8. We choose $+x$ rightward (so $\vec{F} = 10\,\hat{\imath}$ in Newtons) and apply Eq. 9-14 and Eq. 11-37.

(a) Newton's second law in the x direction leads to

$$F - f_s = ma \implies f_s = 10\,\text{N} - (10\,\text{kg})(0.60\,\text{m/s}^2)$$

which yields $f_s = 4.0$ N. As assumed in setting up the equation, $\vec{f}_s$ points leftward.

(b) With $R = 0.30$ m, we find the magnitude of the angular acceleration to be $|\alpha| = |a_{\text{com}}|/R = 2.0\,\text{rad/s}^2$, from Eq. 12-6. The only force not directed towards (or away from) the center of mass is $\vec{f}_s$, and the torque it produces is clockwise:

$$\begin{aligned} |\tau| &= I\,|\alpha| \\ (0.30\,\text{m})(4.0\,\text{N}) &= I\left(2.0\,\text{rad/s}^2\right) \end{aligned}$$

which yields the wheel's rotational inertia about its center of mass: $I = 0.60$ kg·m^2.