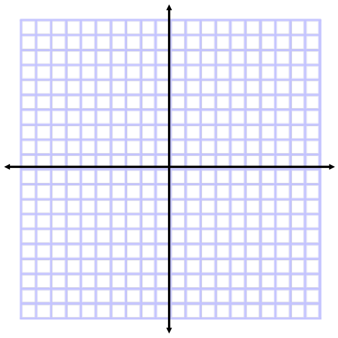
Warm Up

$f(x) = x^2$ base curve



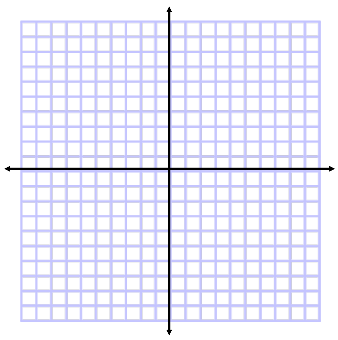
$g(x) = f(x) + 4$

$g(x) = x^2 + 4$

Nov 29-1:49 PM

Warm Up

$f(x) = x^2$ base curve



$g(x) = f(x-5)$

$g(x) = (x-5)^2$

Nov 29-1:49 PM

Sec. 6.4-6.5 - Transformations of the Sine Function

Learning Goal:

By the end of today, I will be able to transform a base curve Sine Function, using vertical and horizontal shifts.

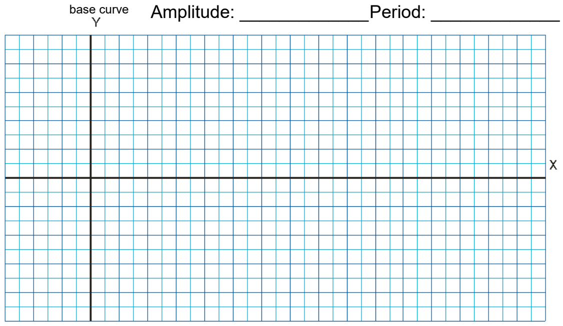
Learning Goal:

By the end of today, I will be able to transform a base curve Sine Function, using vertical / horizontal stretches, compressions and reflections.

Nov 29-1:42 PM

$f(x) = \sin(x)$ The Five Key points of the SINE Function.

base curve Amplitude: _____________Period: _____________

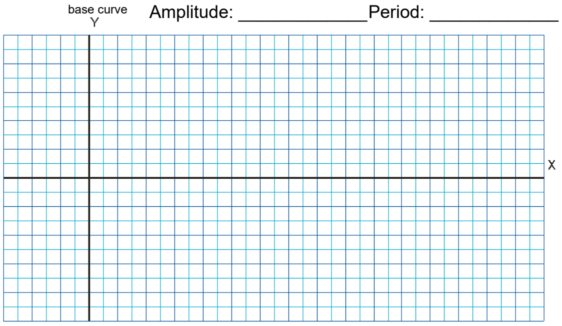


Shift the 5 key points when graphing transformed sine functions.

Nov 29-1:49 PM

f(x) = cos(x) The Five Key points of the COSINE function.

base curve Amplitude: ____________Period: ____________



Shift the 5 key points when graphing transformed sine functions.

Nov 29-1:49 PM

Success Criteria

<u>Graphing Strategies for the Sine Function</u>

1. Describe/list the transformations BEFORE graphing

2. Decide on an appropriate scale BEFORE graphing

3. Plot your base sine curve

4. Plot your transformed sine curve in multiple steps

Nov 29-2:02 PM

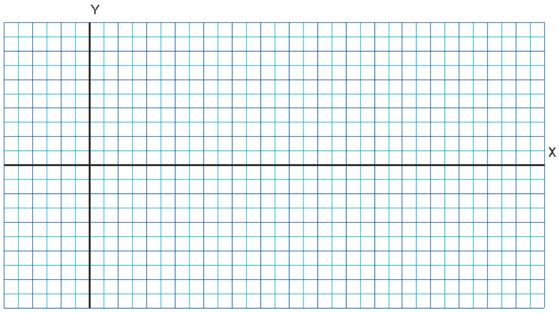
$f(x) = \sin(x)$ base curve

$g(x) = f(x) + 4$

$g(x) = \sin(x) + 4$

Graphing Strategies for the Sine Function

1. Describe/list the transformations BEFORE graphing
2. Decide on an appropriate scale BEFORE graphing
3. Plot your base sine curve
4. Plot your transformed sine curve in multiple steps



Nov 29-1:49 PM

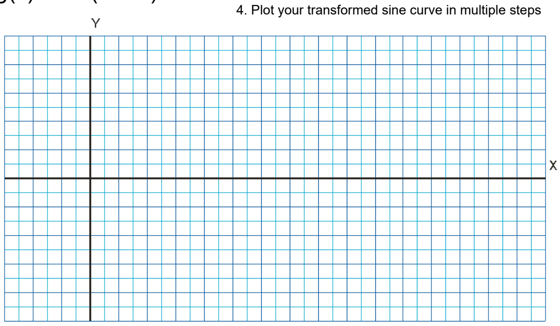
$f(x) = \sin(x)$ base curve

$g(x) = f(x-90°)$

$g(x) = \sin(x-90°)$

Graphing Strategies for the Sine Function

1. Describe/list the transformations BEFORE graphing
2. Decide on an appropriate scale BEFORE graphing
3. Plot your base sine curve
4. Plot your transformed sine curve in multiple steps



Nov 29-1:49 PM

Transformations:

$$y = f(x - h) + k$$

h controls the horizontal translation (left/right)

h > 0 (positive) - right

h < 0 (negative) - left

NOTE: (x + 5) is actually (x - (-5)), be wary of the signs

k controls the horizontal translation (left/right)

k > 0 (positive) - up

k < 0 (negative) - down

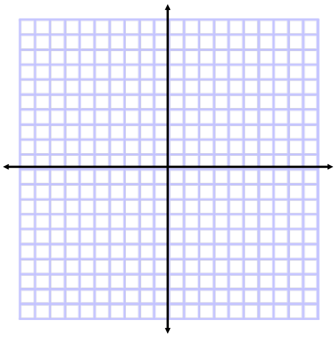
Nov 29-2:39 PM

Warm Up

$f(x) = x^2$ base curve

$g(x) = 2f(x)$

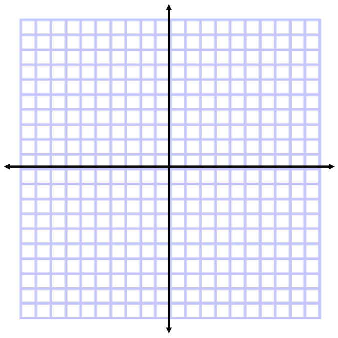
$g(x) = 2x^2$



Nov 29-1:49 PM

Warm Up

$f(x) = x^2$ base curve



$g(x) = -0.5\ f(x)$

$g(x) = -0.5x^2$

Nov 29-1:49 PM

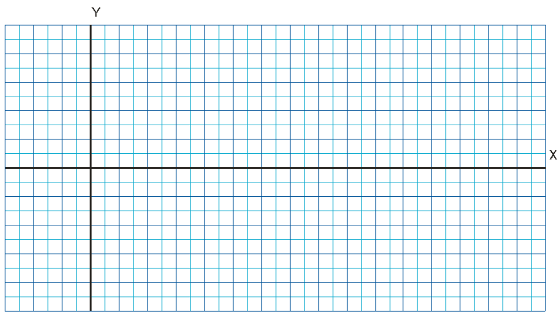
$f(x) = \cos(x)$ base curve

$g(x) = 3\ f(x)$

$g(x) = 3\cos(x)$

Graphing Strategies for the Cosine Function

1. Describe/list the transformations BEFORE graphing
2. Decide on an appropriate scale BEFORE graphing
3. Plot your base sine curve
4. Plot your transformed sine curve in multiple steps



Nov 29-1:49 PM

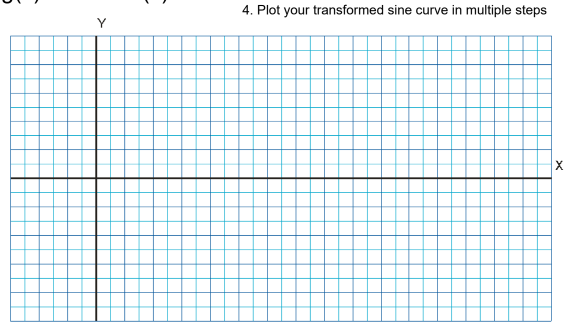
$f(x) = \sin(x)$ base curve

$g(x) = -0.8\, f(x)$

$g(x) = -0.8 \sin(x)$

Graphing Strategies for the Sine Function

1. Describe/list the transformations BEFORE graphing
2. Decide on an appropriate scale BEFORE graphing
3. Plot your base sine curve
4. Plot your transformed sine curve in multiple steps



Nov 29-1:49 PM

Horizontal Stretches and Compressions are controlled by the multiplier "inside" the function.

$$y = a\, f(x)$$

where "a" controls the vertical stretch or compression.

$a > 1$ then it is a vertical stretch

$0<a<1$ then it is a vertical compression

Note: inline with your logical thinking

Nov 29-2:32 PM

Horizontal Stretches and Compressions

Compare the following with graphing technology:

Case 1

y = sin(x)

y = sin(2x)

Case 2

y = sin(x)

y = sin(0.5x)

Nov 29-2:30 PM

Horizontal Stretches and Compressions are controlled by the multiplier "inside" the function.

$$y = f(\,k\,x)$$

where "k" controls the horizontal stretch or compression.

k > 1 then it is a horizontal compression

0<k<1 then it is a horizontal stretch

Note: backwards with your logical thinking

"k" also affects the Period of the function

A shortcut for determining the period is given by:

$$T = \frac{2\pi}{k}$$ radians

$$T = \frac{360^o}{k}$$ degrees

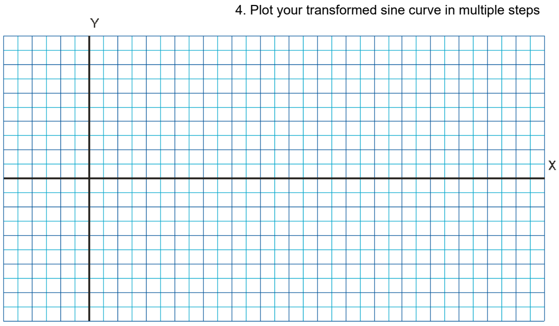
Nov 29-2:32 PM

$f(x) = \sin(x)$ base curve

$g(x) = 2\,f(3x)$
$g(x) = 2\sin(3x)$

Graphing Strategies for the Sine Function

1. Describe/list the transformations BEFORE graphing
2. Decide on an appropriate scale BEFORE graphing
3. Plot your base sine curve
4. Plot your transformed sine curve in multiple steps



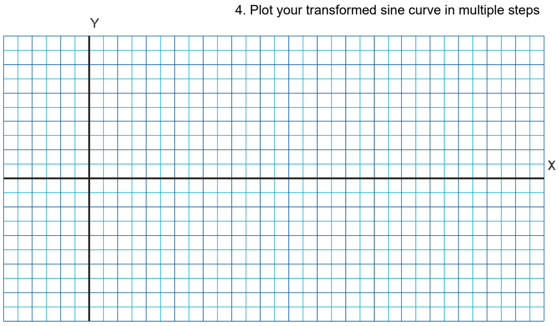
Nov 29-1:49 PM

$f(x) = \cos(x)$ base curve

$g(x) = -0.5\,f(0.25x)$
$g(x) = -0.5\cos(0.25x)$

Graphing Strategies for the Sine Function

1. Describe/list the transformations BEFORE graphing
2. Decide on an appropriate scale BEFORE graphing
3. Plot your base sine curve
4. Plot your transformed sine curve in multiple steps



Nov 29-1:49 PM

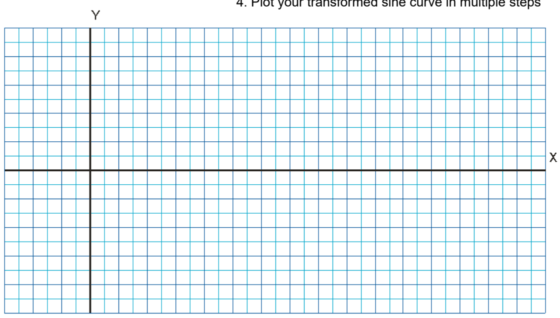
$f(x) = \sin(x)$ base curve

$g(x) = 3\,f(x+45^\circ) - 2$

$g(x) = 3\sin(x+45^\circ) - 2$

Graphing Strategies for the Sine Function

1. Describe/list the transformations BEFORE graphing
2. Decide on an appropriate scale BEFORE graphing
3. Plot your base sine curve
4. Plot your transformed sine curve in multiple steps



Nov 29-1:49 PM

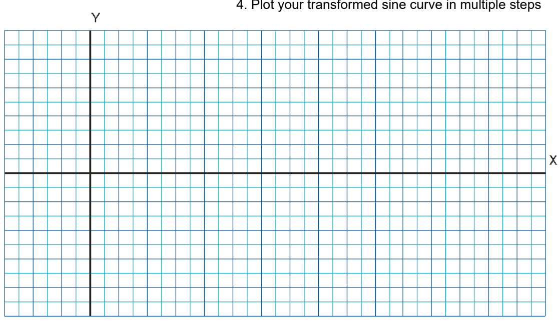
$f(x) = \sin(x)$ base curve

$g(x) = 3\,f(2(x+30^{o)}) + 1$

$g(x) = 3\sin(2(x+30^\circ)) + 1$

Graphing Strategies for the Sine Function

1. Describe/list the transformations BEFORE graphing
2. Decide on an appropriate scale BEFORE graphing
3. Plot your base sine curve
4. Plot your transformed sine curve in multiple steps



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Homework:

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Page 391-3 #4, 6

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