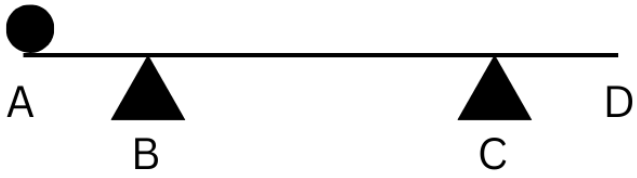
Year 13 Maths

A uniform rod of length of weight 40 N rests symmetrically on two pivots
When a weight of 30 N is placed at A, the rod is on the point of tilting



Find the ratio of distances $AB : BC$

Let x be the distance AB and y be the distance BC

As the rod is tilting around B, there will be no contact at C. Hence the reaction force at C will be zero.

Taking moments about B:

$$30 \times x = 40 \times \frac{y}{2}$$

Here we half the value of y as the rod is resting symmetrically on the pivots.

Therefore:

$$\begin{aligned} 30x &= 20y \\ \implies 3x &= 2y \\ \implies \frac{x}{y} &= \frac{2}{3} \\ \implies AB : BC &= 2 : 3 \end{aligned}$$