Speed and Velocity

Read from **Lesson 1** of the **Circular and Satellite Motion** chapter at **The Physics Classroom**:

http://www.physicsclassroom.com/Class/circles/u6l1a.html

MOP Connection: Circular Motion and Gravitation: sublevel 1

Review:

1. A quantity that is fully described by magnitude alone is a _____ quantity. A quantity that is fully described by both magnitude and direction, is a _____ quantity.
   a. scalar, vector b. vector, scalar

2. Speed is a _____ quantity. Velocity is a _____ quantity.
   a. scalar, vector b. vector, scalar c. scalar, scalar d. vector, vector

3. State the equation for calculating the average speed of an object:

Circular Motion:

4. An object that moves uniformly in a circle can have a constant _____ but a changing _____.
   a. speed, velocity b. velocity, speed

5. The direction of a velocity vector is always _____. Circle all that apply.
   a. in the same direction as the net force that acts upon it
   b. in the opposite direction as the net force that acts upon it
   c. in the same direction as the object is moving
   d. in the opposite direction as the object is moving
   e. ... none of these!

6. **True** or **False**:

   The direction of the velocity vector of an object at a given instant in time depends on whether the object is speeding up or slowing down.

7. For an object moving in uniform circular motion, the velocity vector is directed _____.
   a. radially inwards towards the center of the circle
   b. radially outwards away from the center of the circle
   c. in the direction of the tangent line drawn to the circle at the object's location

8. Use your average speed equation to determine the speed of ... . (Given: Circumference = 2•PI•R)
   a. ... a rider on a carousel ride that makes a complete revolution around the circle (diameter = 21.2-meter) in 17.3 seconds. **PSYW**

   b. ... your clothes that are plastered to the wall of the washing machine during the *spin* cycle. The clothes make a complete revolution around a 61.9-cm diameter circle in 0.285 seconds. **PSYW**

9. A roller coaster car is traveling over the crest of a hill and is at the location shown. A side view is shown at the right. Draw an arrow on the diagram to indicate the direction of the velocity vector.