

1 =

A = Area - $A - m^2$

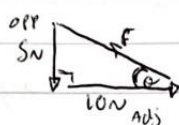
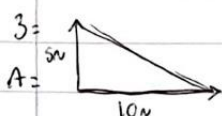
B = Volume - $V - m^3$

C = Mass - kg

D = force - N

E = Weight - N

Z = Density - kg/m^3



By pythag

$$\sum F^2 = 5^2 + 10^2$$

$$\sum F^2 = 25 + 100$$

$$\sum F^2 = 125$$

$$F = \sqrt{125}$$

$$|F = 11.18 N|$$

By trig

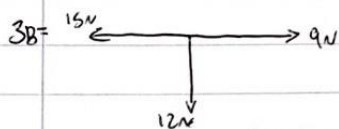
$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

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

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

$$|\theta = 26.56^\circ|$$

∴ The resultant is 11.18 N to the left 26.56° above the horizontal



Trig

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

$$\tan \theta = \frac{12}{6}$$

$$\theta = \tan^{-1}\left(\frac{12}{6}\right)$$

$$|\theta = 63.43^\circ|$$

∴ Resultant is 13.41 N to the right 63.43° below the horizontal

$$\text{Resultant} = -15 + 9 = -6 \text{ (to the left)}$$



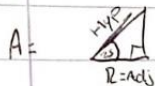
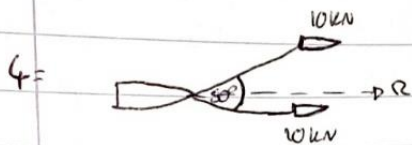
Pythag

$$\sum F^2 = 6^2 + 12^2$$

$$\sum F^2 = 36 + 144$$

$$\sum F^2 = 180$$

$$F = \sqrt{180} \quad |F = 13.41 N|$$



$$\cos 25 = \frac{\text{Adj}}{\text{Hyp}}$$

$$\cos 25 = \frac{R}{10000}$$

$$10000 \times \cos 25 = \frac{R}{10000} \times 10000$$

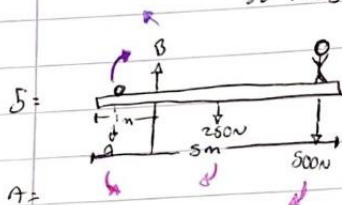
$$R = 10000 \times \cos 25 \quad R = 9063.08 \text{ N}$$

$$\therefore \text{for 2 tug boats} = 2 \times 9063.08 \text{ N}$$

$$= 18126.16 \text{ N}$$

B= Boat moves with constant velocity

$$\therefore \text{Resultant} = \text{drag} = 18126.16 \text{ N}$$



A=Boats B=Edge of pool

Take moments about B

$$\text{CWM} = \text{ACWM}$$

$$(500 \times 4) + (250 \times 1) = (A \times 1)$$

$$2000 + 250 = A$$

$$\underline{2250 = A}$$

B= take moments about A

$$\text{CWM} = \text{ACWM}$$

$$(500 \times 3) + (250 \times 2.5) = (B \times 1)$$

$$1500 + 625 = B$$

$$\underline{2125 = B}$$

Forces up = forces down

$$3125 = 2250 + 500 + 250$$

$$3125 = 3125$$

$$G =$$

A = B → Positive to negative

$$B = (\text{over 2 and 3}) \rightarrow \frac{1}{2} + \frac{1}{6} = \frac{2}{3} \rightarrow 0.6 \quad 0.6 + 0.5 + 3 = \underline{\underline{4.1 \Omega}}$$

$$C = 12V$$

$$D = 12 \div 1.1 = 10.90V$$

$$E = \text{initial} = 10.90V \quad 12 \div 2 = 6 \Omega$$

$$F = 12 \div 6 = 2 \Omega$$

$$G = R3$$