

4.1 Angles

Objective: I can convert between radians and degrees.

Objective: I can calculate arc length.

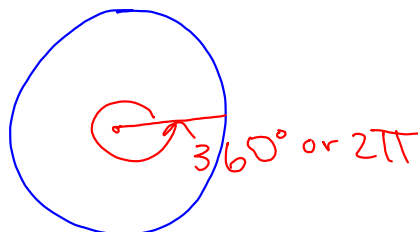
Radians vs. Degrees

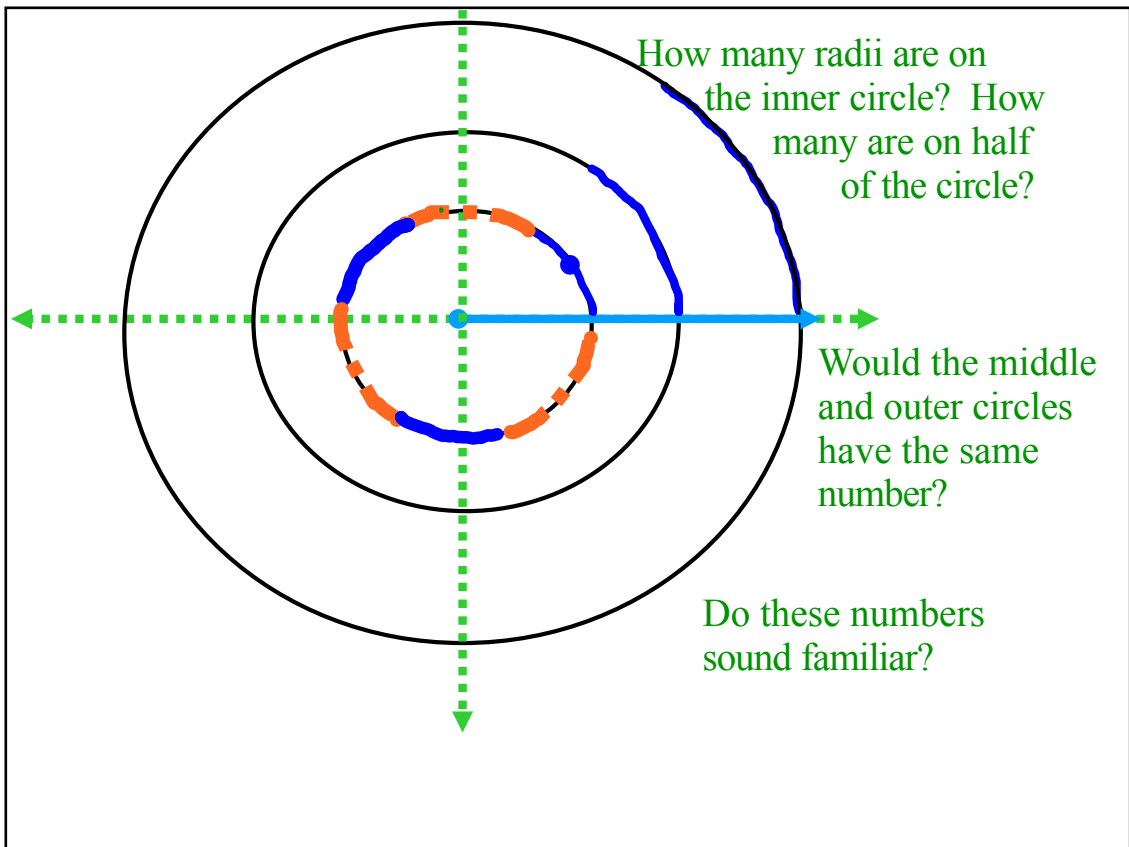
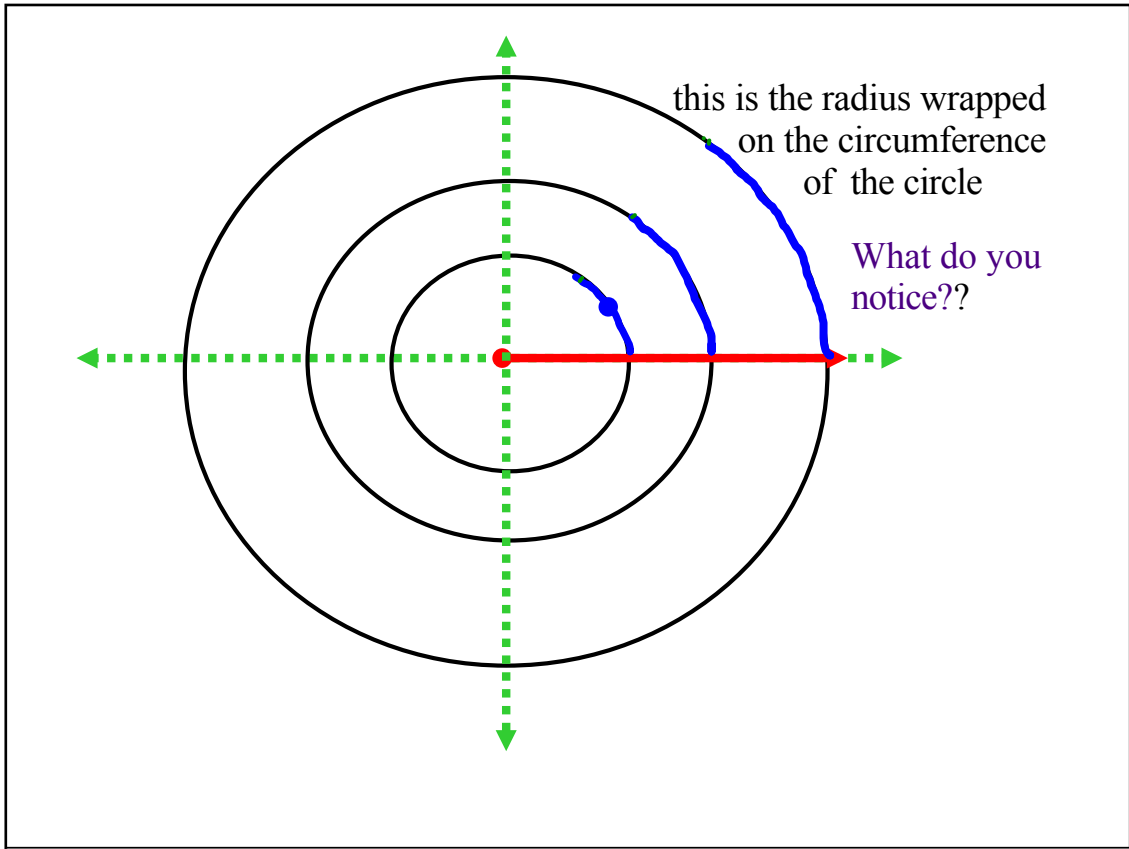
angles are usually named with Greek letters θ , α , β for example

there are 2 units used to measure angles:

degrees: 360° in a circle

radians: 2π rad in a circle





What is a radian?

A central angle of a circle has a measure of 1 RADIAN if it intercepts an arc with the same length as the radius

How many degrees are in half a circle? How many degrees are in π ?

What ratio do I use to convert between degree and radian angle measures?

Examples:

Convert to degrees:

$$2\pi/3 \cdot \frac{180^\circ}{\pi} = 120^\circ$$

$$5\pi/4 \cdot \frac{180^\circ}{\pi} = \frac{900^\circ}{4} = 225^\circ$$

Convert to radians:

$$\frac{150^\circ}{1} \cdot \frac{\pi}{180^\circ} = \frac{150\pi}{180} = \frac{5\pi}{6}$$

$$\frac{315^\circ}{1} \cdot \frac{\pi}{180^\circ} = \frac{315\pi}{180} = \frac{7\pi}{4}$$

~~Work on 9-22 on HW~~

$$\frac{360^\circ}{2\pi} = \frac{180^\circ}{\pi} = \frac{\pi}{180^\circ}$$

Arc Length

$$C = r(2\pi)$$

Circumference
radius
of radians in an entire circle

Since radians are related to arc length we can use the circumference formula to help us find arc length

$$C = r(2\pi)$$

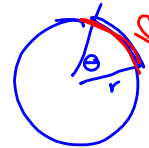
Replace with s (arc length)
radius (doesn't change)
Replace with # of radians in your arc

Arc length
angle in radians

$$s = r\theta$$

when s is the arc length and θ is the angle measured in radians

radius



Arc Length cont.

Arc length formula using degrees

$$s = r\theta$$

θ is supposed to be in radians, if θ is degrees how do you convert from degrees to radians?

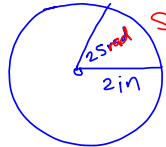
Examples:

use the appropriate arc length formula to find the missing information

s	r	θ
?	2 in	25 rad.

40 cm	?	20°
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EX

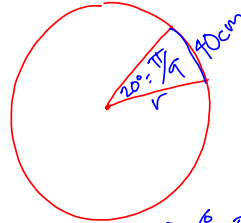


$$s = r\theta$$

$$s = 2(25)$$

$$s = 50 \text{ in}$$

EX



$$s = r\theta$$

$$\frac{9}{180}(40) = r\left(\frac{20}{180}\right)$$

$$114.6 \text{ cm} = r$$