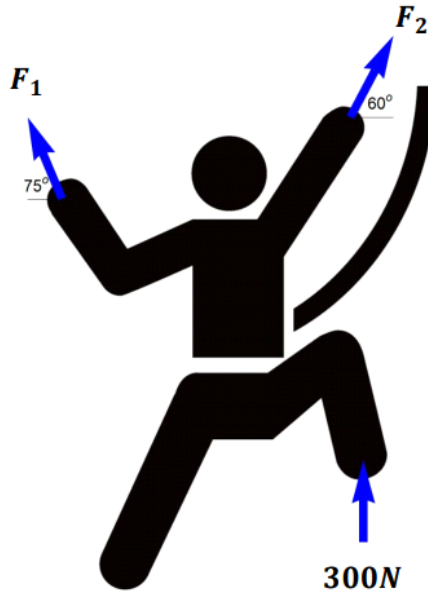


1. A rock climber is holding on with 2 hands and a foot. Determine the magnitude of forces F_1 and F_2 so that the resultant of the three vectors is 600N in the positive y-direction (up).



$$F_{1,z} = 600 \text{ N}$$

$$F_x = 0$$

$$F_x = F_2 \cos(60^\circ) - F_1 \cos(75^\circ)$$

$$F_2 \cos(60^\circ) = F_1 \cos(75^\circ)$$

$$F_1 = \frac{F_2 \cos(60^\circ)}{\cos(75^\circ)}$$

$$F_y = 600$$

$$F_y = 300 + F_1 \sin(75^\circ) + F_2 \sin(60^\circ)$$

$$-F_1 \cos(75^\circ)i + F_1 \sin(75^\circ)j$$

$$F_2 \cos(60^\circ)i + F_2 \sin(60^\circ)j$$

$$0i + 300j$$

$$0i + 600j$$

$$F_2 \frac{\cos(60^\circ)}{\cos(75^\circ)} (\sin(75^\circ) + F_2 \sin(60^\circ)) = 300$$

$$F_2 \left(\frac{\cos(60^\circ)}{\cos(75^\circ)} \sin(75^\circ) + \sin(60^\circ) \right) = 300$$

$$F_2 = 109.8 \text{ N.}$$

$$F_1 = \frac{F_2 \cos(60^\circ)}{\cos(75^\circ)}$$

$$F_1 = \frac{(109.8 \text{ N.}) \cos(60^\circ)}{\cos(75^\circ)}$$

$$F_1 = 212.1 \text{ N.}$$