

Precalculus A

4.4 Graphing the Sine and Cosine Functions

Day 1

Hw: 4.4 Homework #9

D. Paulson

What do you think will happen if we multiply the sine and cosine curve by 2?

- narrower
- wider
- longer height
- slides graph
- shifts up two units
- stretch the graph

What do you think will happen if we multiply the sine and cosine curve by $\frac{1}{2}$?

- wider
- narrower
- make it shorter
- shrink the graph

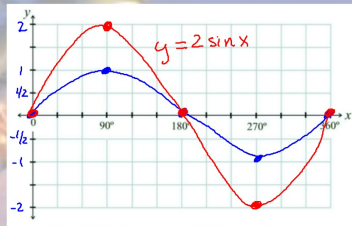
What do you think will happen if we multiply the sine and cosine curve by a negative?

- reflection over x

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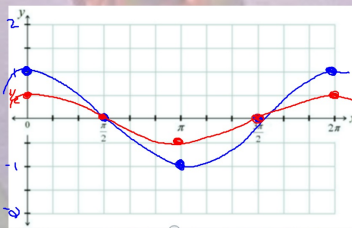
$y = 2\sin x$

$y = \sin x$



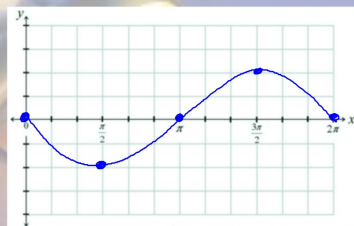
$y = \frac{1}{2}\cos x$

$y = \cos x$

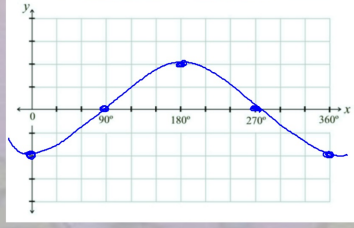


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$y = -\sin x$



$y = -\cos x$



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Sine and Cosine Graphs

$$y = a \sin(bx) \quad y = a \cos(bx)$$

a = amplitude (vertical stretch if $a > 1$)
(vertical shrink if $0 < a < 1$)

b = used to find the period of the graph
(horizontal stretch if $0 < b < 1$)
(horizontal shrink if $b > 1$)

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Changing the Period

Horizontal Dilations of a graph:

The normal period of a sine/cosine function is 2π .

b tells us the number of cycles needed to be completed in 2π .

Therefore the period = 2π divided by b .

To help us graph we will take the period and divide it by 4, this will give us the step between transition points.

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Graphing from an Equation

$$y = 3 \sin(x)$$

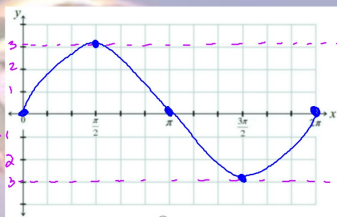
amplitude $a = 3$

$b = 1$

$$\text{period} = \frac{2\pi}{b} = \frac{2\pi}{1}$$

step =

$$\frac{2\pi}{4} = \frac{\pi}{2}$$



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Graphing from an Equation

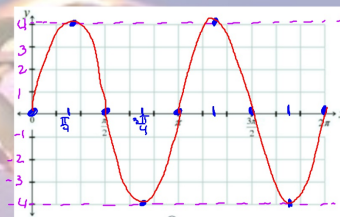
$$y = 4 \sin(2x)$$

amplitude $a = 4$

$b = 2$

$$\text{period} = \frac{2\pi}{b} = \frac{2\pi}{2} = \pi$$

$$\text{step} = \frac{\pi}{4}$$



D. Paulson