\[ \alpha = 3 \text{ rad/s}^2 \]

Eqs. \[ \Theta = \Theta_0 + \omega_0 t + \frac{1}{2} \alpha t^2 \quad w = \omega_0 + \alpha t \quad \omega_f^2 - \omega_0^2 = 2\alpha(\Theta_f - \Theta_0) \]

\[ \Theta - \Theta_0 = \omega_0 t + \frac{1}{2} \alpha t^2 \quad \text{Use to calculate the velocity} \]

\[ 120 = \omega_0 (4) + \frac{1}{2} (3) (4)^2 \quad \text{initial angular acceleration at the beginning of the 4s interval} \]

\[ \omega_0 = 24 \]

Now take what is \( \omega_0 \) above and make it \( \omega_f \) since we are interested in how long it took to get to the above interval

\[ w = \omega_0 + \alpha t \]

\[ 24 = 0 + 3 (t) \]

\[ t = 8 \text{ sec.} \]