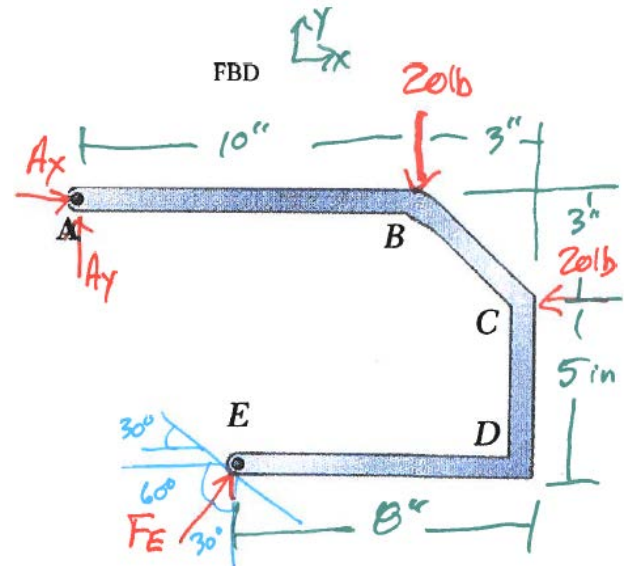
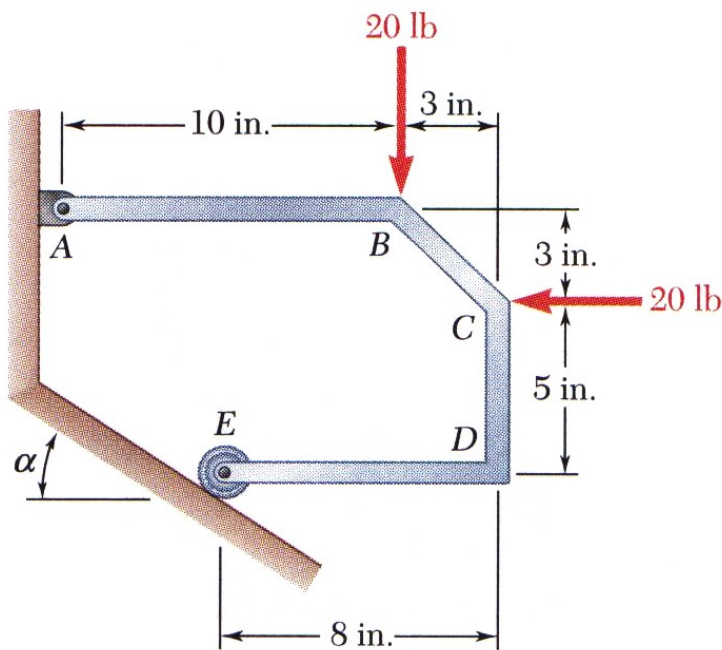


EGM 3420C - Engineering Mechanics

Statics Review 1 Problems

Problem 2

- a. For the frame shown below, draw the complete free body diagram.



- b. If $\alpha = 30^\circ$, determine all unknown reactions at support A and E.

$$\begin{aligned} \sum M_A &= 0 \\ 20 \text{ lb}(10'') + 20 \text{ lb}(3'') - F_E \cos 30^\circ(5'') - F_E \sin 30^\circ(8'') &= 0 \\ F_E &= 31.2 \text{ lbs} \nearrow 60^\circ \end{aligned}$$

$$\begin{aligned} \sum F_y &= 0 \\ A_y - 20 \text{ lb} + F_E \cos 30^\circ &= 0 \\ A_y &= -7.03 \text{ lbs} = 7.03 \text{ lbs} \downarrow \end{aligned}$$

$$\begin{aligned} \sum F_x &= 0 \\ A_x - 20 + F_E \sin 30^\circ &= 0 \\ A_x &= 4.4 = 4.4 \text{ lbs} \rightarrow \end{aligned}$$

ANSWER:

$$A_x = 4.4 \text{ lbs} \rightarrow A_y = 7.03 \text{ lbs} \downarrow F_E = 31.2 \text{ lbs} \nearrow 60^\circ$$