Name: _____ Date: _____ Class: _____

Pre-Activity Worksheet Answer Key

A robot called Nemo has 2.5-inch wheels and a robot named Wall-E has 3.5-inch wheels. The motors of both robots have the same RPM (revolutions per minute). Both robots drive forward for 1 minute.

1. Which of the following is true?
   a. Wall-E will go farther than Nemo.
   b. Nemo will go farther than Wall-E.
   c. Both travel the same distance.

2. Which robot will have a greater linear velocity?
   a. Wall-E
   b. Nemo
   c. Both have the same linear velocity.

3. Which robot will have a greater angular velocity?
   a. Wall-E
   b. Nemo
   c. Both have the same angular velocity.

For the following questions, the robots have the same wheel diameter as above (2.5-in for Nemo and 3.5-in for Wall-E).

4. Wall-E is driving with an angular velocity of 20 radians/sec. Calculate Wall-E's linear velocity.

$$\mathbf{v = \omega r} \qquad \omega = \frac{\mathbf{20\ rad}}{\mathbf{sec}} \qquad \mathbf{r} = \frac{\mathbf{3.5}}{\mathbf{2}}\mathbf{in}$$

$$\mathbf{v} = \frac{\mathbf{20\ rad}}{\mathbf{1\ sec}} \cdot \mathbf{1.75\ in} = \frac{\mathbf{35\ in}}{\mathbf{sec}}$$

5. Nemo is driving with an angular velocity of 20 radians/sec. Calculate Nemo's linear velocity.

$$\mathbf{v = \omega r} \qquad \omega = \frac{\mathbf{20\ rad}}{\mathbf{sec}} \qquad \mathbf{r} = \frac{\mathbf{2.5}}{\mathbf{2}}\mathbf{in}$$

$$\mathbf{v} = \frac{\mathbf{20\ rad}}{\mathbf{1\ sec}} \cdot \mathbf{1.25\ in} = \frac{\mathbf{25\ in}}{\mathbf{sec}}$$

6. You want Wall-E and Nemo to end up at the same location. Given their respective wheel sizes, describe how Wall-E and Nemo can drive to end up at the same location.
   Wall-E could drive for a shorter time than Nemo drives. Wall-E will get there first, but they will end up in the same location. -OR- If Wall-E drives with fewer RPM (or a smaller angular velocity) than NEMO does, then they arrive at the same location and at the same time.