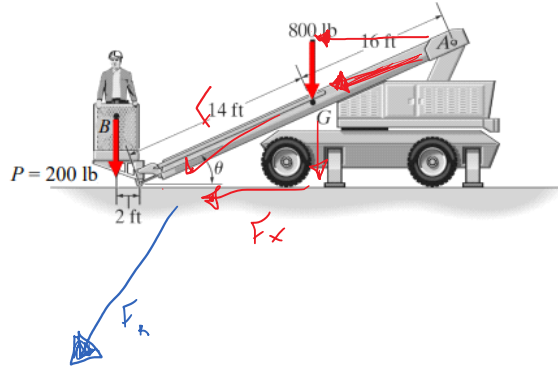


Problem 2. (10 pts)

A boom with a length of 30 ft, and a weight of $W = 800$ lb acting at mass center at G is used to lift the load $P = 200$ lb located at point B . Let $\theta = 30^\circ$.

- Replace the two loads acting on the boom with a single resultant force.
- Specify where the force acts **along the boom**, as a distance measured from end A .



$$F = \frac{800}{\sin(30)}$$

$$F_x = -1385.64$$

$$F_y = -200 - 800$$

$$F_y = -1000$$

$$F_R = \sqrt{(1385.64)^2 + (1000)^2}$$

$$A.) F_R = 1708.8 \text{ lbs}$$

$$\textcircled{a} 215.82^\circ \text{ from } +x$$

$$\tan^{-1}\left(\frac{1385.64}{1000}\right)$$

$$\overset{\curvearrowleft}{M}_A = 800(12.99) + 200(25.98 + 2)$$

$$\overset{\curvearrowleft}{M}_A = 15988.3 \text{ lb} \cdot \text{ft}$$

$$\overset{\curvearrowleft}{M}_A = F_R \cdot d_R$$

$$d_R = \frac{\overset{\curvearrowleft}{M}_A}{F_R}$$

$$d_R = \frac{15988.3}{1708.8}$$

$$h = \frac{9.36}{\cos(30)} = 10.81 \text{ ft}$$

B.)

$$d_R = 9.36 \text{ ft away from A :}$$



B.)

$d_R = 9.36$ ft away from A :
on the boom

