Ex : During an analysis of a helicopter engine, you determine that the rotor's velocity changes from **320 rev/min** to **225 rev/min** in **1.50 min**.

a). What is the average angular acceleration of the rotor blades during this interval?

$$\overline{\alpha} = \frac{\omega_f - \omega_i}{t_f - t_i} = \frac{225 \text{ rev/min} - 320 \text{ rev/min}}{1.50 \text{ min}} = -63.6 \text{ rev/min}^2$$

b). If this α is constant, how long will it take for the rotor blades to stop?

$$\omega_f = \omega_i + \alpha t \qquad t = \frac{\omega_f - \omega_i}{\alpha} = \frac{0 - 320 \text{ rev/min}}{-63.3 \text{ rev/min}^2}$$

$$t = 5.1 \text{ min}$$

c). How many revolutions will the rotor blades make during this time?

$$\Delta\theta = \omega_f t - \frac{1}{2}\alpha t^2 = 0 - \frac{1}{2}(-63.3 \text{ rev/min}^2)(5.1 \text{ min})^2 = 810 \text{ rev}$$

$\Rightarrow$ **Same techniques, different variables.**