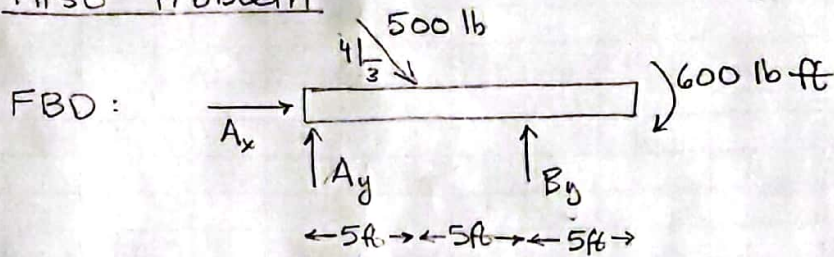


10/21/21

SI Statics
Worksheet #7

Solution

First Problem

Equilibrium equations:

$$\sum F_x = 0 = A_x + \frac{3}{5}(500 \text{ lb}) \Rightarrow \boxed{A_x = -300 \text{ lb}}$$

$$\sum M_A = 0 = (10 \text{ ft})B_y - (5 \text{ ft})\frac{4}{5}(500 \text{ lb}) - 600 \text{ lb}\cdot\text{ft}$$

$$= (10 \text{ ft})B_y - 2600 \text{ ft}\cdot\text{lb} \Rightarrow \boxed{B_y = 260 \text{ lb}}$$

$$\sum F_y = 0 = A_y + 260 \text{ lb} - \frac{4}{5}(500 \text{ lb})$$

$$\Rightarrow \boxed{A_y = 140 \text{ lb}}$$

Check: $\sum M_B = \frac{4}{5}(500 \text{ lb})(5 \text{ ft}) - (140 \text{ lb})(10 \text{ ft}) - 600 \text{ lb}\cdot\text{ft}$
 $= 2000 \text{ lb}\cdot\text{ft} - 1400 \text{ lb}\cdot\text{ft} - 600 \text{ lb}\cdot\text{ft} = 0 \quad \checkmark$

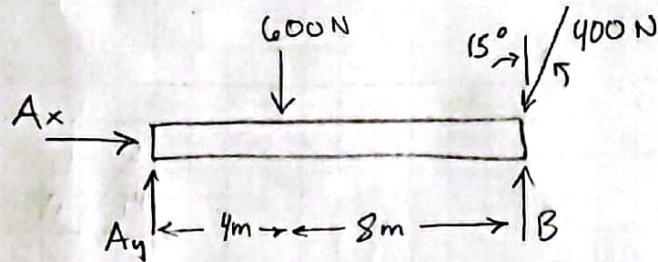
10/21/21

SI Statics
Worksheet #7

Solution

Second Problem

FBD:



Equilibrium Equations:

$$\sum \overset{\curvearrowleft}{M} = 0 = (12\text{m})B - (12\text{m})400\text{N} \cos 15^\circ - (4\text{m})600\text{N}$$
$$= (12\text{m})B - 4636\text{ N}\cdot\text{m} - 2400\text{ N}\cdot\text{m}$$

$$\Rightarrow \boxed{B = 586\text{ N}}$$

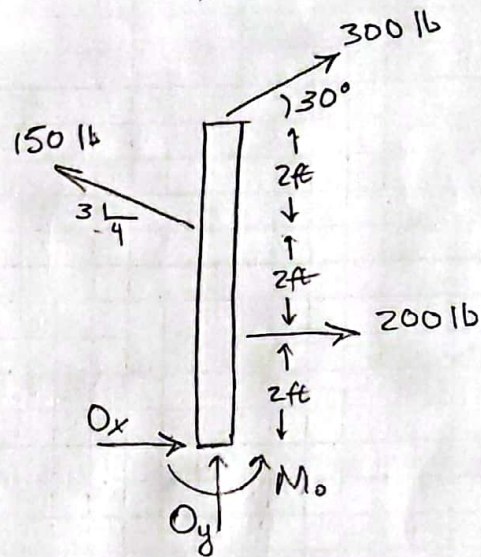
$$\sum F_y = 0 = 586\text{ N} - 400\text{N} \cos 15^\circ - 600\text{ N} + A_y$$

$$\Rightarrow \boxed{A_y = 400\text{ N}}$$

$$\sum F_x = 0 = A_x - 400\text{N} \sin 15^\circ \Rightarrow \boxed{A_x = 103.5\text{ N}}$$

Third Problem

FBD:



Equilibrium equations:

$$\sum \vec{M} = 0 = M_o - 2\text{ft}(200\text{lb}) - 6\text{ft}(300\text{lb} \cos 30^\circ) + 4\text{ft}(150\text{lb})\left(\frac{4}{5}\right) \Rightarrow \boxed{M_o = 1479 \text{ lb}\cdot\text{ft}}$$

$$\sum F_x = 0 = O_x + 200\text{lb} + 300\text{lb} \cos 30^\circ - 150\text{lb}\left(\frac{4}{5}\right) \Rightarrow \boxed{O_x = -340 \text{ lb}}$$

$$\sum F_y = 0 = O_y + 300\text{lb} \sin 30^\circ + 150\text{lb}\left(\frac{3}{5}\right) \Rightarrow \boxed{O_y = -240 \text{ lb}}$$