

NAME \_\_\_\_\_

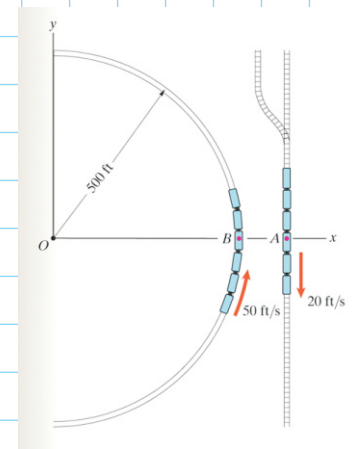
DATE \_\_\_\_\_

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

**GIVEN:**

The train on the circular track is traveling at a constant speed of 50 ft/s. The train on the straight track is traveling at 20 ft/s and is increasing its speed at 2 ft/s<sup>2</sup>. In terms of the earth-fixed coordinate system shown,

what is the velocity of passenger A relative to passenger B?  
what is the acceleration of passenger A relative to passenger B?



**REQUIRED:**

**SOLUTION:**

**Solution:**

$$\mathbf{v}_A = (-20\mathbf{j}) \text{ ft/s}, \mathbf{v}_B = (50\mathbf{j}) \text{ ft/s}$$

$$\boxed{\mathbf{v}_{A/B} = \mathbf{v}_A - \mathbf{v}_B = (-70\mathbf{j}) \text{ ft/s}}$$

$$\mathbf{a}_A = (-2\mathbf{j}) \text{ ft/s}^2, \mathbf{a}_B = -\frac{(50 \text{ ft/s})^2}{500 \text{ ft}}\mathbf{i} = (-5\mathbf{i}) \text{ ft/s}^2$$

$$\boxed{\mathbf{a}_{A/B} = \mathbf{a}_A - \mathbf{a}_B = (5\mathbf{i} - 2\mathbf{j}) \text{ ft/s}^2}$$