

#Fulst / Meldau Nautische Aufgaben, Edition 9 / 1968, page 53 question # 7

#Date;Time = 1957 08 04; 03:25 ZZ

#Ob = 51 05 N 001 34 E

#IB = 0; Ah = 9 m; Std = + 5 25

Almanac Data For Polaris

#Sight: Chr=03:19:04; h=52 7.5

#star no 9 Polaris: t = 331 22.7; h = 89 4.0 N

#Aries: t = 5 7.3

#delta h = 4.7; Az = 0

Geographical Position (lat, lon) = 89.2642 34.3985

GHAAS = 3 33.3'

SHA = 322 2.8'

GHA = 325 36.1'

Dec = N 89 15.9'

SD = 0.0'

HP = 0.0'

Formulas used to calculate sight

Index Error is -0.0000 degrees

Eye Height is 8.0000 meters

Height Correction Degrees = $1.758 \cdot \sqrt{8.0000} / 60.0$

Height Correction Degrees = 0.0829

Apparent Altitude (Ha)

ApparentAltitude = Measurement - IndexCorrection - EyeHeightCorrection

ApparentAltitude = 52.1250 - -0.0000 - 0.0829

ApparentAltitude = 52.0421

Refraction Correction

$x = \tan(\text{Pi}/180 \cdot \text{ApparentAltitude} + 4.848\text{e-}2 \cdot (\text{Pi}/180) / (\tan(\text{Pi}/180 \cdot \text{ApparentAltitude}) + .028))$

$x = \tan(\text{Pi}/180 \cdot 52.0421 + 4.848\text{e-}2 \cdot (\text{Pi}/180) / (\tan(\text{Pi}/180 \cdot 52.0421) + .028))$

$x = 1.2836$

RefractionCorrection = $.267 \cdot \text{Pressure} / (x \cdot (\text{Temperature} + 273.15)) / 60.0$

RefractionCorrection = $.267 \cdot 1010.0000 / (x \cdot (10.0000 + 273.15)) / 60.0$

RefractionCorrection = 0.0124

Corrected Altitude

CorrectedAltitude = ApparentAltitude - RefractionCorrection - LimbCorrection

CorrectedAltitude = 52.0421 - 0.0124 - 0.0000

CorrectedAltitude = 52.0298

Observed Altitude (Ho)

ObservedAltitude = CorrectedAltitude - ParallaxCorrection

ObservedAltitude = 52.0298 - 0.0000

ObservedAltitude = 52.0298

#Date;Time = 1957 08 04; 03:25 ZZ
#Ob = 51 05 N 001 34 E
#IB = 0; Ah = 9 m; Std = + 5 25

Almanac Data For Capella

#Sight: Chr=03:20:26; h=43 37.6
#star no 18 Capella t = 281 36.4; h = 45 57.3 N
#Aries t = 5 7.3;
#Capella t = 72 55.5 E;
#delta h = 5.5; Az = 66

Geographical Position (lat, lon) = 45.9980 75.2753
GHAAS = 3 53.8'
SHA = 280 49.7'
GHA = 284 43.5'
Dec = N 45 59.9'
SD = 0.0'
HP = 0.0'

Formulas used to calculate sight

Index Error is -0.0000 degrees

Eye Height is 9.0000 meters
Height Correction Degrees = $1.758 \times \sqrt{9.0000} / 60.0$
Height Correction Degrees = 0.0879

Apparent Altitude (Ha)

ApparentAltitude = Measurement - IndexCorrection - EyeHeightCorrection
ApparentAltitude = 43.6267 - -0.0000 - 0.0879
ApparentAltitude = 43.5388

Refraction Correction

$x = \tan(\text{Pi}/180 \times \text{ApparentAltitude} + 4.848\text{e-}2 \times (\text{Pi}/180) / (\tan(\text{Pi}/180 \times \text{ApparentAltitude}) + .028))$
 $x = \tan(\text{Pi}/180 \times 43.5388 + 4.848\text{e-}2 \times (\text{Pi}/180) / (\tan(\text{Pi}/180 \times 43.5388) + .028))$
 $x = 0.9519$
RefractionCorrection = $.267 \times \text{Pressure} / (x \times (\text{Temperature} + 273.15)) / 60.0$
RefractionCorrection = $.267 \times 1010.0000 / (x \times (10.0000 + 273.15)) / 60.0$
RefractionCorrection = 0.0167

Corrected Altitude

CorrectedAltitude = ApparentAltitude - RefractionCorrection - LimbCorrection
CorrectedAltitude = 43.5388 - 0.0167 - 0.0000
CorrectedAltitude = 43.5221

Observed Altitude (Ho)

ObservedAltitude = CorrectedAltitude - ParallaxCorrection
ObservedAltitude = 43.5221 - 0.0000
ObservedAltitude = 43.5221

#Date;Time = 1957 08 04; 03:25 ZZ
#Ob = 51 05 N 001 34 E
#IB = 0; Ah = 9 m; Std = + 5 25

Almanac Data For Aldebaran

#Sight: Chr=03:21:54; h=30 1.1
#star no 16 Aldebaran t = 291 37.5; h = 16 25.5 N
#Aries t = 5 7.3
Aldebaran t = 62 32.4 E
#delta h = 2.4; Az = 100.5

Geographical Position (lat, lon) = 16.5093 64.7155
GHAAS = 4 15.9'
SHA = 291 1.2'
GHA = 295 17.1'
Dec = N 16 30.6'
SD = 0.0'
HP = 0.0'

Formulas used to calculate sight

Index Error is -0.0000 degrees

Eye Height is 9.0000 meters
Height Correction Degrees = $1.758 \times \sqrt{9.0000} / 60.0$
Height Correction Degrees = 0.0879

Apparent Altitude (Ha)

ApparentAltitude = Measurement - IndexCorrection - EyeHeightCorrection
ApparentAltitude = 30.0183 - -0.0000 - 0.0879
ApparentAltitude = 29.9304

Refraction Correction

$x = \tan(\text{Pi}/180 \times \text{ApparentAltitude} + 4.848\text{e-}2 \times (\text{Pi}/180) / (\tan(\text{Pi}/180 \times \text{ApparentAltitude}) + .028))$
 $x = \tan(\text{Pi}/180 \times 29.9304 + 4.848\text{e-}2 \times (\text{Pi}/180) / (\tan(\text{Pi}/180 \times 29.9304) + .028))$
 $x = 0.5776$
RefractionCorrection = $.267 \times \text{Pressure} / (x \times (\text{Temperature} + 273.15)) / 60.0$
RefractionCorrection = $.267 \times 1010.0000 / (x \times (10.0000 + 273.15)) / 60.0$
RefractionCorrection = 0.0275

Corrected Altitude

CorrectedAltitude = ApparentAltitude - RefractionCorrection - LimbCorrection
CorrectedAltitude = 29.9304 - 0.0275 - 0.0000
CorrectedAltitude = 29.9030

Observed Altitude (Ho)

ObservedAltitude = CorrectedAltitude - ParallaxCorrection
ObservedAltitude = 29.9030 - 0.0000
ObservedAltitude = 29.9030

#Date;Time = 1957 08 04; 03:25 ZZ
#Ob = 51 05 N 001 34 E
#IB = 0; Ah = 9 m; Std = + 5 25

Almanac Data For Vega

#Sight: Chr=03:23:22; h=30 46.1
#star no 69 Wega t = 81 7.4; h = 38 44.7 N
#Aries t = 5 7.3
Wega t = 87 18.9 W
#delta h = -0.6; Az = 294.5

Geographical Position (lat, lon) = 38.7837 274.6024
GHAAS = 4 37.9'
SHA = 80 45.9'
GHA = 85 23.9'
Dec = N 38 47.0'
SD = 0.0'
HP = 0.0'

Formulas used to calculate sight

Index Error is -0.0000 degrees

Eye Height is 9.0000 meters
Height Correction Degrees = $1.758 \times \sqrt{9.0000} / 60.0$
Height Correction Degrees = 0.0879

Apparent Altitude (Ha)

ApparentAltitude = Measurement - IndexCorrection - EyeHeightCorrection
ApparentAltitude = 30.7683 - -0.0000 - 0.0879
ApparentAltitude = 30.6804

Refraction Correction

$x = \tan(\text{Pi}/180 \times \text{ApparentAltitude} + 4.848\text{e-}2 \times (\text{Pi}/180) / (\tan(\text{Pi}/180 \times \text{ApparentAltitude}) + .028))$
 $x = \tan(\text{Pi}/180 \times 30.6804 + 4.848\text{e-}2 \times (\text{Pi}/180) / (\tan(\text{Pi}/180 \times 30.6804) + .028))$
 $x = 0.5951$
RefractionCorrection = $.267 \times \text{Pressure} / (x \times (\text{Temperature} + 273.15)) / 60.0$
RefractionCorrection = $.267 \times 1010.0000 / (x \times (10.0000 + 273.15)) / 60.0$
RefractionCorrection = 0.0267

Corrected Altitude

CorrectedAltitude = ApparentAltitude - RefractionCorrection - LimbCorrection
CorrectedAltitude = 30.6804 - 0.0267 - 0.0000
CorrectedAltitude = 30.6538

Observed Altitude (Ho)

ObservedAltitude = CorrectedAltitude - ParallaxCorrection
ObservedAltitude = 30.6538 - 0.0000
ObservedAltitude = 30.6538

#Results:

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#LAT = 51 10.0 N

#LON = 01 39.3 E

#BV= 35deg; 5.8 Nmi

#OCPN

#LAT = 51 24.5 N

#LON = 02 14.0 E

#some explanations:

Ah Augeshöhe

height of eye

BV Besteckversetzung

error in direction and distance

hb beobachtete Höhe

observed altitude

deltah Höhenunterschied

difference of altitudes

h Höhe

altitude

Ob beobachteter Ort

position by navigational System

Og geißter Ort

position by DR

Ok gekoppelter Ort

position by DR

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