



Consider a ladder.
 The lengths of the sides:
 $\overline{AO} = \overline{BO}$. A weight W
 is attached to the midpoint
 P ($\overline{AP} = \overline{PO}$). The mass of
 the ladder is negligible com-
 pared to W . The ladder rest
 on a frictionless horizontal
 floor. Junction O at the top
 is rigid.

Which one is right?

- A) $F_1 = \frac{3W}{4}$.
- B) $F_1 = \frac{W}{2}$.
- C) $F_1 = \frac{W}{4}$.

About A, the clockwise torque is,

$$\tau_{cw} = \overline{AP'} \times W,$$

where $\overline{AP'} = \frac{AB}{4}$.

The counterclockwise torque,

$$\tau_{ccw} = \overline{AB} \times F_1.$$

The equation,

$$\tau_{ccw} = \tau_{cw}$$

gives $F_1 = \frac{W}{4}$.

Answer **C**.