

30. (a) Computing torques about point A , we find

$$T_{\max} L \sin \theta = W x_{\max} + W_b \left(\frac{L}{2} \right) .$$

We solve for the maximum distance:

$$x_{\max} = \frac{T_{\max} \sin \theta - \frac{W_b}{2}}{W} L = \frac{500 \sin 30^\circ - \frac{200}{2}}{300} (3.0) = 1.5 \text{ m} .$$

(b) Equilibrium of horizontal forces gives

$$F_x = T_{\max} \cos \theta = 433 \text{ N} .$$

(c) And equilibrium of vertical forces gives

$$F_y = W + W_b - T_{\max} \sin \theta = 250 \text{ N} .$$