

Ryan Calderon 14/1/22

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1

- a) Area m^2
- b) Volume m^3
- c) Mass kg
- d) Force N
- e) Weight N

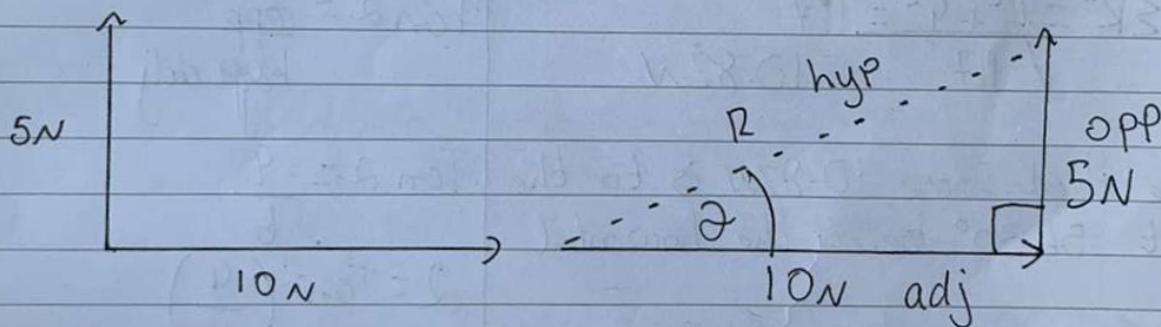
2

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}} \quad \begin{matrix} \text{Mass} = kg \\ \text{Volume} = m^3 \end{matrix}$$

$$\frac{kg}{m^3}$$

3

a



$$\Sigma R^2 = 5^2 + 10^2 = 125$$
$$\sqrt{125} = 11.18N$$

$$\tan 2 = \frac{\text{opp}}{\text{Adj}}$$

$$\tan 2 = \frac{5}{10}$$

The third force $11.18N$ is to the ~~left~~ ^{Right} 26.56° ~~and is~~ above the horizontal

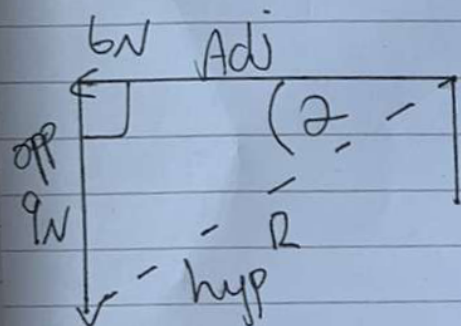
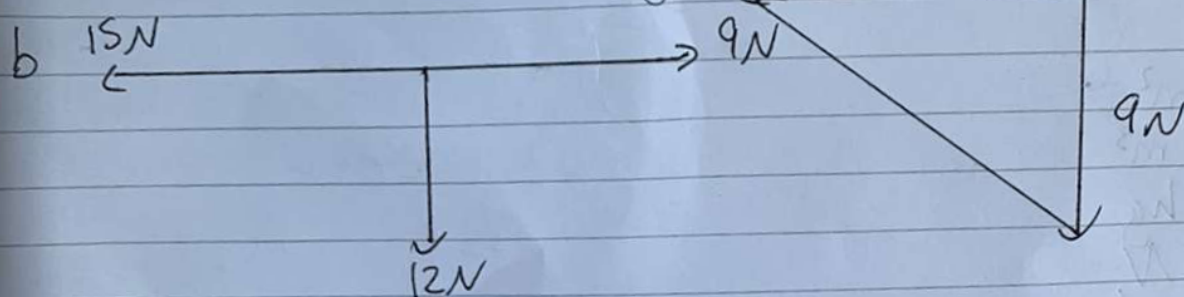
$$2 = \tan^{-1} \left(\frac{5}{10} \right)$$

$$\text{Bearing} = 90 + 26.56 = 116.56^\circ$$

$$2 = 26.56^\circ$$

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$$\sum R^2 = 6^2 + 9^2 = 117$$

$$\sqrt{117} = 10.82N$$

$$\tan \alpha = \frac{\text{opp}}{\text{adj}}$$

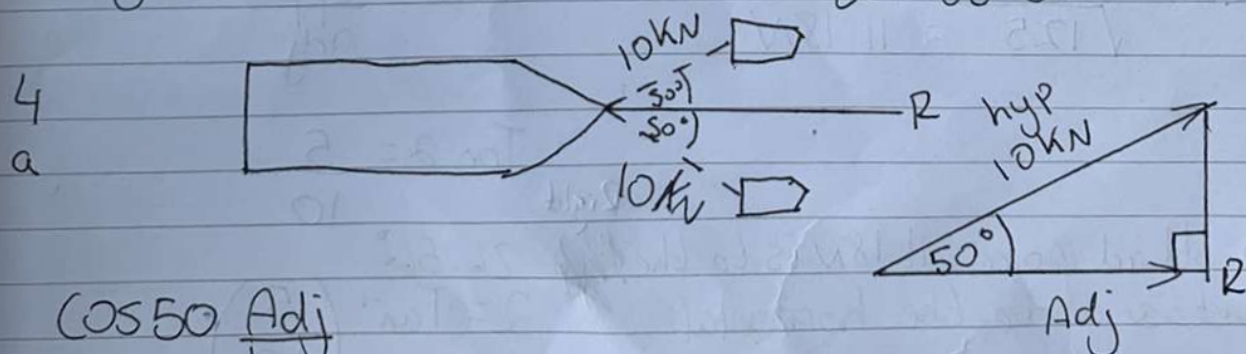
The third force 10.82N is to the left 56.30° below the horizontal

$$\tan \alpha = \frac{9}{6}$$

$$\alpha = \tan^{-1}\left(\frac{9}{6}\right)$$

$$\alpha = 56.30^\circ$$

$$\text{Bearing} = 90 + 56.30 = 146.30^\circ$$



$$\cos 50 = \frac{\text{Adj}}{\text{hyp}}$$

$$\cos 50 = \frac{R}{10000}$$

$$10,000 \times \cos 50 = R$$

$$R = 6427.88N$$

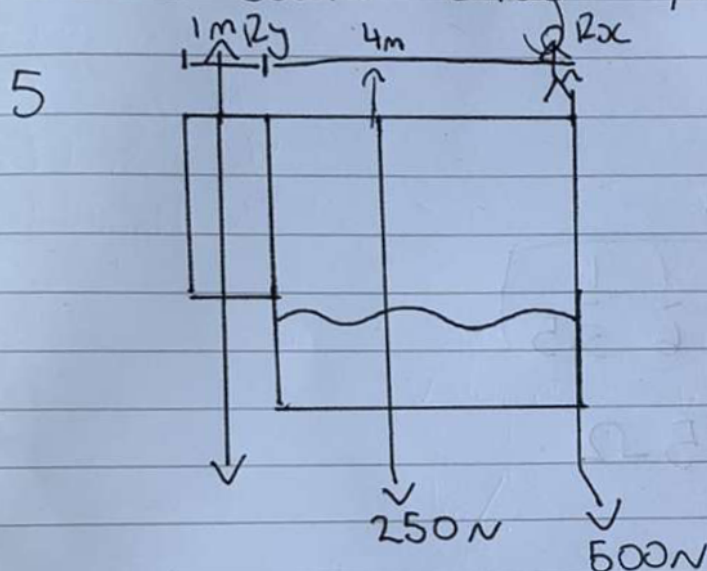
$$\therefore \text{For 2 tug boats} = 2 \times 6427.88$$

$$= 12855.76N$$

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b Boat Moves with constant velocity $\therefore$ Resultant of two boats = Drag = 12,855.76 N $\checkmark$



a Taking moments about $\odot$

$$\begin{aligned} \cancel{CWM} &= \cancel{ACWM} \\ R_y \times 4 &= 250 \times 2 & R_y \times 4 &= 250 \times 2 \\ \cancel{R_y} &= \frac{250 \times 2}{4} & R_y &= \frac{250}{2} \\ R_y &= 125 \text{ N} & R_y &= 125 \text{ N} \end{aligned}$$

b Taking moments about $\odot$

$$\begin{aligned} \cancel{CWM} &= \cancel{ACWM} \\ &= R_x \times 4 \end{aligned}$$

$$\begin{aligned} CWM &= ACWM \\ 250 \times 2 &= R_x \times 4 \end{aligned}$$

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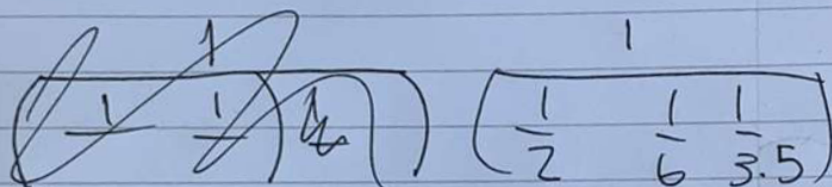
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b

a) A positive to negative

b) $25 + 2 + 6 + 3 = 11.5 \Omega$

c) $R_2 + R_3 = 8.44$



$= 1.05 \Omega$

d) ~~12~~ 4V

e) ~~18~~ 6V

f) 2V

g) R3