

GENERATED USING EPHEM



## THE NAUTICAL ALMANAC FOR THE SUN

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**27.09.2023**

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September 27, 2023

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**Disclaimer:** These are computer generated tables - use them at your own risk. The accuracy has been randomly checked, but cannot be guaranteed. The author claims no liability for any consequences arising from use of these tables. Besides, this publication only contains sun tables: an official version of the Nautical Almanac is indispensable.

DIP corrects for height of eye over the surface. This value has to be subtracted from the sextant altitude ( $H_s$ ). The correction in degrees for height of eye in meters is given by the following formula:

$$d = 0.0293\sqrt{m}$$

This is the first correction (apart from index error) that has to be applied to the measured altitude.

The next correction is for refraction in the earth's atmosphere. As usual this table is correct for 10°C and a pressure of 1010 hPa. This correction has to be applied to apparent altitude ( $H_a$ ). The exact values can be calculated by the following formula.

$$R_0 = \cot \left( H_a + \frac{7.31}{H_a + 4.4} \right)$$

For other than standard conditions, calculate a correction factor for  $R_0$  by:

$$f = \frac{0.28P}{T + 273}$$

where  $P$  is the pressure in hectopascal and  $T$  is the temperature in °C.

Semidiameter has to be added for lower limb sights and subtracted for upper limb sights. The value for semidiameter is tabulated in the daily pages.

To correct your sextant altitude  $H_s$  do the following: Calculate  $H_a$  by

$$H_a = H_s + I - d$$

where  $I$  is the sextant's index error and  $d$  is DIP. Then calculate the observed altitude  $H_o$  by

$$H_o = H_a - R + P \pm SD$$

where  $R$  is refraction,  $P$  is parallax and  $SD$  is the semidiameter.

Sight reduction tables can be downloaded for the US government's internet pages. Search for HO-229 or HO-249. These values can also be calculated with two, relatively simple, formulas:

$$\sin H_c = \sin L \sin d + \cos L \cos d \cos LHA$$

and

$$\cos A = \frac{\sin d - \sin L \sin H_c}{\cos L \cos H_c}$$

where  $A$  is the azimuth angle,  $L$  is the latitude,  $d$  is the declination and  $LHA$  is the local hour angle. The azimuth ( $Z_n$ ) is given by the following rule:

- if the  $LHA$  is greater than 180°,  $Z_n = A$
- if the  $LHA$  is less than 180°,  $Z_n = 360^\circ - A$

27	GHA	Dec
0	182° 11.4	S01° 26.8
1	197° 11.6	27.8
2	212° 11.8	28.7
3	227° 12.0	· · 29.7
4	242° 12.2	30.7
5	257° 12.5	31.6
6	272° 12.7	S01° 32.6
7	287° 12.9	33.6
8	302° 13.1	34.6
9	317° 13.3	· · 35.5
10	332° 13.5	36.5
11	347° 13.7	37.5
12	2° 14.0	S01° 38.5
13	17° 14.2	39.4
14	32° 14.4	40.4
15	47° 14.6	· · 41.4
16	62° 14.8	42.3
17	77° 15.0	43.3
18	92° 15.2	S01° 44.3
19	107° 15.5	45.3
20	122° 15.7	46.2
21	137° 15.9	· · 47.2
22	152° 16.1	48.2
23	167° 16.3	49.2
	SD=16.0'	d = -1.0'