Name _____

Finding the Linear and Angular Speed in Circular Motion

Date _____ Period _____

Linear Speed

The distance an object moves divided by the elapsed time.

$$v = \frac{s}{t}$$

v = linear speed s = distance traveled t = time

500 miles in 8 hours

300 feet in 25 seconds

Angular Speed

The angle (measured in radians) an object moves divided by the elapsed time.

$$\omega = \frac{\theta}{t}$$

ω = angular speed θ = angle (in radians) t = time

20 radians in 2 minutes

1080° in 15 seconds

1080° = 6π

Converting Revolutions per Minute to an Angular Speed

40 rpm

40 rpm

Relating Linear Speed and Angular Speed

Linear Speed

$$v = \frac{s}{t} \qquad v = \frac{r \cdot \theta}{t}$$

Arc Length

$s = r \cdot \theta$

Linear Speed in Circular Motion

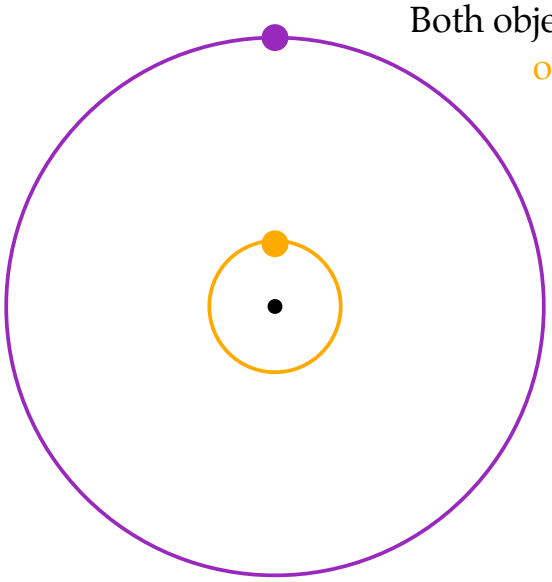
$$v = r \cdot \frac{\theta}{t} \qquad v = r \cdot \omega$$

$$\omega = \frac{\theta}{t}$$

v = linear speed

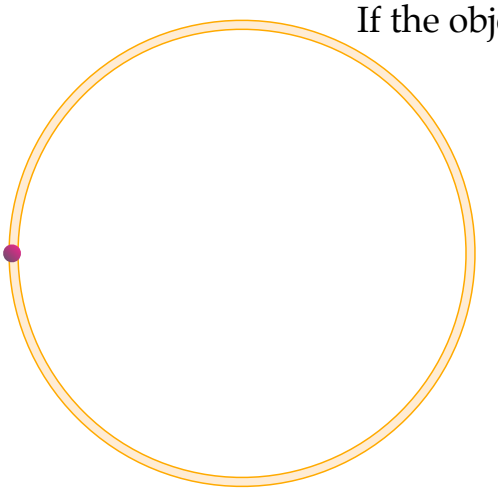
r = radius of circle

ω = angular speed



Both objects are moving at a rate of 30 rpm. The radius of the orange circle is 3 ft and the radius of the purple circle is 12 ft. What is the linear speed of both objects.

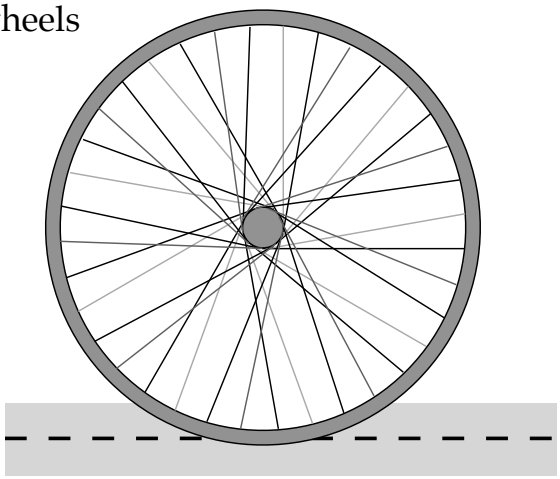
$$v = r \cdot \omega$$



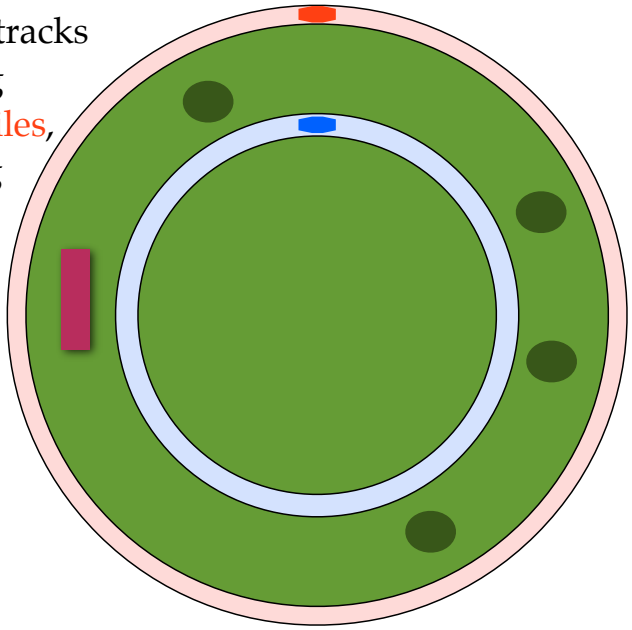
An object is traveling on a circular path with a radius of 2 feet. If the object travels 8 feet in a minute, what is the linear speed of the object? What is the angular speed?

The diameter of a bicycle wheel is 26 inches. If the wheels are turning at 400 rpm, how fast is the bicycle going?

$$v = r \cdot \omega$$



Two cars are driving on two different circular tracks at the same linear speed. If one car is covering 16 laps/hour on a track with a radius of 0.7 miles, how many laps/hour is the other car traveling on a track with radius 0.5 miles.



Linear Speed

$$v = \frac{s}{t}$$

Angular Speed

$$\omega = \frac{\theta}{t}$$

Linear Speed in Circular motion

$$v = r \cdot \omega$$