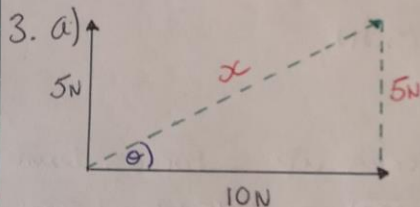


1.

- a) Area = m^2
- b) Volume = m^3
- c) Mass = Kg
- d) Force = Newton (kgm/s^2)
- e) weight = Newton (kgm/s^2)

2.

$$\text{Density} = \frac{\text{mass}}{\text{volume}} = \frac{\text{Kg}}{m^3}$$



$$x^2 = 10^2 + 5^2$$

$$x = \sqrt{125}$$

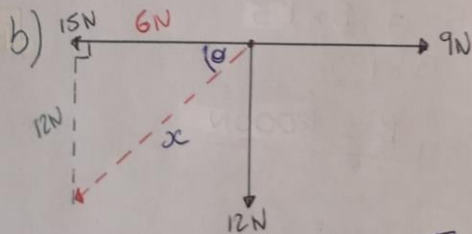
$$x = 11.18\text{N}$$

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

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

$$\theta = 26.57^\circ$$

The resultant is 11.18N to the right, 26.57° above the horizontal.
Bearing 63.43°



$$x^2 = 6^2 + 12^2$$

$$x = \sqrt{180}$$

$$x = 13.42\text{N}$$

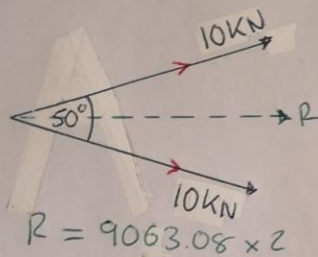
$$\tan \theta = \frac{12}{6}$$

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

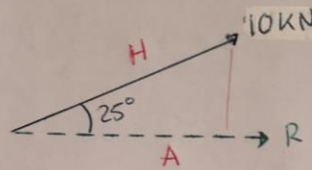
$$\theta = 63.43^\circ$$

The resultant is 13.42N to the left, 63.43° below the horizontal.
Bearing 206.57°

4.



$$R = 9063.08 \times 2$$



$$10000 \cos 25 = R$$

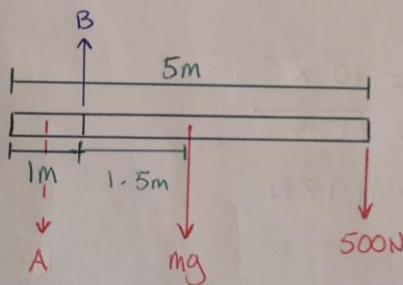
$$R = 9063.08\text{ N}$$

$$10 \times 10^3$$

a) Resultant force on ship is 18126.16 N

b) Drag force = 18126.16 N

5.



$$mg = 250\text{ N}$$

Forces up = Forces down

$$3125\text{ N} = 2375 + 250 + 500$$

$$3125\text{ N} = 3125\text{ N}$$

Taking moments about A

$$Cwm = Acwm$$

$$250 \times 2.5 + 500 \times 5 = B \times 1$$

$$625 + 2500 = B \times 1$$

$$\frac{3125}{1} = B$$

$$B = 3125\text{ N}$$

Taking moments about B

$$Cwm = Acwm$$

$$250 \times 1.5 + 500 \times 4 = A \times 1$$

$$2375 = A$$

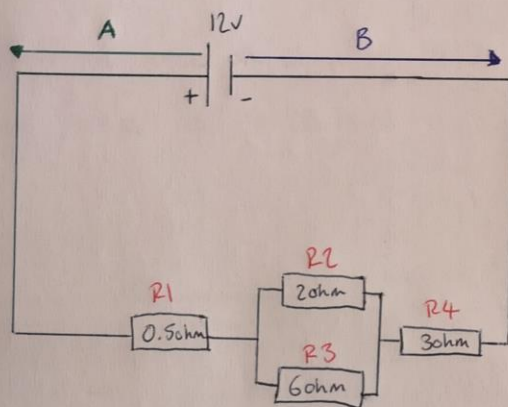
$$A = 2375\text{ N}$$

5.

a) Force on bolts = 2375 N

b) Force on edge of pool = 3125 N

6.

a) Direction of conventional current flow is Ab) Total resistance = $5 \text{ ohms} (0.5 + 3) + \frac{2 \times 6}{2 + 6}$
 $3.5 + 1.5$ c) Current draw = $V = IR$
2.4 amps $\frac{12}{5} = \frac{15}{5} = 2.4$ d) $V = IR = (2.4 \times 3)$
7.2 voltse) current through $R2 = 2 \text{ amps}$

f) 6 amps

g) $R1$ transfers most energy