

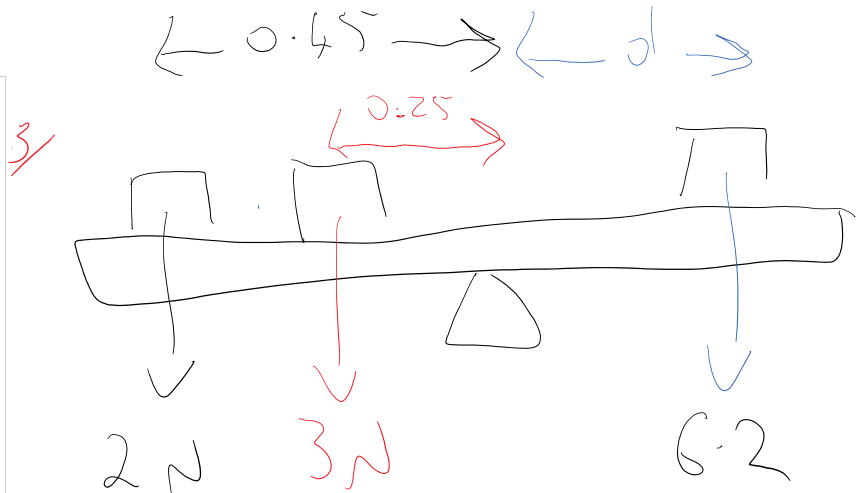


Worksheet 4

1. A child of weight 200N sits on a seesaw at a distance of 1.2m from the pivot at the centre. The seesaw is balanced by a second child sitting on it at a distance of 0.8m from the centre. Calculate the weight of the second child.
2. A metre rule pivoted at its centre of mass, supports a 3N weight at its 5cm mark, a 2N weight at the 25cm mark and a weight W at the 80cm mark.
 - a. Sketch the free body diagram.
 - b. Calculate the weight W
3. In question 2, the 2N weight and the 3N weight are swapped with each other.
 - a. Draw the new free body diagram
 - b. Work out the distance of the weight W from the pivot.
4. A uniform metre rule supports a 4.5N weight at its 100mm mark. The rule is balanced horizontally on a horizontal knife edge at its 340mm mark.
 - a. Draw the new free body diagram
 - b. calculate the weight of the rule.

Weight acts from the centre

$$CWm = ACWm$$



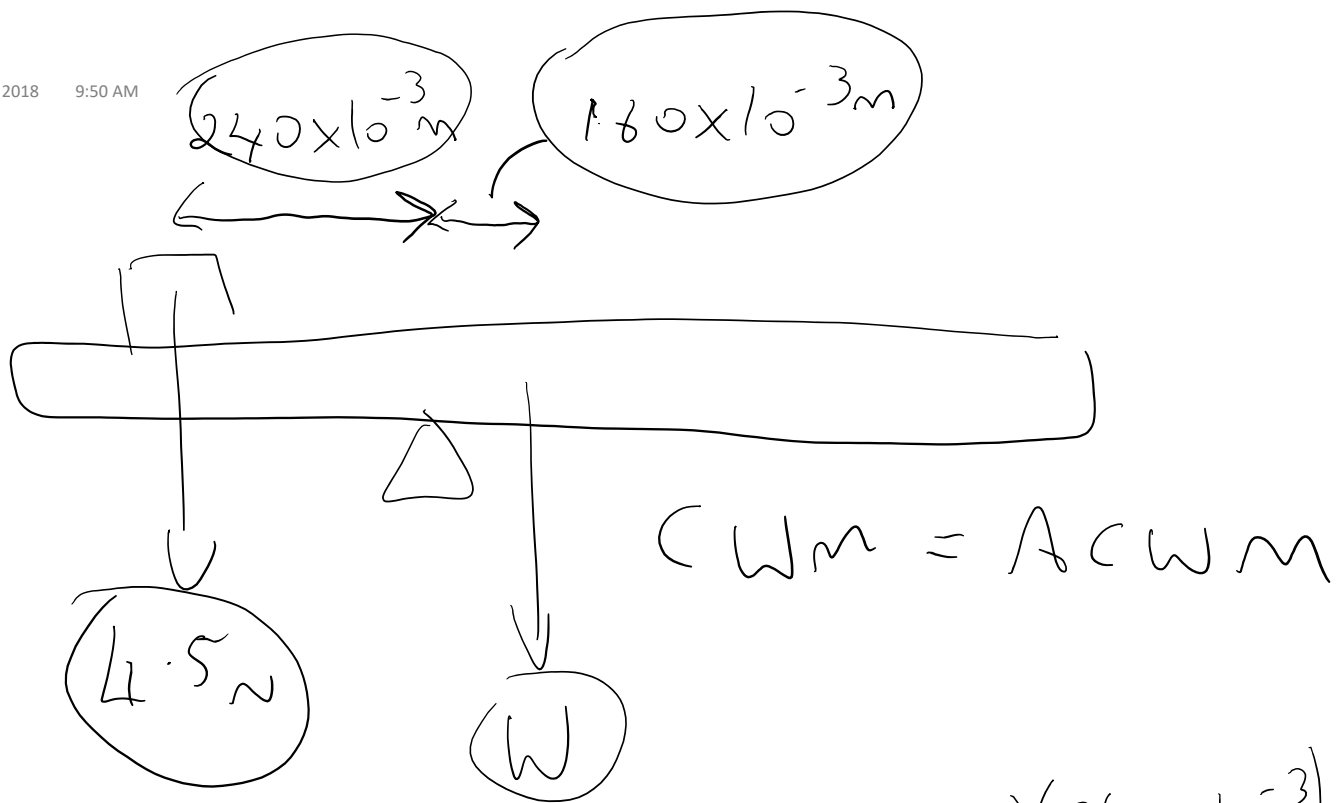
$$CWm = ACWm$$

$$6.2d = (2)(0.45) + (3)(0.25)$$

$$6.2d = 0.9 + 0.75$$

$$6.2d = 1.65$$

$$d = \frac{1.65}{6.2} = 0.266m$$



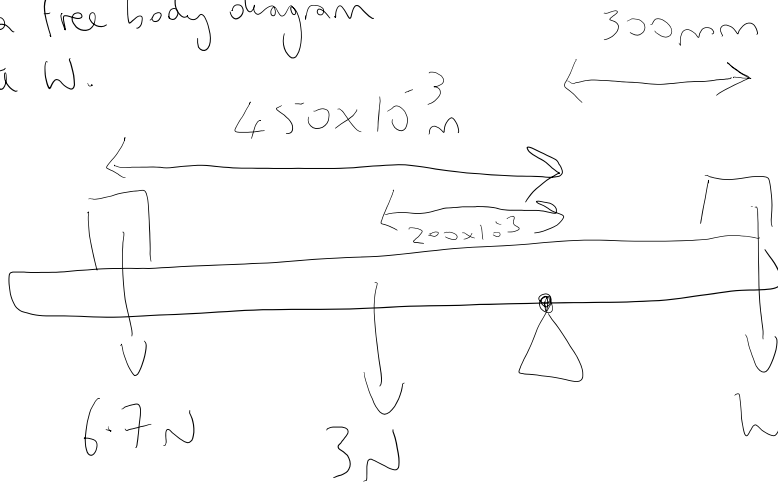
$$(160 \times 10^{-3})(W) = (4.5)(240 \times 10^{-3})$$

$$0.16W = 1.08$$

$$W = \frac{1.08}{0.16} = 6.75\text{ N}$$

A uniform metre rule is balanced on a pivot at the 700mm mark. A 6.7N weight is at the 250mm mark and a weight W at the 1000mm mark.
 The weight of the ruler is 3N

- i) Draw a free body diagram
 ii) Calculate W .



$$CLM = A(WM)$$

$$W(0.3) = (6.7 \times 0.45) + (3)(0.2)$$

$$W(0.3) = 3.615$$

$$W = 3.615 / 0.3 = 12.05N$$