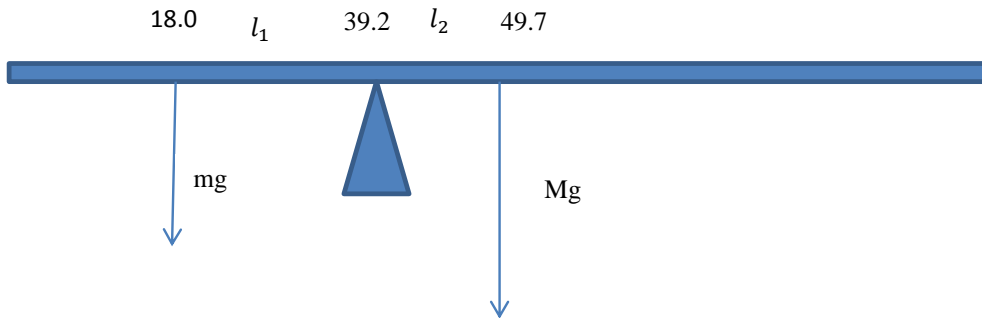


A meter stick is found to balance at the 49.7-cm mark when placed on a fulcrum. When a 46.0-gram mass is attached at the 18.0-cm mark, the fulcrum must be moved to the 39.2-cm mark for balance. What is the mass of the meter stick?



M - mass of the meter stick, $m = 46.0$ gram

Newton's first law for rotational motion:

$$mgl_1 = Mgl_2$$

Lengths l_1 and l_2 can be found as:

$$l_1 = 39.2 - 18.0 = 21.2 \text{ cm}$$

$$l_2 = 49.7 - 39.2 = 10.5 \text{ cm}$$

Therefore, mass of the meter stick equals:

$$M = m \frac{21.2}{10.5} = 46.0 \frac{21.2}{10.5} g = 92.9 g$$

Answer: 92.9 g