

### Answer on Question #66441, Physics / Mechanics | Relativity

A block of mass  $M$  is tied to one end of a massless rope. The other end of the rope is in the hands of a man of mass  $2M$ . The block and the man are in rest on the wedge. The man pulls the rope. Pulley is massless and frictionless. What is the displacement of the wedge when the block meets the pulley. (man does not leave his position during the pull)

#### Solution:

The external horizontal force the system is zero

$$M_{\text{block}}\Delta x_1 + M_{\text{man}}\Delta x_2 + M_{\text{wedge}}\Delta x_3 = 0$$

$$\Delta x_2 = \Delta x_3 = L$$

$$M_{\text{block}}(L-2) + M_{\text{man}}L + M_{\text{wedge}}L = 0$$

$$L = 2M / 4 M$$

$$L = 0.5 \text{ m}$$

**Answer: 0.5 m**