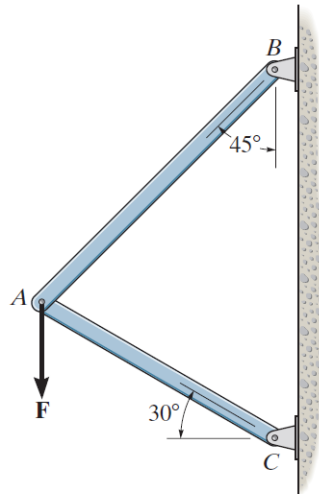


Problem 2-4

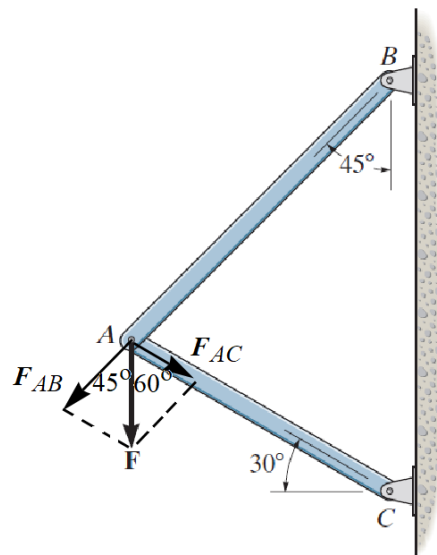
The vertical force \mathbf{F} acts downward at A on the two-membered frame. Determine the magnitudes of the two components of \mathbf{F} directed along the axes of AB and AC . Set $F = 500$ N.



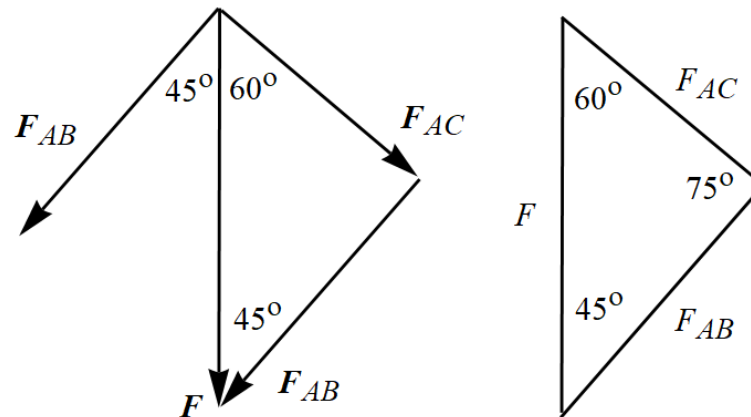
Probs. 2-4/5

Solution

Decompose the vertical force \mathbf{F} into components along axes aligned with members AB and AC .



Enlarge the parallelogram and draw the triangle consisting of the vector components and \mathbf{F} .



On the right is the triangle with the corresponding vector magnitudes. Use the law of sines to determine F_{AB} and F_{AC} .

$$\frac{F}{\sin 75^\circ} = \frac{F_{AB}}{\sin 60^\circ} \quad \rightarrow \quad F_{AB} = \frac{F}{\sin 75^\circ} \sin 60^\circ$$

$$\frac{F}{\sin 75^\circ} = \frac{F_{AC}}{\sin 45^\circ} \quad \rightarrow \quad F_{AC} = \frac{F}{\sin 75^\circ} \sin 45^\circ$$

Since $F = 500 \text{ N}$,

$$F_{AB} \approx 448 \text{ N}$$

$$F_{AC} \approx 366 \text{ N.}$$