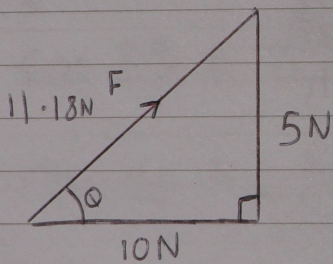
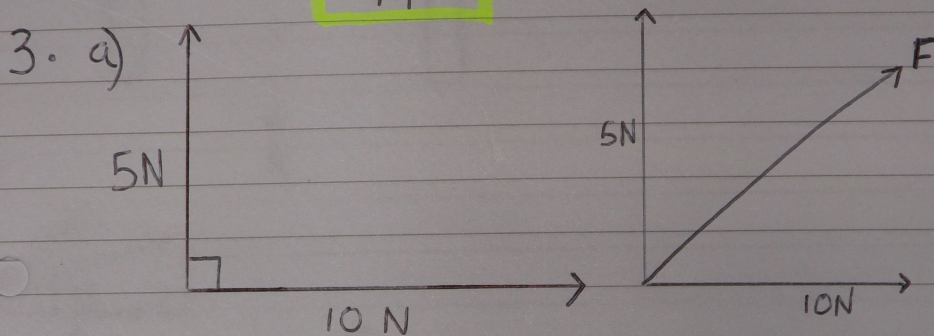


1. A) Area = M^2
 B) Volume = M^3
 C) Mass = Kg
 D) Force = N
 E) Weight = Kg

2. Density = $\frac{Kg}{M^3}$



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

$$F = \sqrt{125}$$

$F = 11.18 \text{ N}$

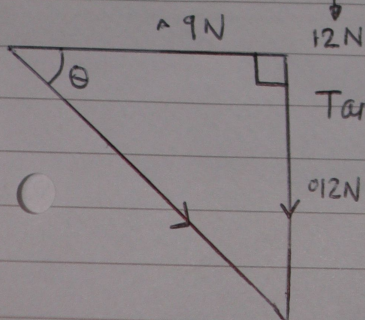
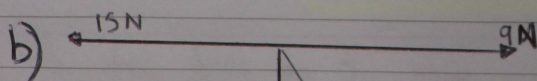
$$\tan \theta = \frac{5}{10}$$

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

$\theta = 26.57^\circ$

The resultant is 11.18 N to the right, 26.57° above the horizontal.

Bearing = $90 - 26.57 = 63.43^\circ$



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

$$\tan \theta = \frac{9}{12}$$

$$\theta = \tan^{-1}\left(\frac{9}{12}\right)$$

$\theta = 36.87^\circ$

Resultant = $15 - 9 = 6 \text{ N}$

$$\Sigma F^2 = 9^2 + 12^2$$

$$\Sigma F^2 = 225$$

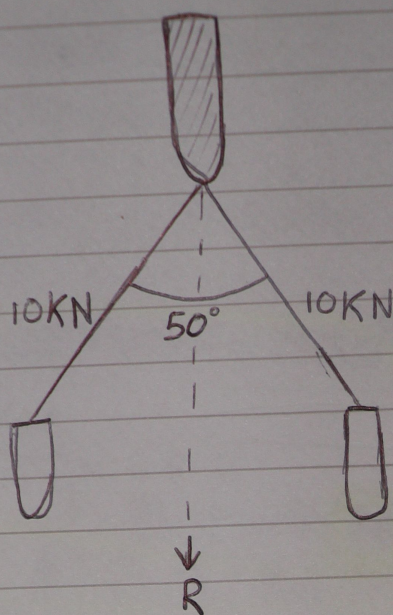
$$F = \sqrt{225}$$

$F = 15 \text{ N}$

Resultant is 15 N to the right 36.87° below the horizontal

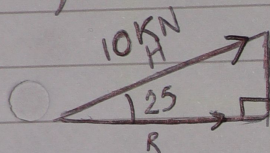
Bearing: $90 + 36.87$
 $= 126.87^\circ$

4. ~~g~~



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a)



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

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

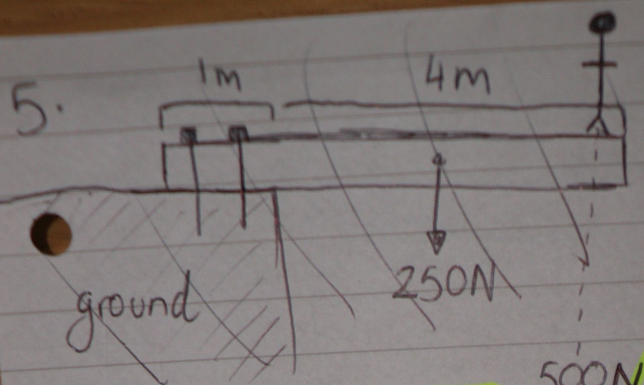
$$10,000 \times \cos 25 = R$$

$$R = 9,063.07 \text{ N}$$

c) $\therefore$ For 2 tug boats = $2 \times 9,063.07$

$$R = 18,126.14 \text{ N}$$

b) The drag force on the ship

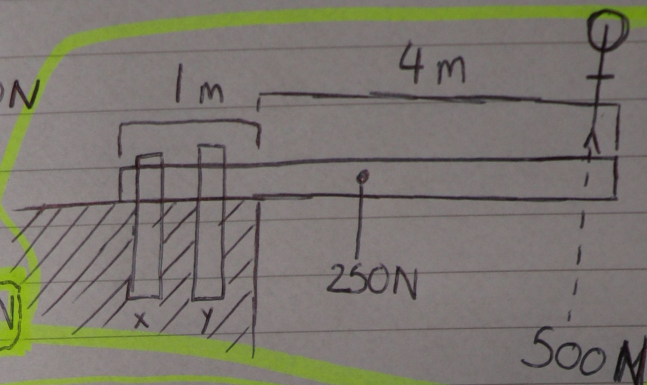


$$b. 250N + 500N = 750N$$

$$F = M \times A$$

$$F = 750N \times 9.81$$

$$F = 7357.5N = 7.4kN$$



6. a) ~~AN~~ ~~5~~ ~~in~~ ~~the~~

The conventional current flow in 'A' is positive. 'B' is Negative.

$$b) R_1 + \frac{1}{\frac{1}{R_2} + \frac{1}{R_3}} + R_4$$

$$R = 0.5\Omega + \frac{1}{\frac{1}{2\Omega} + \frac{1}{6\Omega}} + 3\Omega$$

$$R = 0.5\Omega + 1.5\Omega + 3\Omega$$

$$R = 5\Omega$$

$$e) V = IR$$

$$I = \frac{V}{R}$$

$$I = \frac{12}{2}$$

$$I = 6A$$

$$c) V = I \times R$$

$$I = \frac{V}{R}$$

$$I = \frac{12V}{5\Omega}$$

$$I = 2.4 \text{ Amps}$$

$$f) V = IR$$

$$I = \frac{V}{R}$$

$$I = \frac{12}{6}$$

$$I = 2A$$

$$d) V = IR$$

$$V = 2.4A \times 3\Omega$$

$$V = 7.2V$$

$$g) P = I \times V$$

$$P = 2.4 \times 12$$

$$P = 28.8W$$

R3 has the highest amount of energy = 72W

$$R2 = P = IV$$

$$P = 2 \times 12$$

$$P = 24W$$

$$R3 = P = IV$$

$$P = 6 \times 12$$

$$P = 72W$$

$$R4 = P = IV$$

$$P = 3 \times 12$$

$$P = 36W$$