Math 1060 ~ Trigonometry

9 Applications of Radian Measure

Learning Objectives

In this section you will:

- Determine arc length.
- Determine area of a sector of a circle.
- Solve problems involving linear and angular velocity.

Vocabulary

Arc

Sector

Length of a circular arc

Ex 1: Find the arc length along a circle of radius 10 cm subtended by an angle of 123°.

Ex 2: What is the radius of a circle for which 2/3 of the circumference is 6π ft?
Area of a Sector

Ex 3: A lawn sprinkler sprays a distance of 15 feet out and rotates back and forth at a 120° angle. What is the area that the sprinkler waters?

Linear and Angular Velocity

Velocity \( \vec{v} = \frac{\text{displacement}}{\text{time}} \)

Average Angular Velocity \( \bar{\omega} = \frac{\text{change in angle}}{\text{time}} \)

Speed = |\( \vec{v} \)|
**Velocity for Circular Motion**

\[ v = r \omega \]

Ex 4: The giant wheel in London, known as the Millennium Wheel has a radius of 60 meters. It completes one rotation in 30 minutes. What is the linear and angular velocity of a person riding in one of the cabins on the wheel? (It does not stop to pick up passengers, they hop on and off as it moves.)