



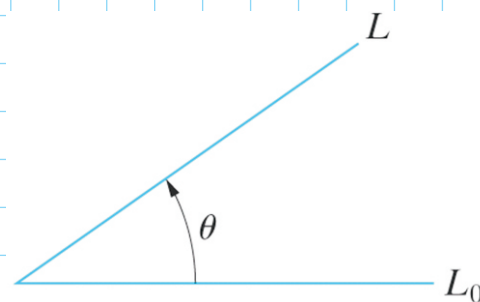
NAME \_\_\_\_\_

DATE \_\_\_\_\_

**WEEK:** \_\_\_\_\_ **PROBLEM:** \_\_\_\_\_

**GIVEN:**

The angular acceleration of the line  $L$  relative to the line  $L_0$  is given as a function of time by  $\alpha = 2.5 - 1.2t \text{ rad/s}^2$ . At  $t = 0, \theta = 0$  and the angular velocity of  $L$  relative to  $L_0$  is  $\omega = 5 \text{ rad/s}$ . Determine  $\theta$  and  $\omega$  at  $t = 3 \text{ s}$ .



**REQUIRED:**

**SOLUTION:**

**Solution:**

$$\alpha = 2.5 - 1.2t$$

$$\omega = 2.5t - 0.6t^2 + 5$$

$$\theta = 1.25t^2 - 0.2t^3 + 5t$$

$$\Rightarrow \begin{cases} \theta(3) = 1.25(3)^2 - 0.2(3)^3 + 5(3) = 20.85 \text{ rad} \\ \omega(3) = 2.5(3) - 0.6(3)^2 + 5 = 7.1 \text{ rad/s} \end{cases}$$