Graphing Sine and Cosine

Objective:

- Define the period, amplitude, and midline of the sine and cosine function
- Graph the sine and cosine functions
- Write the equation for a given sine or cosine curve

WARMUP – Day 1

List three things in this world that are periodic – that is they follow a repetitive cycle:

1.

2.

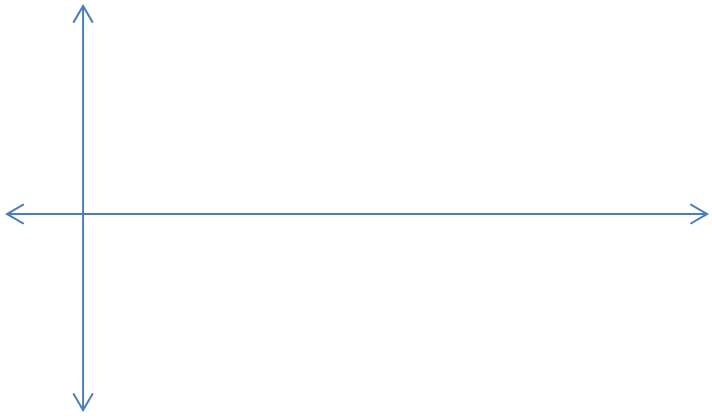
3.

Building the Sine and Cosine Graphs – Connecting to the Unit Circle

Complete the tables below – then graph your results on the axis provided.

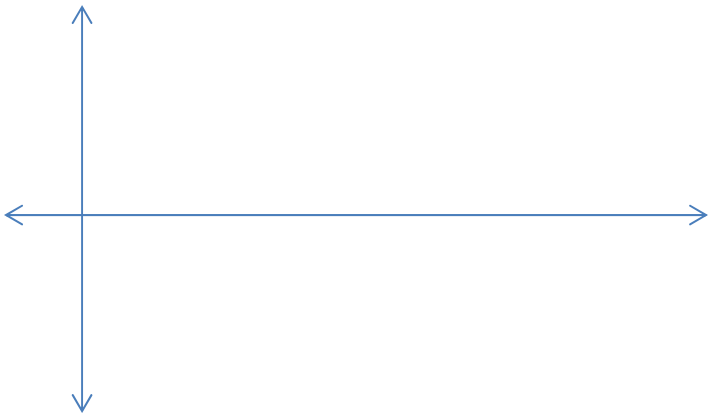
$$y = \sin(x)$$

(x)	$y = \sin(x)$
0	
$\frac{\pi}{6}$	
$\frac{\pi}{4}$	
$\frac{\pi}{3}$	
$\frac{\pi}{2}$	
π	
$\frac{5\pi}{4}$	
$\frac{3\pi}{2}$	
$\frac{7\pi}{6}$	
2π	



$y = \cos(x)$

(x)	$y = \cos(x)$
0	
$\frac{\pi}{6}$	
$\frac{\pi}{4}$	
$\frac{\pi}{3}$	
$\frac{\pi}{2}$	
π	
$\frac{5\pi}{4}$	
$\frac{3\pi}{2}$	
$\frac{7\pi}{6}$	
2π	



Discovering the Connection Between the Unit Circle and Graphing

Hopefully, you had a good experience exploring the connection between the values on the unit circle and subsequent plotting on the coordinate plane.

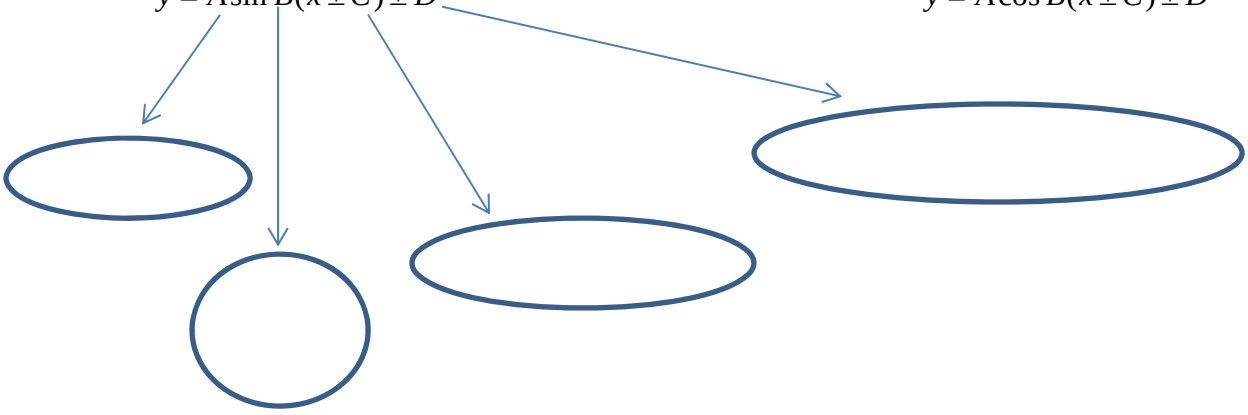
Defining Key Terms

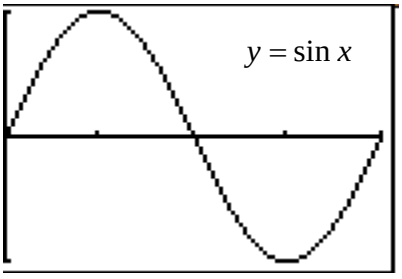
	Real-Life Equivalent
Period –	
Amplitude –	
Midline --	

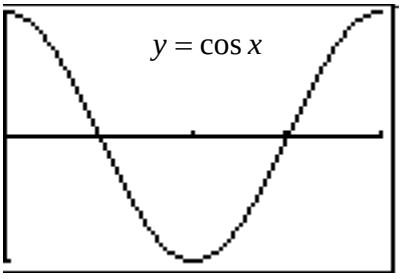
Extend this: What would the period of the sine/cosine functions be?

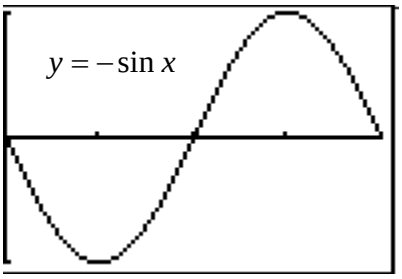
General Forms of the Sine and Cosine Equation

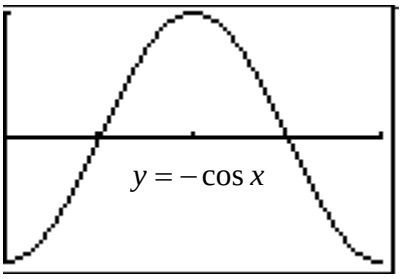
$y = A\sin B(x \pm C) \pm D$ $y = A\cos B(x \pm C) \pm D$











Determining Key Features from an Equation

Ex 1: Find the amplitude, period, and midline of the equations below.

(a) $y = -5\sin 7x - 3$

Period:

Amp:

Mid:

(b) $y = \cos\frac{3\pi}{4}(x-8)+4$

Period:

Amp:

Mid:

(c) $y = \frac{2}{3}\cos\frac{9}{5}x$

Period:

Amp:

Mid:

Graphing ONE CYCLE – No Horizontal Shift

Ex 2: Graph $y = 3\sin x + 1$

Ex 3: Graph $y = -2\cos x - 3$

Ex 4: Graph $y = -\sin \pi x + 2$

Ex 5: Graph $y = 4\cos 2\pi x - 8$

WARMUP – Day 2

Graph $y = -5\sin\frac{1}{4}x + 3$

Graphing ONE CYCLE with a Horizontal Shift

Ex 6: Graph $y = \sin\left(x - \frac{\pi}{4}\right)$

Ex 7: Graph $y = \cos\left(x + \frac{\pi}{2}\right) - 2$

Graphing everything but the Kitchen Sink – You know what? Let's throw that in there too!

Ex 8: Graph $y = -\cos 3(x - \pi) + 1$

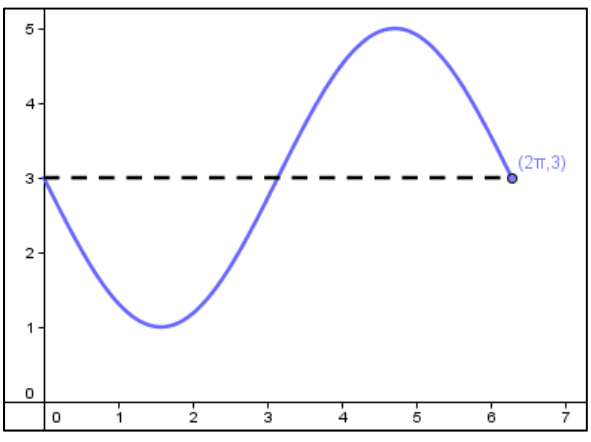
Ex 9: Graph $y = 7\sin 4\left(x + \frac{\pi}{6}\right) - 2$

Writing Equations from a Graph

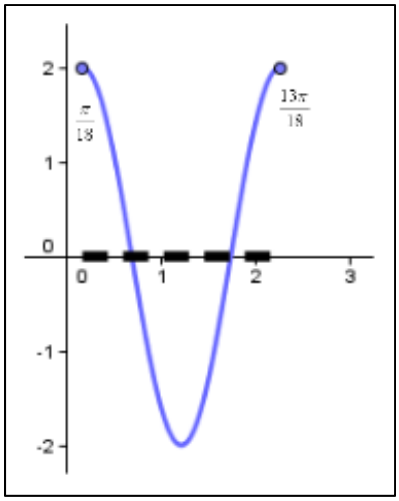
The most important thing you can do is identify all of the information possible from the graph's features. For example,

- How high/low are the peaks/valleys?
- How long is one cycle?
- Where is the midline?
- Where does the cycle start? End?

Ex 10: Write the equation for the graph shown.



Ex 11: Write the equation for the graph shown.



Ex 12: Write the equation for the graph shown.