

Problem 8-36

The crate is to be pushed in the x-direction.

\therefore the total force must be in the x-direction.

The 2 forces shown have a net x-component in the +x direction, and so the 3rd force does not need an x-component. However, it does need a y-component so that $\Sigma F_y = m a_y = 0$.

$$\therefore F_{1y} + F_{2y} + F_{3y} = 0$$

$$\therefore 130 \sin 20.0^\circ - 100 \sin 50.0^\circ + F_{3y} = 0$$

$$\therefore F_{3y} = 32.1 \text{ N}$$

\therefore the smallest force needed is 32.1 N in the y-direction.