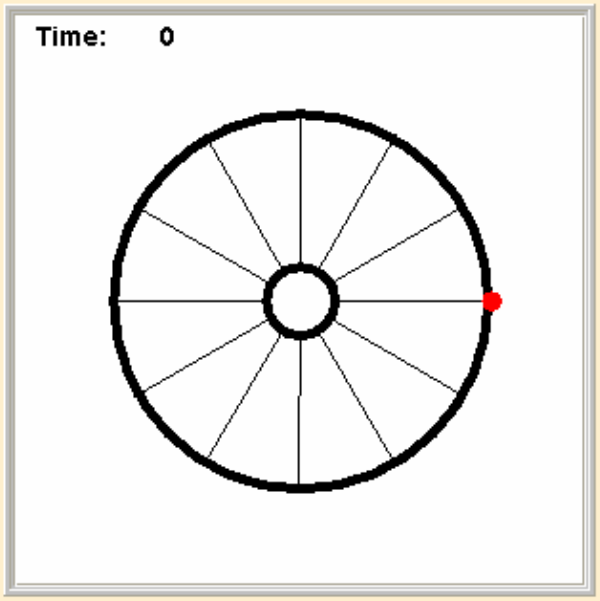
Worksheet for Exploration 3.6: Uniform Circular Motion

Exploration 3.6



A point (red) on a rotating wheel is shown in the animation **(position is given in meters and time is given in seconds)**. Restart.

a. Note that the speed of the red point is constant. Is its velocity constant?

b. Click here to view the velocity vector. After viewing the vector rethink your answer: is the velocity of the red point constant?

i. On the screen shot above sketch the velocity vector at the initial time.

ii. Sketch the vector at some later time or times.

c. What is the direction of the red point's acceleration vector? Click here to view the acceleration and velocity vectors.
   i. How does the speed of the red point change as it moves?

d. How does the speed of the red point compare to the speed of another point, say a green one, which is at only half the radius of the red point? Click here to view both points. For clarity the green point is shown on the opposite side from the red one.

e. Why is the speed of the green point less than the speed of the red point?

   i. Determine the speed of each point by letting a full circle occur. (Use measurements for the radius and time period).

v_{red}=_____

v_{green}=_____

f. How does the magnitude of the acceleration of the red point compare to the magnitude of the acceleration of the green point? Click here to view both points and their velocity and acceleration vectors.

   i. To measure the acceleration you need to determine how the velocity is changing. You already know the direction and also the speed. Consider using the velocity vector at the initial time, and at a time that is half way through a full circle (you should see why this is convenient).

a_{red}=_____

a_{green}=_____