

Analyzing the left section, we determined the following in class:

$$\begin{aligned} \sum F_y = 0 &\Rightarrow Ay = 60 \\ \sum M_F = 0 &= -60(20) + F_{BC}(15) \Rightarrow F_{BC} = 80 \text{ k, T} \\ \sum F_x = 0 &= 60 - 60 + 80 + F_{FC} \Rightarrow F_{FC} = 80 \text{ k, C} \end{aligned}$$

$$\begin{aligned} \sum M_D = 0 &= -60(5) - 60(15) + Cy(15) \\ Cy &= -80 \text{ k} \downarrow \\ \sum M_C = 0 &= -60(5) - 60(15) + Dy(15) \end{aligned}$$

$$Dy = 80 \text{ k} \uparrow$$

What we know so far is the following :

$$R_{Ax} = 60 \text{ K} \leftarrow$$

$$R_{Ay} = \emptyset$$

$$R_{Cy} = 80 \text{ K} \downarrow$$

$$R_{Dy} = 80 \text{ K} \uparrow$$

$$FE = 80 \text{ K, Compression}$$

$$BC = 80 \text{ K, Tension}$$

For Monday, determine the following using Method of Joints :

$$AF = ? \quad \text{Compression or Tension?}$$

$$ED = ? \quad "$$

$$DC = ? \quad "$$

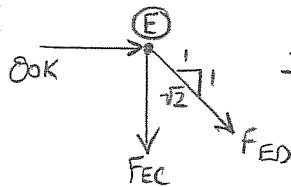
$$BA = ? \quad "$$

$$FB = ? \quad "$$

$$EC = ? \quad "$$

Now we can apply the Method of Joints to solve for the remaining members:

For joint E,



$$\rightarrow \Sigma F_x = 0 = 80 \text{ K} + F_{ED} \left( \frac{1}{\sqrt{2}} \right)$$

$$F_{ED} = \frac{-80 \times \sqrt{2}}{1} = -113.14 \text{ K} \leftarrow$$

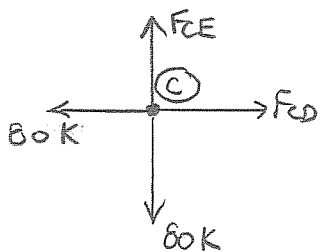
$$F_{ED} = 113 \text{ K, C}$$

$$+\uparrow \Sigma F_y = 0 = -F_{EC} + 113 \left( \frac{1}{\sqrt{2}} \right)$$

$$F_{EC} = 80 \text{ K} \downarrow$$

$$F_{EC} = 80 \text{ K, T}$$

For Joint C,



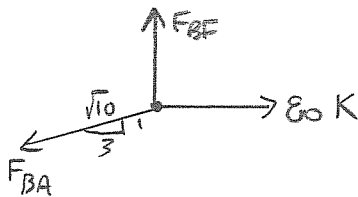
$$\rightarrow \Sigma F_x = 0 = -80 \text{ KN} + F_{CD}$$

$$F_{CD} = 80 \text{ K} \rightarrow = 80 \text{ K, T}$$

$$+\uparrow \Sigma F_y = 0 = -80 \text{ KN} + F_{CE}$$

$$F_{CE} = 80 \text{ K} \uparrow = 80 \text{ K, T}$$

For joint B,



$$\rightarrow \Sigma F_x = 0 = -F_{BA} \left( \frac{3}{5} \right) + 80 \text{ K}$$

$$F_{BA} = \left( \frac{80 \times 5}{3} \right) = 84.33 \quad \checkmark$$

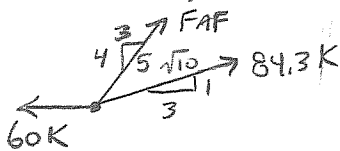
$$F_{BA} = 84.3 \text{ K, T}$$

$$+\uparrow \Sigma F_y = 0 = -84.33 \left( \frac{4}{5} \right) + F_{BF}$$

$$F_{BF} = 84.33 \left( \frac{4}{5} \right)$$

$$F_{BF} = 26.67 \text{ K} \uparrow = 26.7 \text{ K, T}$$

For joint A,



$$+\uparrow \Sigma F_y = 0 = 84.33 \left( \frac{4}{5} \right) + F_{AF} \left( \frac{4}{5} \right)$$

$$F_{AF} = \left( \frac{-84.33 \left( \frac{4}{5} \right) \times 5}{4} \right)$$

$$F_{AF} = -33.33 \text{ K} \quad \checkmark$$

$$F_{AF} = 33.3 \text{ K, C}$$

So the results are as follows:

Reactions

$$R_{Ax} = 60 \text{ K} \leftarrow$$

$$R_{Ay} = 0$$

$$R_{Cy} = 80 \text{ K} \downarrow$$

$$R_{Dy} = 80 \text{ K} \uparrow$$

Members

$$AF = 33.3 \text{ K, C}$$

$$FE = 80.0 \text{ K, C}$$

$$ED = 113 \text{ K, C}$$

$$DC = 80 \text{ K, T}$$

$$BC = 80 \text{ K, T}$$

$$BA = 84.3 \text{ K, T}$$

$$BF = 26.7 \text{ K, T}$$

$$CE = 80 \text{ K, T}$$