

# Spiral Review:

State the transformations.

1.  $f(x) = 2x^2 - 4$

down 4

vertical stretch

2.  $f(x) = -4|x - 3| + 2$

up 2, right 3

reflection over x-axis

vertical stretch

3.  $f(x) = -3(x + 1)^2 - 1$

down 1

left 1

reflected over x-axis

vertical stretch

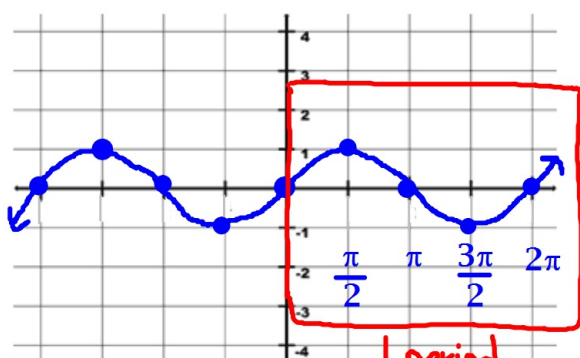
4.  $f(x) = (5x)^2 - 2$

down 2

horizontal shrink

## p.292 4.5 Graphs of the Sine and Cosine Functions

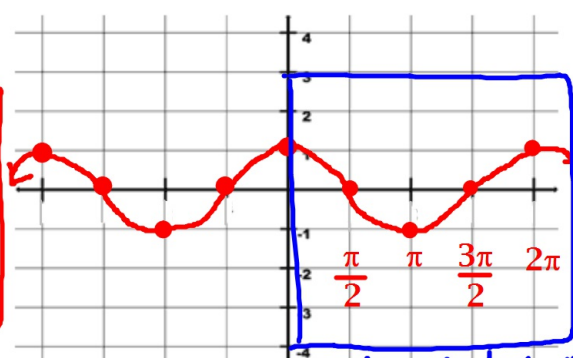
$y = \sin x$



1 period  
"S"

x	0	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
y	0	1	0	-1	0

$y = \cos x$



1 period  
"U"

x	0	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
y	1	0	-1	0	1

## Graphing

$$y = a \sin bx$$

amplitude (vertical stretch/shrink)  
 $|a|$

$$y = a \cos bx$$

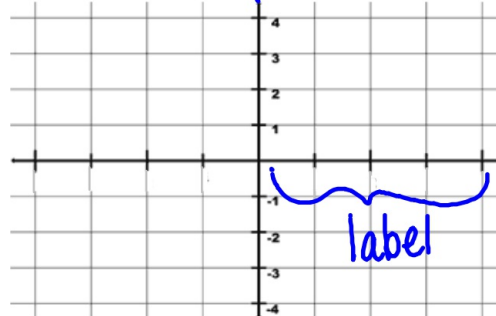
used to find the period (length)

How to find the period...

Period:  $\frac{2\pi}{b}$

\* To find increments:

$$\frac{\text{period}}{4}$$

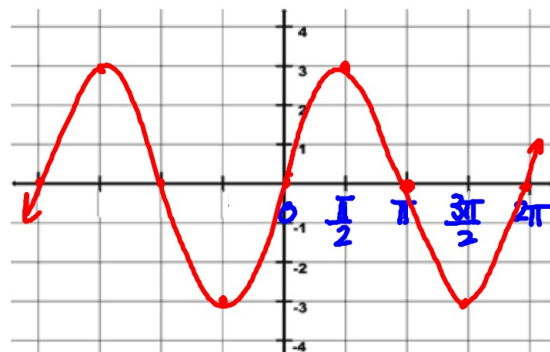


Students will be able to graph the sine and cosine functions.

**Example 1:** Graph each defined function over the interval  $[-2\pi, 2\pi]$ . Give the amplitude.

a.)  $y = 3 \sin x$

x	0	$\pi/2$	$\pi$	$3\pi/2$	$2\pi$
$\sin x$	0	1	0	-1	0
$3\sin x$	0	3	0	-3	0



① Amplitude:  $|3| = 3$

② Find period (label top of table)

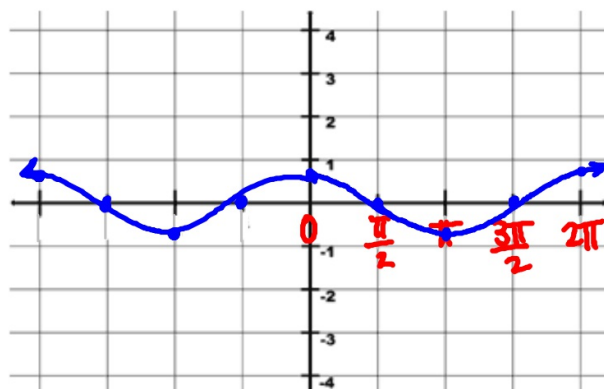
③ Normal row?

④ Apply the amplitude (multiply)

Students will be able to graph the sine and cosine functions.

b.)  $y = \frac{3}{4} \cos x$

X	0	$\pi/2$	$\pi$	$3\pi/2$	$2\pi$
cos x	1	0	-1	0	1
$\frac{3\cos x}{4}$	$\frac{3}{4}$	0	$-\frac{3}{4}$	0	$\frac{3}{4}$



Amplitude:  $|\frac{3}{4}| = \frac{3}{4}$

Students will be able to graph the sine and cosine functions.

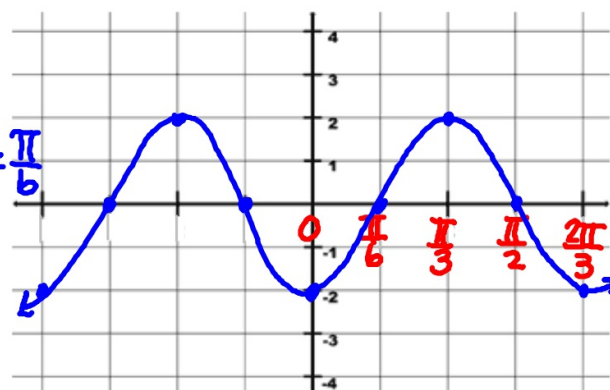
Example 2: Graph each defined function over a two-period interval. Give the period and the amplitude.

a.)  $y = -2 \cos 3x$

amplitude:  $|-2| = 2$

period:  $\frac{2\pi}{3} \rightarrow$  increments:  $\frac{\frac{2\pi}{3}}{4} = \frac{\pi}{6}$

x	$0 + \frac{\pi}{6}$	$\frac{\pi}{6} + \frac{\pi}{6}$	$\frac{2\pi}{6} + \frac{\pi}{6}$	$\frac{3\pi}{6}$	$\frac{4\pi}{6}$
3x	0	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
cos 3x	1	0	-1	0	1
$-2\cos 3x$	-2	0	2	0	-2



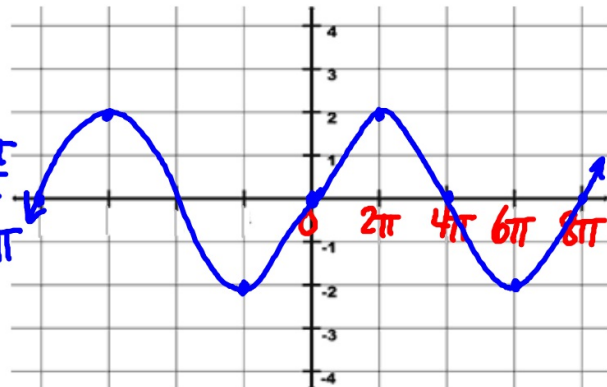
Students will be able to graph the sine and cosine functions.

b.)  $y = 2 \sin \frac{1}{4} x$

amplitude:  $|a| = 2$

period:  $\frac{2\pi}{\frac{1}{4}} = 8\pi$  increments:  $\frac{8\pi}{4} = 2\pi$

x	0	$2\pi$	$4\pi$	$6\pi$	$8\pi$
$\frac{1}{4}x$	0	$\frac{\pi}{2}$	$\pi$	$\frac{3\pi}{2}$	$2\pi$
$\sin \frac{1}{4}x$	0	1	0	-1	0
$2 \sin \frac{1}{4}x$	0	2	0	-2	0



Turn-in:  
p. 299 (14, 18)

HW

wkst 4.5