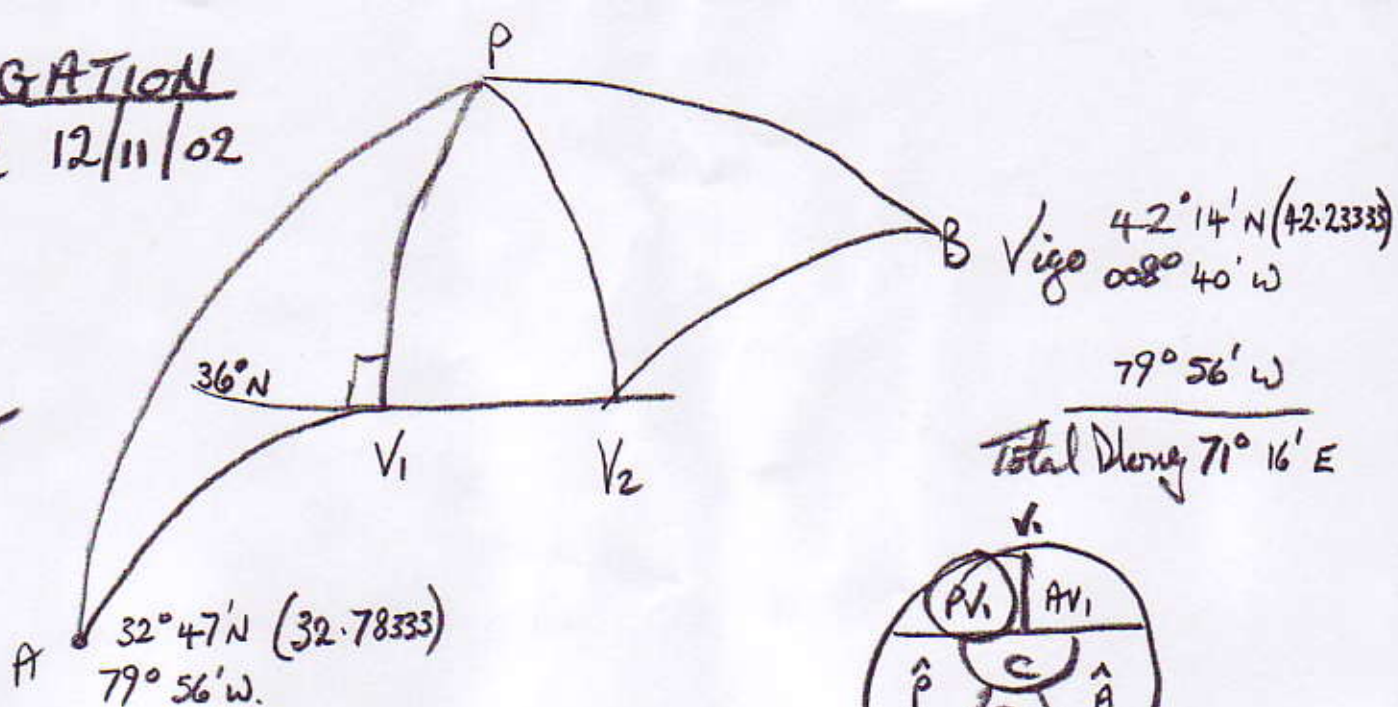


NAVIGATION
SQA 12/11/02

Q1.

~~Q1.~~



Total Drangy 71° 16' E

Dist to go to winter zone

$$\frac{125 \times 24 \times 14.5}{21} = 2071.43 \text{ n.m.}$$

$$\begin{aligned} PA &= 57.21667 \\ PV_1 &= 54.00 \\ PB &= 47.76667 \\ \cos PA &= \cos PV_1 \times \cos AV_1 \therefore \cos AV_1 = \frac{\cos PA}{\cos PV_1} \therefore AV_1 = 22.89889 \\ \text{For } \hat{P} \cos \hat{P} &= \frac{\tan PV_1}{\tan PA} = \frac{\tan 54}{\tan 57.21667} = 1373.93 \end{aligned}$$

$$\begin{aligned} \therefore \hat{P} &= 27.56939 = 27^\circ 34.46 \text{ E} \\ \text{INITIAL LONG} &= 79^\circ 56' \text{ W} \\ \text{LONG } V_1 &= 52^\circ 21.84 \end{aligned}$$

$$\begin{aligned} \text{Dist to W. Zone} &= 2071.43 \\ \text{Parallel leg} &= 697.5 \text{ n.m.} \\ \text{Dlong} &= \frac{\text{Dep}}{\cos lat} = \frac{697.5}{\cos 36} = 862.16 \\ &= 14^\circ 22.16 \text{ E} \\ \text{LONG } V_1 &= 52^\circ 21.84 \text{ W} \\ \text{LONG } V_2 &= 37^\circ 59.68 \text{ W} \\ \text{LONG } B &= 008^\circ 40' \text{ W} \\ \text{Dlong } V_2 B &= 29^\circ 19.68 \text{ E} \\ &= 29.328 \end{aligned}$$

$$\begin{aligned} \cos V_2 B &= \cos V_2 \text{long } V_2 B \sin PV_2 \sin PB \\ &\quad + \cos PV_2 \cos PB \\ &= \cos 29.328 \sin 54 \sin 47.76667 + \\ &\quad \cos 54 \cos 47.76667 \\ &= 23.46367 \\ &= 1407.82 \\ + &\quad 2071.43 \\ &= 3479.25 \end{aligned}$$

Minimum Dist = 3479.25 n.m

SQA - NAVIGATION - CHIEF MATE/MASTER - 12/11/02

Q2. R.V.

P.V. @ 05 00 GMT 27th Nov 1976 in Pos'n 38° 17' S 166° 04' E
 Co. 288° T @ 22K.

OV (Other Vessel) in Pos'n 38° 10' S 161° 03' E.

Nov 27d 05h 00m GMT.
 Long 166° 04' E 11h 4m (approx)

Approx LMT 27d 16h 04m

RV @ following sunrise = Sunrise 28d. LMT.

Sunrise 28d @ 35° S 04h 40m LMT.

@ 40° S 04h 27m LMT.

@ 38° S 28d 04h 32m LMT.

PV Approx Start LMT = 27d 16h 04m

1st Approx Steaming time 12h 28m

1st Approx Distance = 12.4667 hrs x 22 = 274.27 n.m.

D. Lat = Dist Cos Co
 = 274.27 Cos 288
 = 84.75 N

Dep = Dist Sin Co
 = 274.27 Sin 288
 = 260.85 W

Mean Lat 38° 17' S - 42' 4
 = 37° 34' 6 = 37.57667

Dlong = Dep / Cos m. Lat
 = 260.85 / Cos 37.57667
 = 329.13 W

2nd D. Lat = 283.43 Cos 288
 = 87.59 N

Mean Lat 38° 17' S - 43' 8
 = 37° 33' 2 = 37.55333

Dep = 283.43 Sin 288 = 269.56 W

PV Start Lat 38° 17' S Dep Long 166° 04' E
 D. Lat 1 24' 75 N 260.85 W Dlong 5° 29' 13 W

1st Approx Lat 36° 52' 25 S Long 160° 34' 87 E

LMT Sunrise 28d @ 36° 52' S = 04h 35m

1st Approx Long 160° 34' 87 E 10h 42m

2nd Approx GMT 27d 17h 53m sunrise time

Start GMT 27d 05h 00m

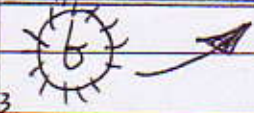
2nd Approx S. T. 12h 53m

2nd Approx dist = 12.88333 x 22 = 283.43

PV Start Lat 38° 17' S Dep Long 166° 04' E D. Long = 269.56

D. Lat 1° 27' 59 N 269.56 W D. Long 5 40.01 W Cos 37.55333

2nd Approx Lat 36° 49' 41 S (RV. Pos'n) Long 160° 23' 99 E = 340.01 W



Q2
Contd.

SQA - NAV - MATE/MASTER - 12/11/02 -

2nd Approx Pos'n. RV pos'n Lat $36^{\circ} 49.41 S$

LONG $160^{\circ} 23.99 E$

O.V. Start Pos'n Lat $38^{\circ} 10.0 S$

LONG $161^{\circ} 03.0 E$

D. Lat $1^{\circ} 20.59 N$

$39.01 W$

$80.59 N$

$36^{\circ} 49.41$

+ 40.3

Mean Lat $37^{\circ} 29.71 = 37.49517$

Dep = Dlong Cos M Lat = $39.01 \times \cos 37.49517 = 30.95 \text{ n.m. } W$

~~Co~~
 $\frac{\text{Dep}}{\text{Dlat}} = \tan Co \therefore Co = \tan^{-1} \left(\frac{30.95072}{80.59} \right) = N 21.00937 W$

Co to steer $339^{\circ} T$

$\frac{\text{Dlat}}{\cos Co} = \text{Dist} = \frac{80.59}{\cos 21.00937} = 86.33 \text{ n.m.}$

$86.33 \text{ in } 12 \text{ h } 53 \text{ m} = \frac{86.33}{12.88333} = 6.7 \text{ Knots.}$

Answer:- a) GMT of RV = NOV 27d 17h 53m

b) RV Pos'n Lat $36^{\circ} 49.41 S$ Long $160^{\circ} 23.99 E$

c) Course $339^{\circ} T @ 6.7 K.$