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14/1/2020

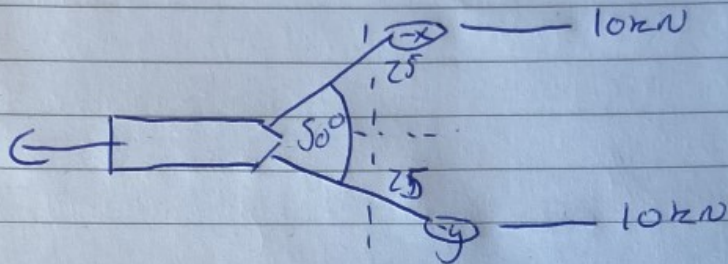
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Science exam

4)

a)



$$10\text{ kN} + 10\text{ kN} \\ = \underline{20\text{ kN}}$$

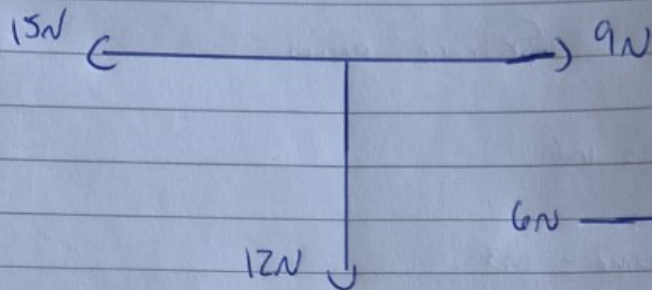
$$90 - 25 = 65$$

$$\sin 65 = 0.91 \quad 10\text{ kN} \times 0.91 = 9.1\text{ kN}$$

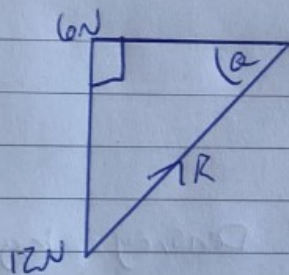
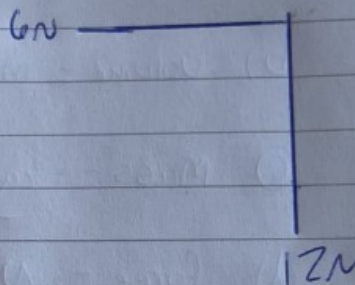
$$9.1 \times 2 = 18.2\text{ kN}$$

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$$-15 + 9 = -6$$



$$R^2 = 6^2 + 12^2$$

$$R^2 = 180$$

$$R = \sqrt{180}$$

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

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

$$\tan \alpha = \left(\frac{12}{6}\right)$$

$$\alpha = 63.43^\circ$$

$$\text{bearing} = 270 - 63.43$$
$$= 206.57^\circ$$

13.42N to the left

63.43 to the horizontal

The bearing = 206.57°

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Science exam

1. a) Area = m^2

b) Volume = m^3

c) Mass = kg

d) Force = N

e) Weight = N

2. Density = $\frac{\text{mass}}{\text{Volume}}$

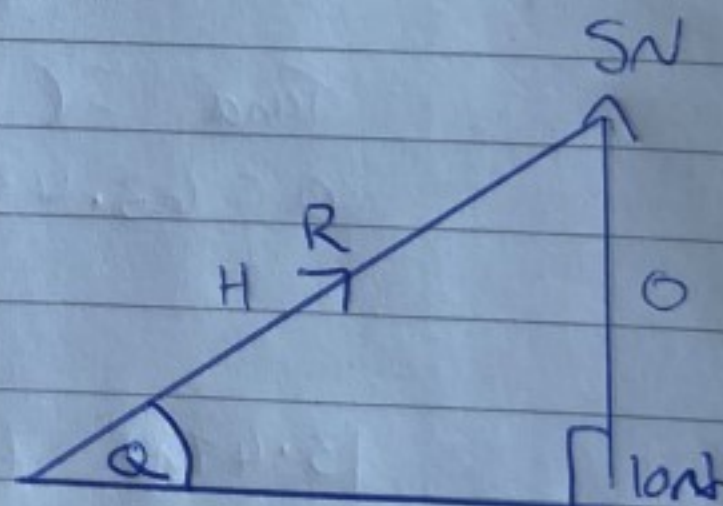
= Density = kgm^{-3}

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

3.

a)

5N



10N

$$R^2 = 5^2 + 10^2$$

$$R^2 = 125N$$

$$R = \sqrt{125}$$

$$R = 11.18N$$

bearing

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

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

$$\alpha = 26.57^\circ$$

$$\text{bearing} = 90 - 26.57$$

$$= 63.43$$

11.18N to the right

26.57 above the horizontal

Science Exam

(b) ^(a) positive to negative

$$\begin{aligned} & \text{(b)} \quad \frac{1}{\left(\frac{1}{2} + \frac{1}{6} \right)} \\ & \quad \quad \quad 0.5 \quad + \quad 0.17 \quad = 0.67 \\ & \quad \quad \quad \frac{1}{0.67} = 0.67 \Omega \end{aligned}$$

$$R_T = 0.5 + 0.67 + 3$$

$$R_T = 4.17 \Omega$$

$$c) \quad 1 = \frac{V}{R} \quad 1 = \frac{12}{4.17}$$

$$1 = \underline{2.88A}$$

$$D) \quad 2.88 \times 3 = \underline{8.64V}$$

$$e) \quad \frac{V}{R} \quad 1 = \frac{10.56}{2}$$

$$2.88 - 2.16 = 0.72$$

$$f) \quad 2\Omega \text{ Resistor} = 0.72A$$

$$g) \quad 2.88 - 0.72 = 2.16A$$

$$6\Omega \text{ Resistor} = 2.16A$$

3

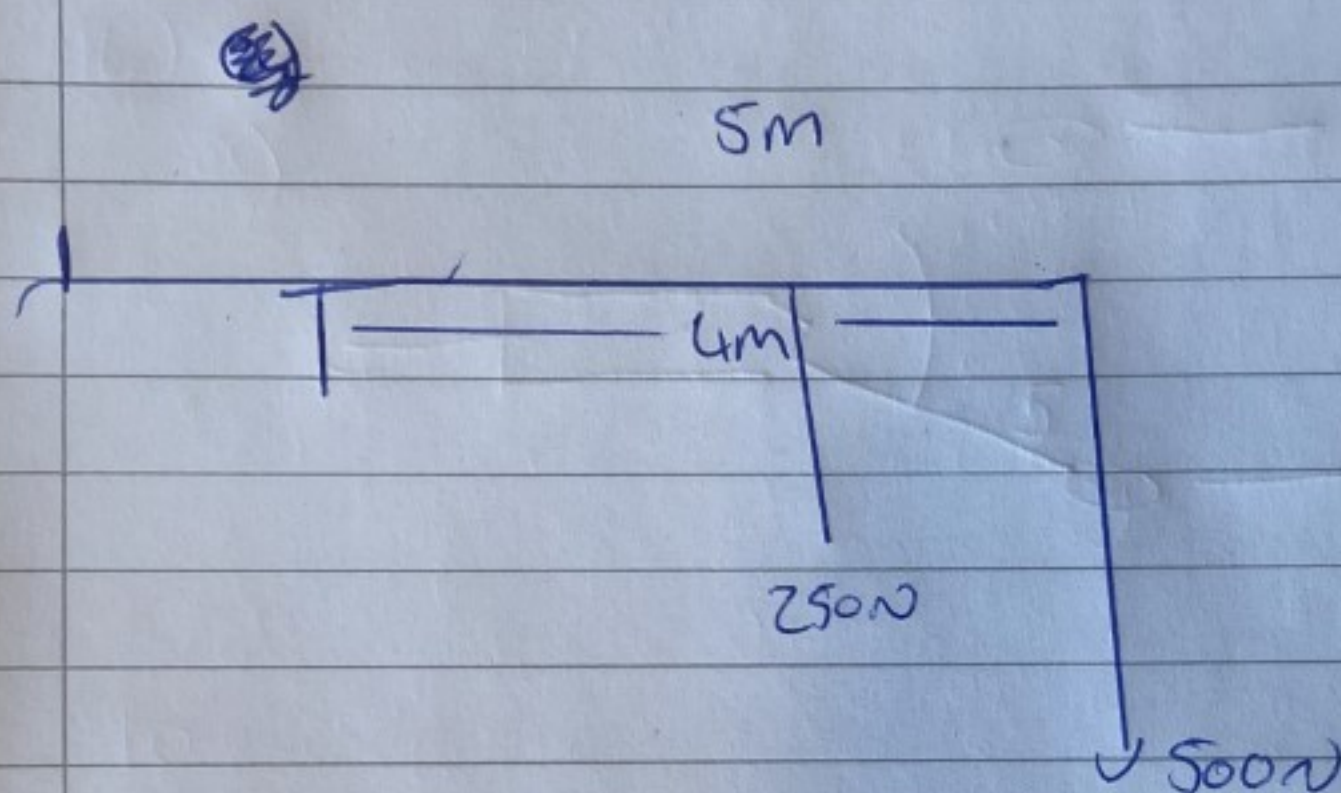
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Science exam

5)

Weight $\times$ ~~Per~~ Distance

(a) $750\text{N} \times 5\text{m} =$
 Force 3750N

(b) Weight $\times$ Distance
 $750\text{N} \times 4\text{m}$
 Force $= 3000\text{N}$