By the end of the lesson, we will be able to:

~ Find arc length
~ Find sector area

Arc Length and Sectors

In geometry, you learned formulas to find arc length and sector area when the angle is in degrees. However, the formulas for arc length and sector area are much simpler when measuring in radians.

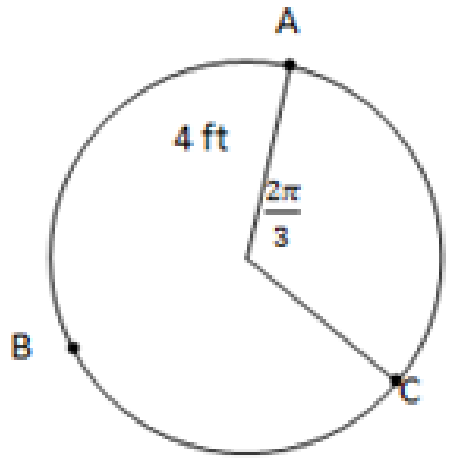
Arc length when θ is in radians: $s = r\theta$

Sector area when θ is in radians: $A = \frac{1}{2}r^2\theta$

Lesson 52: Arc Length and Sector Area

Examples:

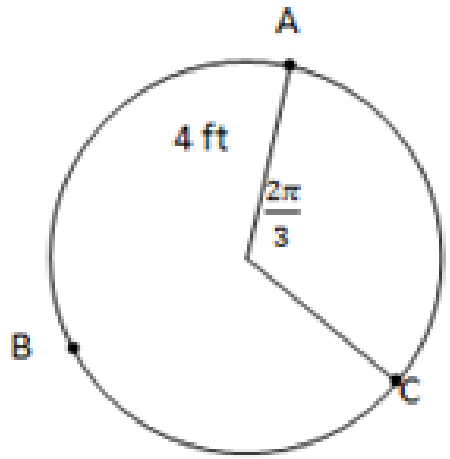
A. Find the length of $\widehat{AC}$



Lesson 52: Arc Length and Sector Area

Examples:

B. Find the length of $\overset{\frown}{ABC}$



Examples:

C. Find the length of the arc of a circle with a radius of 7 cm and a central angle of $\frac{4\pi}{25}$

Lesson 52: Arc Length and Sector Area

Examples: Given the radius of a circle and an arc length, find the central angle, theta. (Keep in fraction form.)

E. Radius = 4 ft and Arc Length = 20 ft

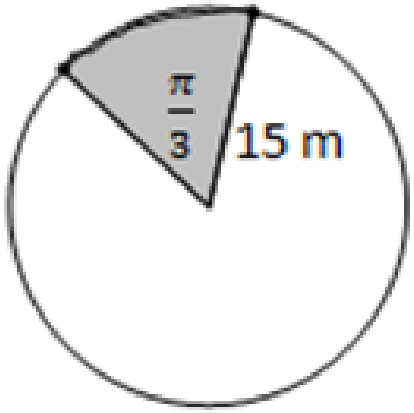
Lesson 52: Arc Length and Sector Area

Examples: Given the radius of a circle and an arc length, find the central angle, theta. (Keep in fraction form.)

F. Radius = 5 in and Arc Length = 7 in

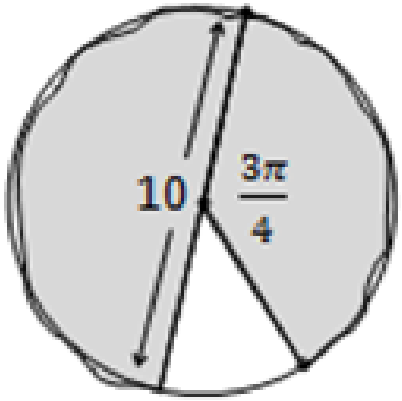
Lesson 52: Arc Length and Sector Area

Examples: Find the area of the shaded sector:



Lesson 52: Arc Length and Sector Area

Examples: Find the area of the shaded sector:



Lesson 53: Graphing Trig Functions

By the end of the lesson, we will be able to:

~Find the Amplitude and Period
~Graph Sine and Cosine functions

Graphing Trig Functions

$$y = a \sin b(x - h) + k$$
$$y = a \cos b(x - h) + k$$

Transformations of trig functions:

a gives amplitude (vertical stretch); if a is negative, the graph is flipped upside down

b gives period (horizontal stretch), use the formula: period $= \frac{2\pi}{b}$

h gives the horizontal shift, called phase shift

k gives the vertical shift

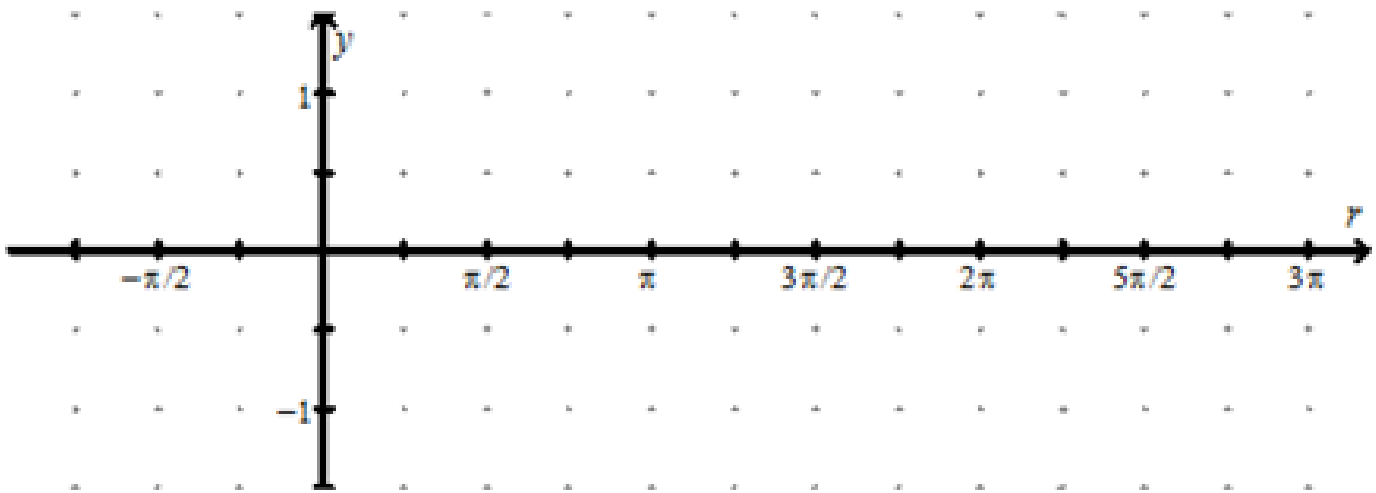
* This year, we are not going to worry about h and k.

Lesson 53: Graphing Trig Functions

Example 1: Graph the following trig function.

θ (radians)	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π
$\cos\theta$ (decimal)											

$y = \cos\theta$



Amplitude:

Period:

Critical Values:

Domain:

Range:

Lesson 53: Graphing Trig Functions

Reminder: Critical Values for Trig Functions are the

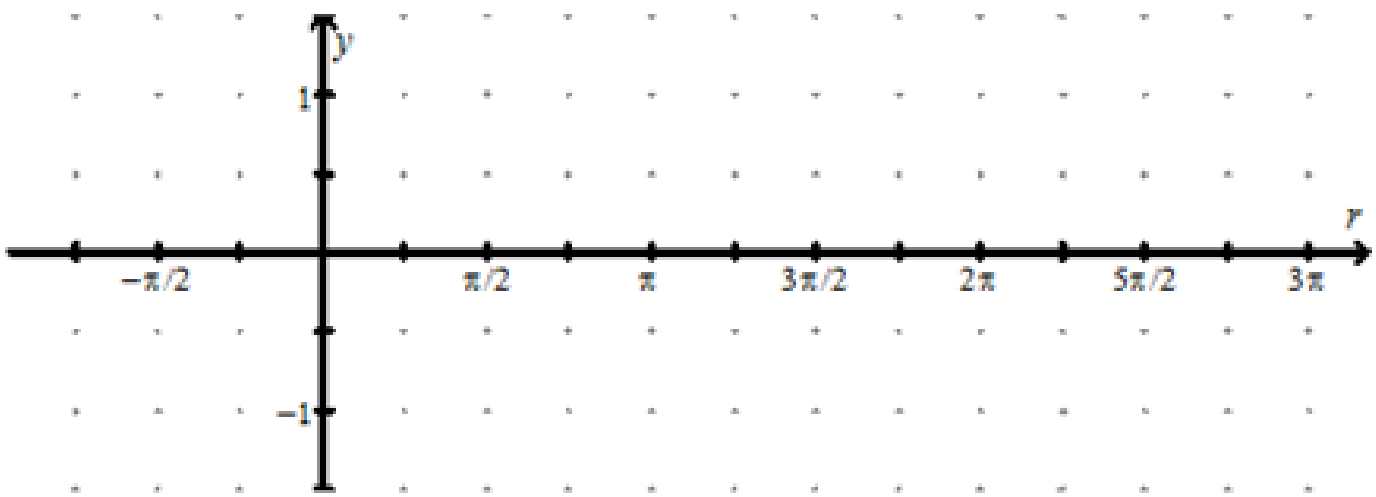
* High points on the wave.
* Low points on the wave.
* The points where the wave crosses the x -axis.

Lesson 53: Graphing Trig Functions

Example 2: Graph the following trig function.

θ (radians)	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π
$\sin\theta$ (decimal)											

$$y = \sin\theta$$



Amplitude:

Period:

Critical Values:

Domain:

Range:

Lesson 53: Graphing Trig Functions

Example 3: State the Amplitude and Period of each function.

a.) $y = 3\cos\left(\frac{1}{2}\theta\right)$

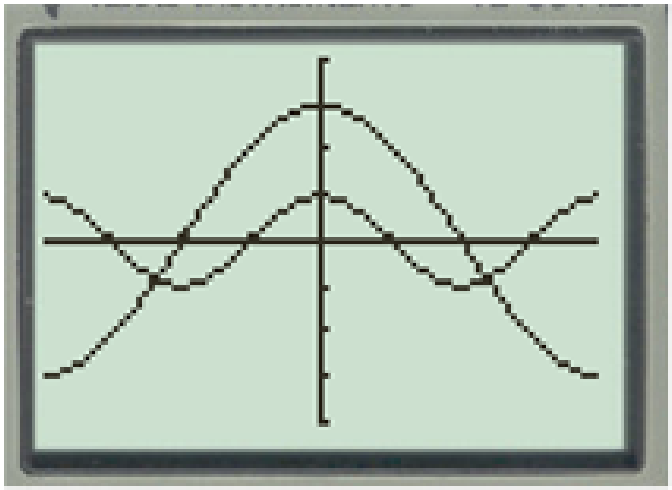
Now graph $y = \cos\theta$ with $y = 3\cos\left(\frac{1}{2}\theta\right)$ (Use Zoom #7)

What changed?

Lesson 53: Graphing Trig Functions

Example 3: State the Amplitude and Period of each function.

a.) $y = 3\cos\left(\frac{1}{2}\theta\right)$



Now graph $y = \cos\theta$ with $y = 3\cos\left(\frac{1}{2}\theta\right)$ (Use Zoom #7)

What changed?

Lesson 53: Graphing Trig Functions

Example 3: State the Amplitude and Period of each function.

b.) $y = 2\sin\theta$

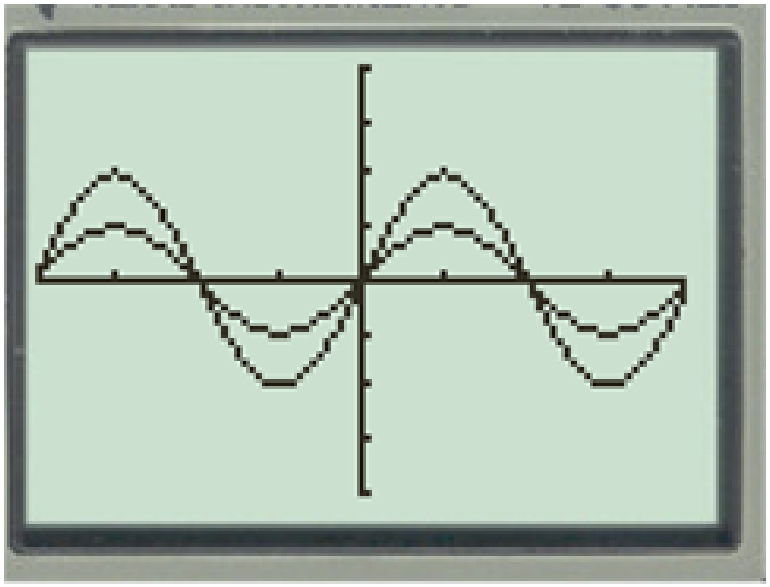
Now graph $y = \sin\theta$ with $y = 2\sin\theta$ (Use Zoom #7)

What changed?

Lesson 53: Graphing Trig Functions

Example 3: State the Amplitude and Period of each function.

b.) $y = 2\sin\theta$



Now graph $y = \sin\theta$ with $y = 2\sin\theta$ (Use Zoom #7)

What changed?

Lesson 53: Graphing Trig Functions

Example 3: State the Amplitude and Period of each function.

c.) $y = 6\cos\left(\frac{2}{3}\theta\right)$

What transfomations are going to occur?

Lesson 53: Graphing Trig Functions

Example 3: State the Amplitude and Period of each function.

c.) $y = 6\cos\left(\frac{2}{3}\theta\right)$

Lesson 53: Graphing Trig Functions

Steps to graph trig functions:

1. Identify amplitude and calculate the period.
2. If there is a vertical shift, sketch a line at y=k, along which the graph will oscillate.
3. Identify the start and end points of one period, and then the middle and quarter points. Graph the5 critical values.

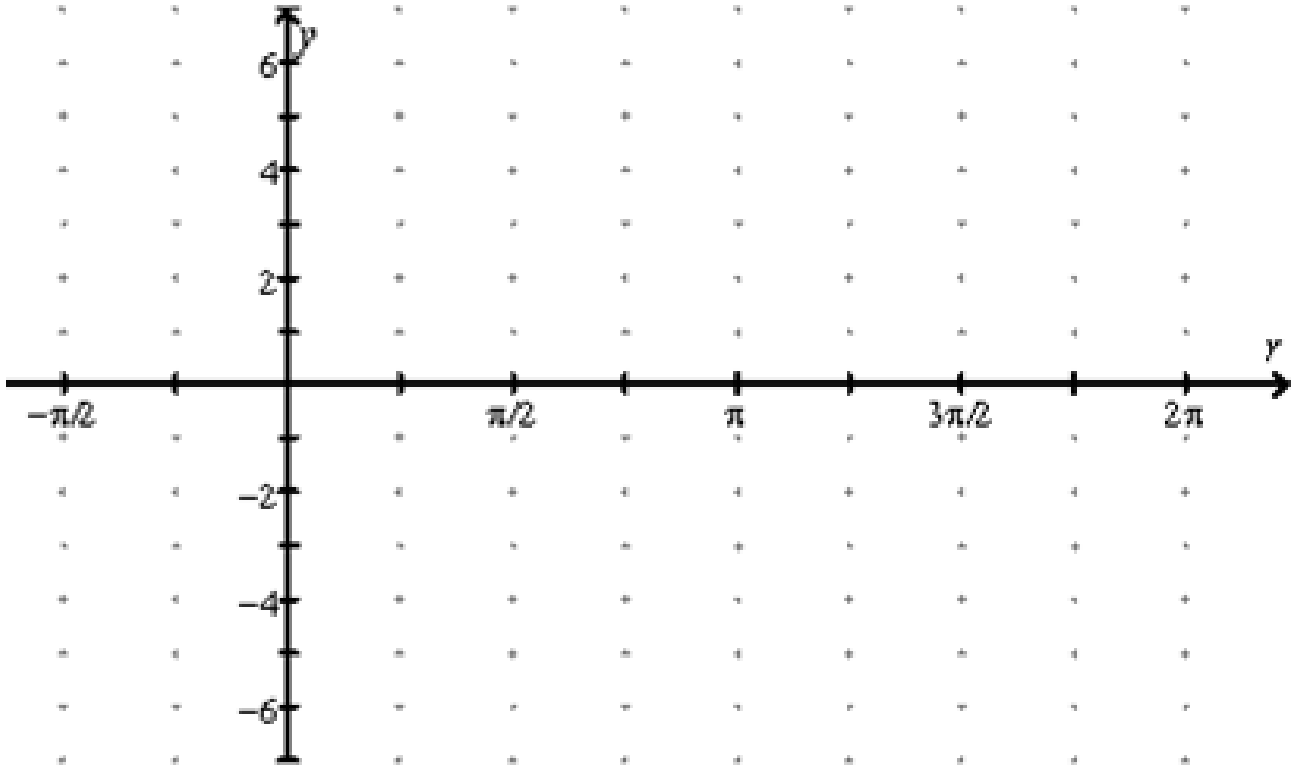
(Remember, if there is a flip upsidedown, then the y's of the critical points change signs.)

4. Connect the critical points with a sine/cosine wave.
5. Continue the pattern for additional periods if there is space on the graph.

Lesson 53: Graphing Trig Functions

Example 4: Graph the following trig function.

$$y = 5\cos 4\theta$$



Amplitude:

Period:

Domain:

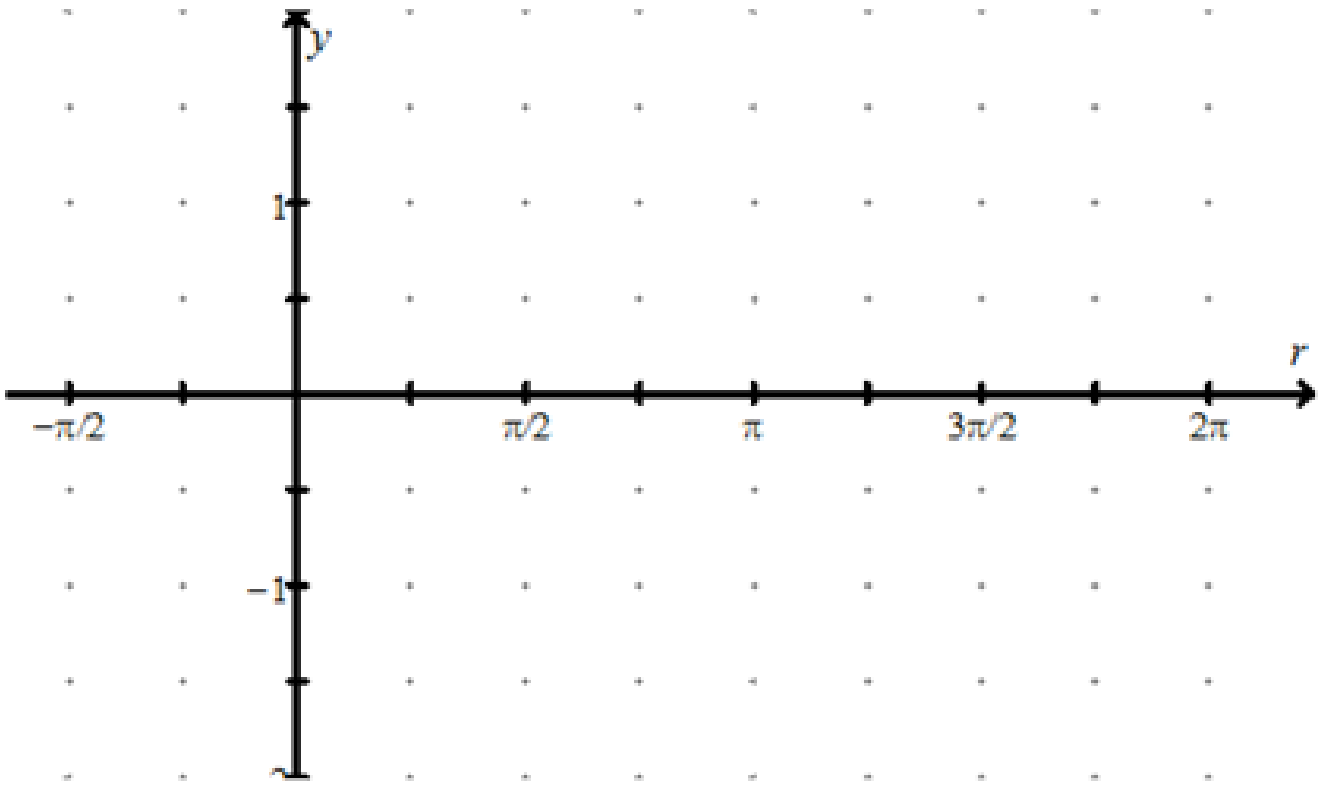
Range:

Critical Values:

Lesson 53: Graphing Trig Functions

Example 5: Graph the following trig function.

$$y = \frac{1}{2}\sin 2\theta$$



Amplitude:

Period:

Domain:

Range:

Critical Values:

By the end of the lesson, we will be able to:

~ Find arc length
~ Find sector area

Can you?

Lesson 53: Graphing Trig Functions

By the end of the lesson, we will be able to:

~Find the Amplitude and Period
~Graph Sine and Cosine functions

Can you?

Homework:

Journal 52+53

Assignment 52/53/CRT REVIEW?