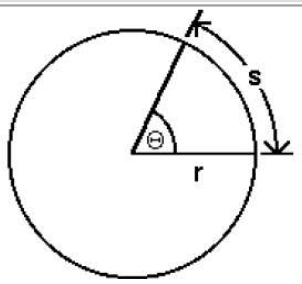
Angular Speed --- angle covered for a given time, described in units like revolutions per minute, degrees per second, radians per hour, etc.

Linear Speed --- the distance travelled for a given time, described as speed units: meters per second, miles per hour, etc.

Student Handout

ANGULAR & LINEAR SPEED: TRIGONOMETRY

Definitions of Symbols		**Relationships**
C = circumference r = radius d = diameter (d = 2r) s = arc length Θ= central angle ***in radians*** π= approximately 3.14 **Formulas** $C = 2\pi r = \pi d$ and $\Theta = \frac{s}{r}$		1 revolution = 1 turn around circle (**definition**) 1 revolution = 2π radians (***angular*** measurement) 1 revolution = $2\pi r$ (***linear*** measurement, i.e. **distance**)
NOTES:	when s = r, Θ= 1 radian	when s = C, Θ= 2π radians

Ex. Complete the following conversions.

1. 1200 ft per min = _____ ft per sec.

2. 55 in per min = _____ ft per min

3. 60 mph = _____ ft per hr

4. 60 mph = _____ ft per sec

5. 24,000 ft per min = _____ mph

6. 49 in per sec = _____ ft per min

Ex. Find the linear speed for each circular object.

7. radius = 4.5 in and 3 revolutions per min

_____ in per min

8. diameter = 10 ft and 6 revolutions per sec

_____ft per sec

9. A roller with diameter 16 in makes 5 revolutions per sec. Find the speed in ft per sec.

10. A wheel with radius 15 inches turns at 35 mph. Find the number of revolutions per minute for the wheel.

Ex. Find the angular speed for each.

9. 12 revolutions per sec = _____ radians per sec

10. 4 revolutions per minute = _____ radians per min

11. 62 revolutions per min = _____ radians per hr

12. 1750 revolutions per hr = _____ radians per min

Ex. Solve.

1. A phonograph record has a radius of 3 in and revolves at 45 RPM. Find the linear speed of the outside edge of the record.

2. A car is traveling 60 mph. The diameter of the wheels is 3 ft.

a) Find the number of revolutions per minute the wheels are rotating.

b) What is the angular speed of the wheels in radians per minute?