P4.1-1) A circular saw blade is rotating at 1500 rpm when power to the saw is turned off. The angular speed of the blade decelerates at a rate of $\alpha = 2t$ rad/s^2, where t is in seconds. Determine the number of revolutions it takes for the saw blade to come to rest.

Given:

Find:

Solution:

Derive the saw's angular velocity as a function of time.

Circle the equation that you will use?

$$\boldsymbol{\omega} = \frac{d\boldsymbol{\theta}}{dt} \qquad \boldsymbol{\alpha} = \frac{d\boldsymbol{\omega}}{dt} \qquad \boldsymbol{\alpha}\, d\boldsymbol{\theta} = \boldsymbol{\omega}\, d\boldsymbol{\omega}$$

$\boldsymbol{\omega}(t)$ = _____

Determine the time it takes until the blade stops.

t_{stop} = _____

Derive the saw's angular position as a function of time.

Circle the equation that you will use?

$$\boldsymbol{\omega} = \frac{d\boldsymbol{\theta}}{dt} \qquad \boldsymbol{\alpha} = \frac{d\boldsymbol{\omega}}{dt} \qquad \boldsymbol{\alpha}\, d\boldsymbol{\theta} = \boldsymbol{\omega}\, d\boldsymbol{\omega}$$

$\boldsymbol{\theta}(t)$ = _____

Calculate the saw's angular displacement.

$\Delta\boldsymbol{\theta}$ = _____