

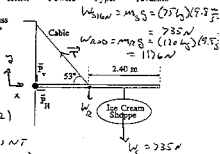
Name _____

Social Security #: _____

Discussion Sec. # _____

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A 75.0 kg sign hangs from a 4.80 m uniform horizontal rod whose mass is 120 kg. The rod is supported by a cable that makes an angle of 53° with the rod. See figure. The sign hangs 3.60 m out along the rod.



A. What is the tension in the cable?

STATIC EQUIL.

TRANS. X: $P_H - T \cos 53^\circ = 0$ (1)

Y: $P_V + T \sin 53^\circ - 735 \text{ N} - 1176 \text{ N} = 0$ (2)

ROT: USE ATTACHMENT PT. AS PIVOT POINT

$-W_R(2.40 \text{ m}) + T(2.40 \text{ m} \sin 53^\circ) - W_S(3.60 \text{ m}) = 0$

$T = \frac{(1176 \text{ N})(2.40 \text{ m}) + (735 \text{ N})(3.60 \text{ m})}{(2.40 \text{ m})(.8)}$

$T = 2850 \text{ N}$ 11 PTS

B. What are the forces \vec{P}_H and \vec{P}_V exerted by the wall on the left end of the rod?

FROM (1) ABOVE

$P_H = T \cos 53^\circ = (2850 \text{ N})(.6)$

$\vec{P}_H = 1710 \text{ N } \hat{x}$ 11 PTS

FROM (2) ABOVE

$P_V = 735 \text{ N} + 1176 \text{ N} - T \sin 53^\circ$

$= 1911 \text{ N} - 2280 \text{ N}$

$\vec{P}_V = 369 \text{ N } (-\hat{y})$

NOTE: \vec{P}_V POINTS DOWN

11 PTS