Module 3 Lesson 3

**Radian Measure** and

**Arc Length**

Learning Targets…

I can define radian measure and draw one radian in standard position on the unit circle.

I can use the relationships between the radius of a sector of a circle and the sector’s angle, along with its intercepted arc to solve problems.

I understand that an angle with full circle rotation measures 2π radians and an angle with a semicircle rotation measures π radians. These facts aide in converting between radian and degree measure.

**Converting from degrees to radians**

Convert the following angles into radian measure. Write the answer in terms of π and to the nearest tenth.

120o 45o -270o  345o

**Converting from radians to degrees**

Convert the following angles into degree measure.

Another way to quickly think of radians is that = 180o so just substitute 180 in for when converting radians to degrees.

For example,

Find

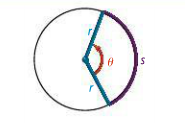
**Finding the Cosine, Sine and Tangent of a Radian Measure.**

Find the exact value of each of the following:

1. 4.
2. 5.

3.

**Central Angles and Lengths of Intercepted Arcs**

For a sector of a circle with radius and a central angle of measure (***in radians***), the length s of the intercepted arc is

.

Find the lengths s and b in the given diagram, rounding to the nearest tenth.

Find the arc length if the central angle of the sector is and the radius is 4 in.

Find the central angle of a sector of a circle if the arc length is 6 feet and the radius is 2.5 feet.

Applications

1. A dog is attached to a leash. He travels around an arc that has a length of . Which of the following represents the radian angle he has rotated through?

(1) (3)

(2) (4)

2. A wheel whose diameter is rolls a distance of without slipping. Through what radian angle did the wheel rotate?

(1) (3)

(2) (4)

3. The distance from the center of a Ferris wheel to a person who is riding is . What distance does a person travel if the Ferris wheel rotates through an angle of ?

(1) (3)

(2) (4)

4. A golfer swings a club about a pivot point. If the head of the club travels a distance of and rotates through an angle of , which of the following gives the distance the club head is from the pivot

point?

(1) (3)

(2) (4)