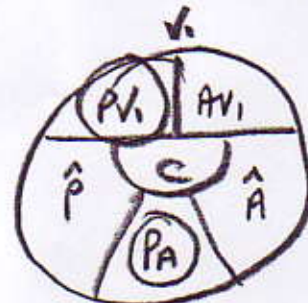
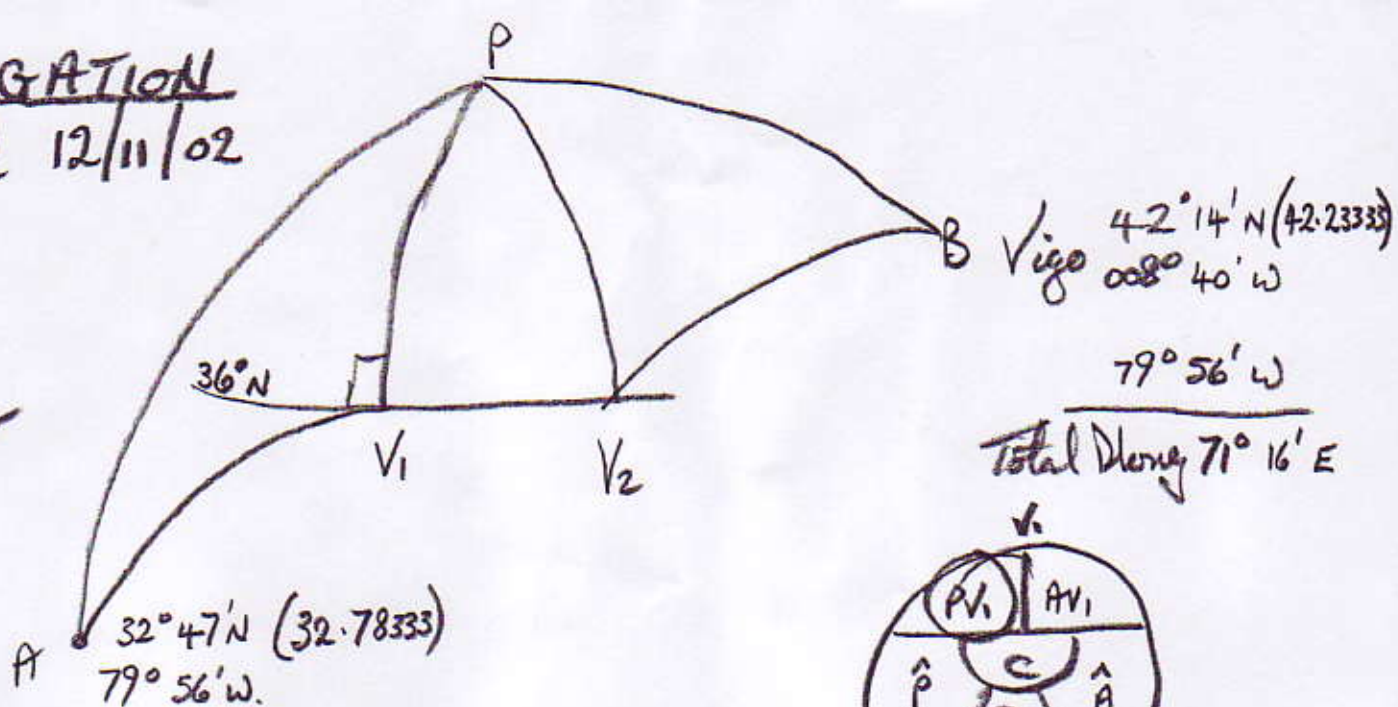


NAVIGATION  
SQA 12/11/02

Q1.

~~Handwritten scribble~~



Dist to go to winter zone

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

$$PA = 57.21667$$

$$PV_1 = 54.00$$

$$PB = 47.76667$$

$$\cos PA = \cos PV_1 \times \cos AV_1 \quad \therefore \cos AV_1 = \frac{\cos PA}{\cos PV_1} \quad \therefore AV_1 = 22.89889$$

$$\text{For } \hat{P} \quad \cos \hat{P} = \frac{\tan PV_1}{\tan PA} = \frac{\tan 54}{\tan 57.21667}$$

$$= 1373.93$$

$$\text{Dist to W. Zone} = \underline{2071.43}$$

$$\therefore \hat{P} = 27.56939 = 27^\circ 34.46' E$$

$$\text{INITIAL LONG} = 79^\circ 56' W$$

$$\text{LONG } V_1 = 52^\circ 21.84'$$

$$\text{Parallel leg} = 697.5 \text{ n.m.}$$

$$\text{Dlong} = \frac{\text{Dep}}{\cos lat} = \frac{697.5}{\cos 36} = 862.16$$

$$= 14^\circ 22.16' E$$

$$\text{LONG } V_1 = 52^\circ 21.84' W$$

$$\text{LONG } V_2 = 37^\circ 59.68' W$$

$$\text{LONG } B = 008^\circ 40' W$$

$$\text{Dlong } V_2 B = 29^\circ 19.68' E = 29.328$$

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

$$\underline{\underline{\text{Minimum Dist} = 3479.25 \text{ n.m.}}}$$

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

Q2. R.V.

P.V. @ 05 00 GMT 27<sup>th</sup> 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

1<sup>st</sup> Approx Steaming time 12h 28m

1<sup>st</sup> 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

D long = Dep / Cos lat  
 = 260.85 / Cos 37.57667  
 = 329.13 W

2<sup>nd</sup> 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 D long 5° 29' 13 W

1<sup>st</sup> Approx lat 36° 52' 25 S Long 160° 34' 87 E

LMT sunrise 28d @ 36° 52' S = 04h 35m

1<sup>st</sup> Approx long 160° 34' 87 E 10h 42m

2<sup>nd</sup> Approx GMT 27d 17h 53m sunrise time

Start GMT 27d 05h 00m

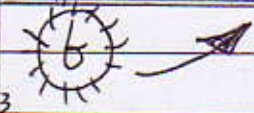
2<sup>nd</sup> Approx S. T. 12h 53m

2<sup>nd</sup> 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

2<sup>nd</sup> 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  $1^{\circ} 20.59 N$

$39.01 W$

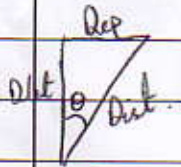
$80.59 N$

$36^{\circ} 49.41$

+  $40.3$

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