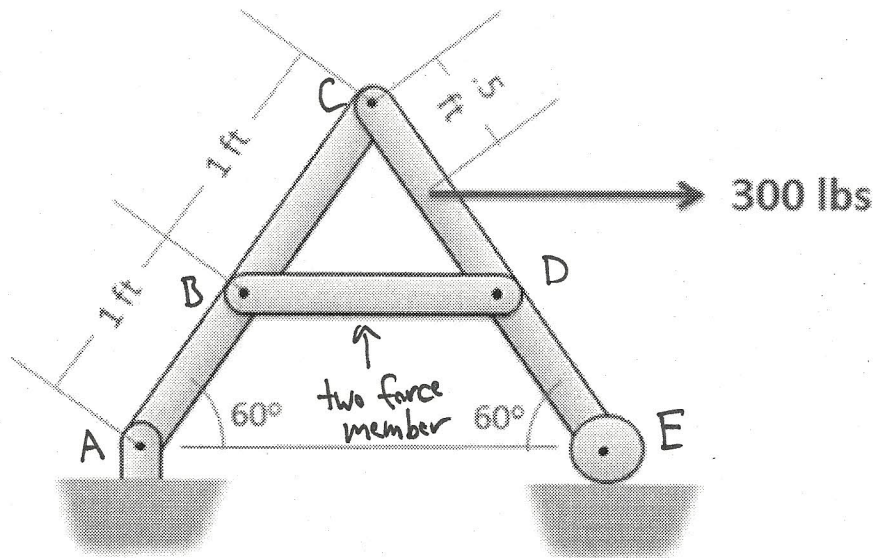


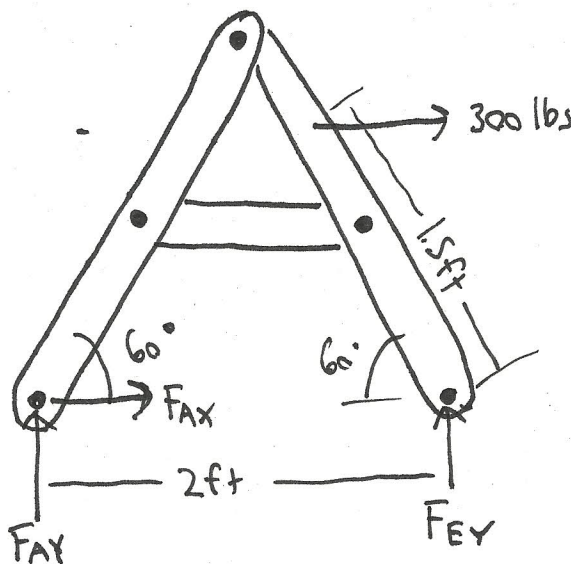
Question 1:

Find all the forces acting on each of the members in the structure below.



Calculations:

Start by analyzing the whole ~~body~~ structure as a rigid body



$$\sum F_x = F_{AX} + 300 = 0$$

$$\sum F_y = F_{AY} + F_{EY} = 0$$

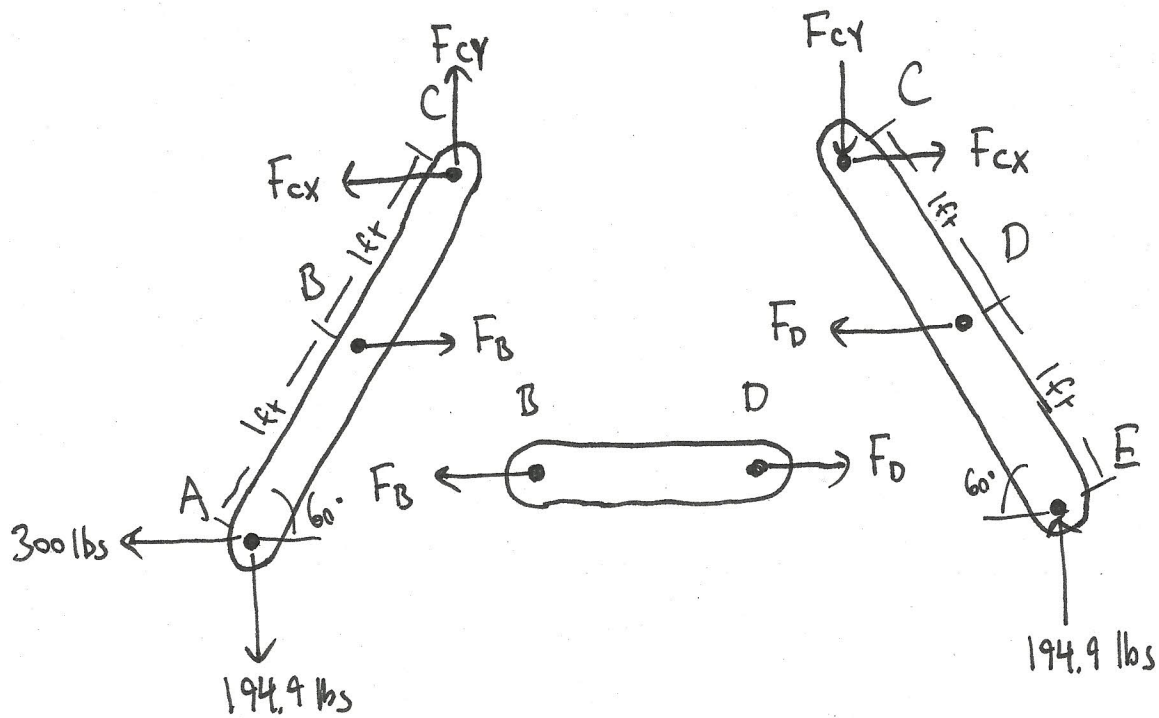
$$\sum M_A = (2)(F_{EY}) - (1.5 \sin(60))(300) = 0$$

$$F_{AX} = -300 \text{ lbs}$$

$$F_{EY} = \frac{(1.5 \sin(60))(300)}{2} = 194.9 \text{ lbs}$$

$$F_{AY} = -194.9 \text{ lbs}$$

Now break the components apart.



Member ABC

$$\sum F_x = -F_{Cx} + F_B - 300 = 0$$

$$\sum F_y = F_{Cy} - 194.9 = 0$$

$$\sum M_C = (1 \sin(60))(F_B) + (2 \cos(60))(194.9) - (2 \sin(60))(300) = 0$$

$$F_{Cy} = 194.9 \text{ lbs}$$

$$F_B = \frac{(-2 \cos(60))(194.9) + (2 \sin(60))(300)}{\sin(60)} = 374.9 \text{ lbs}$$

$$F_{Cx} = 374.9 - 300 = 74.9 \text{ lbs}$$

Member BD

$$\sum F_x = -F_B + F_D = 0$$

$$F_D = 374.9 \text{ lbs}$$

Solution

