5. We denote $\vec{F}$ as the horizontal force of the person exerted on the crate (in the $+x$ direction), $\vec{f}_k$ is the force of kinetic friction (in the $-x$ direction), $\vec{N}$ is the vertical normal force exerted by the floor (in the $+y$ direction), and $m\vec{g}$ is the force of gravity. The magnitude of the force of friction is given by $f_k = \mu_k N$ (Eq. 6-2). Applying Newtons' second to the $x$ and $y$ axes, we obtain

$$\begin{aligned} F - f_k &= ma \\ N - mg &= 0 \end{aligned}$$

respectively.

(a) The second equation yields the normal force $N = mg$, so that the friction is

$$f_k = \mu_k mg = (0.35)(55\,\text{kg})\left(9.8\,\text{m/s}^2\right) = 1.9 \times 10^2\ \text{N} .$$

(b) The first equation becomes

$$F - \mu_k mg = ma$$

which (with $F = 220$ N) we solve to find

$$a = \frac{F}{m} - \mu_k g = 0.56\ \text{m/s}^2 .$$