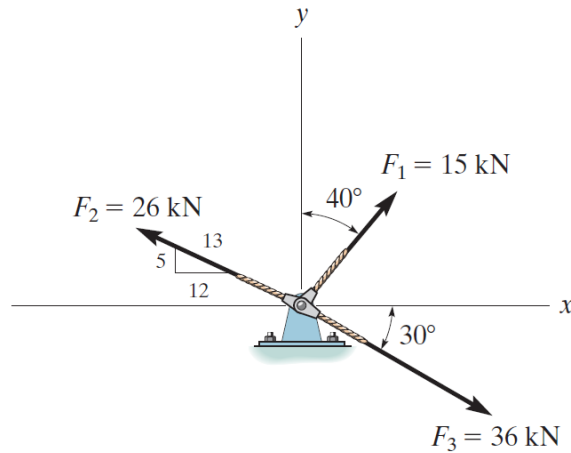


Problem 2-50

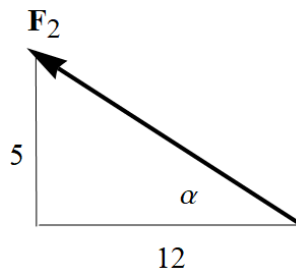
Express \mathbf{F}_1 , \mathbf{F}_2 , and \mathbf{F}_3 as Cartesian vectors.



Probs. 2-50/51

Solution

Begin by finding the angle α that \mathbf{F}_2 makes with the x -axis.



$$\tan \alpha = \frac{5}{12} \rightarrow \alpha = \tan^{-1} \left(\frac{5}{12} \right) \approx 22.6^\circ$$

Write each of the forces in component form.

$$\mathbf{F}_1 = 15 \langle \sin 40^\circ, \cos 40^\circ \rangle \text{ kN} \approx \langle 9.64, 11.5 \rangle \text{ kN}$$

$$\mathbf{F}_2 = 26 \langle -\cos \alpha, \sin \alpha \rangle \text{ kN} = 26 \left\langle -\frac{12}{13}, \frac{5}{13} \right\rangle \text{ kN} = \langle -24, 10 \rangle \text{ kN}$$

$$\mathbf{F}_3 = 36 \langle \cos 30^\circ, -\sin 30^\circ \rangle \text{ kN} \approx \langle 31.1, -18 \rangle \text{ kN}$$