°00'	-60'	180°	69°00'	-60'	180°	68°00'	-60'	180°	67°00'	-60'	180°	10
11	72°00'	-60'	180°	71°00'	-60'	180°	70°00'	-60'	180°	69°00'	-60'	180°	68°00'	-60'	180°	67°00'	-60'	180°	66°00'	-60'	180°	11
12	71°00'	-60'	180°	70°00'	-60'	180°	69°00'	-60'	180°	68°00'	-60'	180°	67°00'	-60'	180°	66°00'	-60'	180°	65°00'	-60'	180°	12
13	70°00'	-60'	180°	69°00'	-60'	180°	68°00'	-60'	180°	67°00'	-60'	180°	66°00'	-60'	180°	65°00'	-60'	180°	64°00'	-60'	180°	13
14	69°00'	-60'	180°	68°00'	-60'	180°	67°00'	-60'	180°	66°00'	-60'	180°	65°00'	-60'	180°	64°00'	-60'	180°	63°00'	-60'	180°	14
15	68°00'	-60'	180°	67°00'	-60'	180°	66°00'	-60'	180°	65°00'	-60'	180°	64°00'	-60'	180°	63°00'	-60'	180°	62°00'	-60'	180°	15
16	67°00'	-60'	180°	66°00'	-60'	180°	65°00'	-60'	180°	64°00'	-60'	180°	63°00'	-60'	180°	62°00'	-60'	180°	61°00'	-60'	180°	16
17	66°00'	-60'	180°	65°00'	-60'	180°	64°00'	-60'	180°	63°00'	-60'	180°	62°00'	-60'	180°	61°00'	-60'	180°	60°00'	-60'	180°	17
18	65°00'	-60'	180°	64°00'	-60'	180°	63°00'	-60'	180°	62°00'	-60'	180°	61°00'	-60'	180°	60°00'	-60'	180°	59°00'	-60'	180°	18
19	64°00'	-60'	180°	63°00'	-60'	180°	62°00'	-60'	180°	61°00'	-60'	180°	60°00'	-60'	180°	59°00'	-60'	180°	58°00'	-60'	180°	19
20	63°00'	-60'	180°	62°00'	-60'	180°	61°00'	-60'	180°	60°00'	-60'	180°	59°00'	-60'	180°	58°00'	-60'	180°	57°00'	-60'	180°	20
21	62°00'	-60'	180°	61°00'	-60'	180°	60°00'	-60'	180°	59°00'	-60'	180°	58°00'	-60'	180°	57°00'	-60'	180°	56°00'	-60'	180°	21
22	61°00'	-60'	180°	60°00'	-60'	180°	59°00'	-60'	180°	58°00'	-60'	180°	57°00'	-60'	180°	56°00'	-60'	180°	55°00'	-60'	180°	22
23	60°00'	-60'	180°	59°00'	-60'	180°	58°00'	-60'	180°	57°00'	-60'	180°	56°00'	-60'	180°	55°00'	-60'	180°	54°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°
	7			8			9			10			11			12			13			

0° 360° LHA

Latitude CONTRARY to DECLINATION

0° 360° LHA

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

