

27. (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:

$$x_{\max} = \left(\frac{T_{\max} \sin \theta - W_b / 2}{W} \right) L = \left(\frac{500 \sin 30.0^\circ - 200 / 2}{300} \right) (3.00) = 1.50 \text{ m}.$$

(b) Equilibrium of horizontal forces gives $F_x = T_{\max} \cos \theta = 433 \text{ N}$.

(c) And equilibrium of vertical forces gives $F_y = W + W_b - T_{\max} \sin \theta = 250 \text{ N}$.