9. We assume the sense of initial rotation is positive. Then, with $\omega_0 > 0$ and $\omega = 0$ (since it stops at time t), our angular acceleration is negative-valued.

   (a) The angular acceleration is constant, so we can apply Eq. 11-12 ($\omega = \omega_0 + \alpha t$). To obtain the requested units, we have $t = 30/60 = 0.50\,\text{min}$. Thus,

$$\alpha = -\frac{33.33\,\text{rev/min}}{0.50\,\text{min}} = -66.7\ \text{rev/min}^2\ .$$

   (b) We use Eq. 11-13:

$$\theta = \omega_0 t + \frac{1}{2}\alpha t^2 = (33.33)(0.50) + \frac{1}{2}(-66.7)(0.50)^2 = 8.3\ \text{rev}\ .$$