101. (a) Eq. 11-15 gives

$$90\,\text{rev} = \frac{1}{2}\left(\omega_0 + 10\,\text{rev/s}\right)(15\,\text{s})$$

which leads to $\omega_0 = 2.0\,\text{rev/s}$.

(b) From Eq. 11-12, the angular acceleration is

$$\alpha = \frac{10\,\text{rev/s} - 2.0\,\text{rev/s}}{15\,\text{s}} = 0.53\ \text{rev/s}^2\ .$$

Using the equation again (with the same value for α) we seek a *negative* value of t (meaning an earlier time than that when $\omega_0 = 2.0$ rev/s) such that $\omega = 0$. Thus,

$$t = -\frac{\omega_0}{\alpha} = -\frac{2.0\,\text{rev/s}}{0.53\,\text{rev/s}^2} = -3.8\ \text{s}$$

which means that the wheel was at rest 3.8 s before the 15 s interval began.