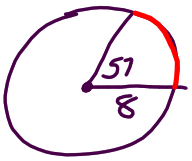
Name: _____ Date: _____
Period: _____ Mr. Valentino

Aim: What is a **radian**?

Do Now: What is the length of the arc of a circle with a radius of 8 whose central angle is 57° (to the nearest whole number)?

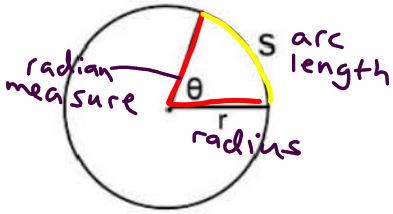


$\frac{57}{360} \cdot 2\pi r$

$\frac{57}{360} \cdot 2\pi(8) =$ 8 units

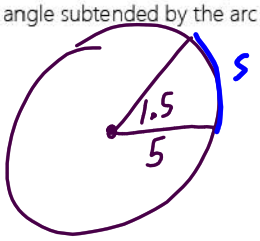
What is a Radian?

1 Radian - The angle made by taking the radius and wrapping it along the edge of a circle



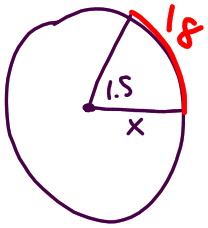
$S = \theta r$

1. Jack wants to plant a border of flowers in the shape of an arc along the edge of a circular walkway. If the circle has a radius of 5 yards and the angle subtended by the arc measures 1.5 radians, what is the length, in yards, of the border?



$S = \theta r$
$S = (1.5)(5)$
$= 7.5$ yards

2. In a circle, a central angle containing 1.5 radians intercepts an arc whose measure is 18 centimeters. The length of the radius is



$\frac{18}{1.5} = \frac{1.5r}{1.5}$

$r = 12$ cm

Converting between Degrees and Radians

Degrees -> Radians	Radians -> Degrees
multiply degrees by $\frac{\pi}{180}$	multiply radians by $\frac{180}{\pi}$

Convert from degrees to radians (or radians to degrees)

60 º = _____ radians

150 º = _____ radians

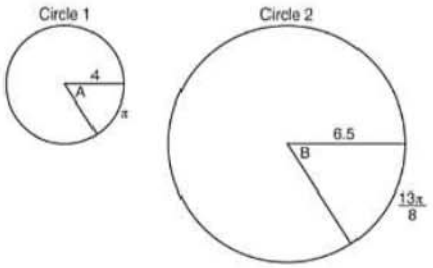
π /6 radians = _____ degrees

5π /2 radians = _____ degrees

A central angle of a circular garden measures 2π radians and intercepts an arc of 20 feet. What is the radius of the garden? (Try this one by converting to degrees first and using the arc length formula)

Arc Length w/Degrees	Arc Length w/Radians
$S=\frac{\theta 2\pi r}{360}$	$S = \theta r$

In the diagram below, Circle 1 has radius 4, while Circle 2 has radius 6.5. Angle A intercepts an arc of length π, and angle B intercepts an arc of length 13π/8 . Dominic thinks that angles A and B have the same radian measure. State whether Dominic is correct or not. Explain why.



Practice Problems

1. Circle O has a radius of 10. Find the length of an arc with a central angle measuring 1.5 radians.

2. In a circle, a central angle containing 1.5 radians intercepts an arc whose measure is 18 centimeters. The length of the radius is

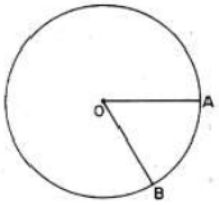
3. An arc of a circle measures 30 centimeters and the radius measures 10 centimeters. In radians, what is the measure of the central angle that subtends the arc?

4. In a circle with a radius of 3 centimeters, find, in centimeters, the length of an arc intercepted by a central angle of 2 radians.

5. A wedge-shaped piece is cut from a circular pizza. The radius of the pizza is 6 inches. The rounded edge of the crust of the piece measures 4.2 inches. To the nearest tenth, the angle of the pointed end of the piece of pizza, in radians, is

6. In circle O, the length of radius OB is 5 centimeters and the length of AB is 5 centimeters. The measure of ∠AOB is

1) 1 radian
2) π radians
3) greater than 60°
4) 60°



7. A dog has a 20-foot leash attached to the corner where a garage and a fence meet, as shown in the accompanying diagram. When the dog pulls the leash tight and walks from the fence to the garage, the arc the leash makes is 55.8 feet. What is the measure of angle θ between the garage and the fence, in radians?

1) 0.36
2) 2.79
3) 3.14
4) 160