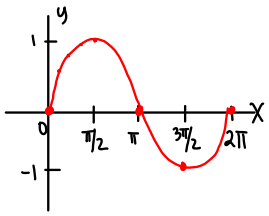
WARM UP

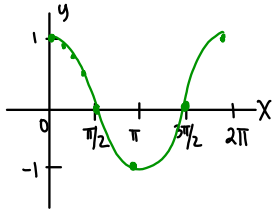
Fill in the following table and then plot the points.

x	$y = \sin x$	approximation for y rounded to the nearest decimal
0	0	0
$\frac{\pi}{6}$	$\frac{1}{2}$	.5
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	.7
$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	.86
$\frac{\pi}{2}$	1	1
π	0	0
$\frac{3\pi}{2}$	-1	-1
2π	0	0



Sep 24-4:24 PM

x	$y = \cos x$	approximation for y
0	1	1
$\frac{\pi}{6}$	$\frac{\sqrt{3}}{2}$	.86
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	.7
$\frac{\pi}{3}$	$\frac{1}{2}$	.5
$\frac{\pi}{2}$	0	0
π	-1	-1
$\frac{3\pi}{2}$	0	0
2π	1	1



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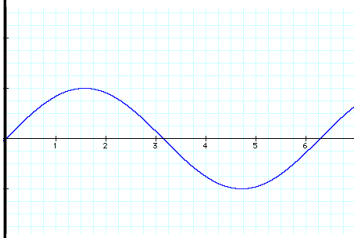
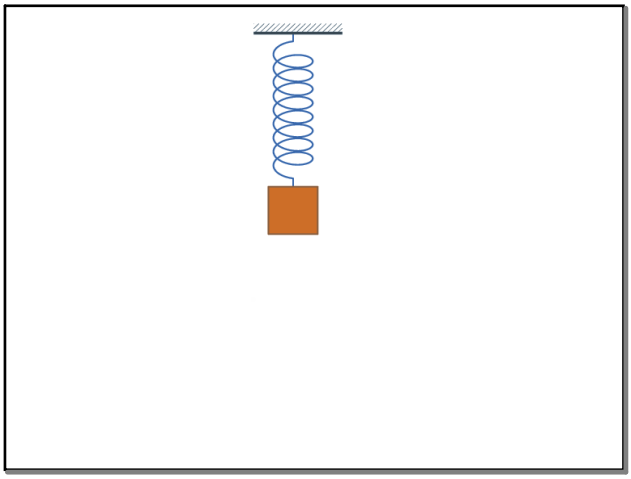


What are some examples of SINUSOIDAL functions in "real life"?

Sep 23-3:58 PM

Sep 23-4:02 PM



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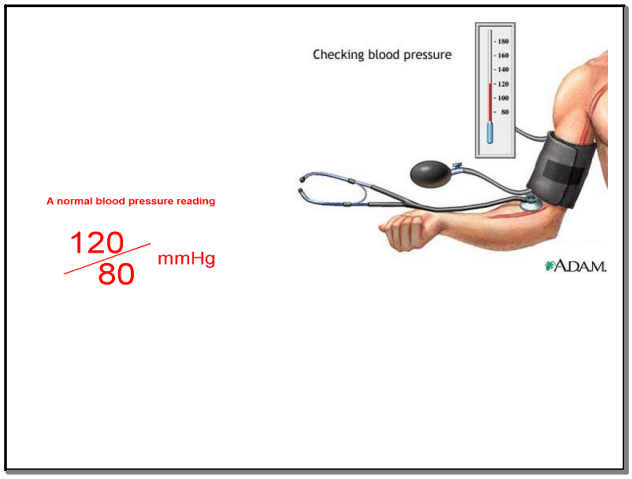


Sep 23-4:10 PM

Some things to notice (between 0 and 2pi)

$f(x) = \sin x$

Period: 2π
Maximum: 1
Minimum: -1
X-Intercepts: $0, \pi, 2\pi$
Range: $[-1, 1]$
Increasing: $(0, \frac{\pi}{2}) \cup (\frac{3\pi}{2}, 2\pi)$
Decreasing: $(\frac{\pi}{2}, \frac{3\pi}{2})$

$f(x) = \cos x$

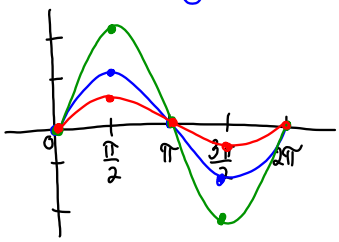
Period: 2π
Maximum: 1
Minimum: -1
X-Intercepts: $\frac{\pi}{2}, \frac{3\pi}{2}$
Range: $[-1, 1]$
Increasing: $(\pi, 2\pi)$
Decreasing: $(0, \pi)$

Sep 20-4:26 PM

TRANSFORMATIONS!

Multiplying a positive number to the outside of a parent graph Stretches or Shrinks the parent graph vertically.

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



Sep 20-4:27 PM

Definition
The **amplitude** of

$$y = a\sin x, \quad y = a\cos x$$

represents half the distance between the maximum and minimum values of the function and is given by

Amplitude=|a|.

$y = 2\sin x$

$amp = |2| = 2$

Sep 20-4:38 PM

State the amplitude of the following trigonometric functions:

$f(x) = .4\sin x$ amplitude = .4

$g(x) = -2\cos x$ amplitude = 2

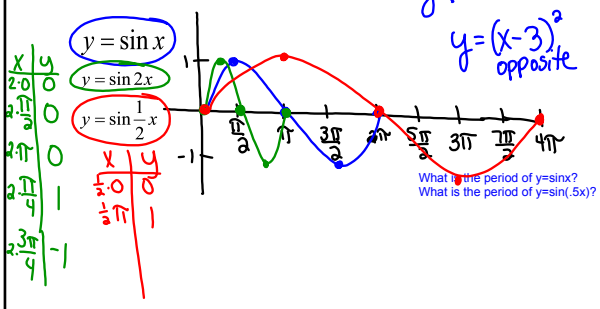
$h(x) = \sin x$ amplitude = 1

Sep 20-4:41 PM

TRANSFORMATIONS!

Multiplying a positive number to the INSIDE of a parent graph Stretch or Shrink the parent graph horizontally

$y = (x-3)^2$ opposite



Sep 20-4:27 PM

Definition
Let b be a positive real number. The **period** of

$$y = a\sin bx, y = a\cos bx$$

is given by $\frac{2\pi}{b}$

$y = \sin 2x$ $\frac{2\pi}{2} = \pi$

$y = \sin\frac{1}{2}x$ $\frac{2\pi}{\frac{1}{2}} = 4\pi$

$b > 1$: Shrink period is less than 2π

$0 < b < 1$: Stretch period greater than 2π

Sep 20-4:43 PM

Describe the relationship between the graphs f and g. Consider amplitudes, periods, and shifts.

1. f(x)= sin x
   g(x) = $\left|-\frac{1}{2}\right|$ sin x

amp = $\frac{1}{2}$
period = $\frac{2\pi}{\frac{1}{2}} = 4\pi$
Reflect over x-axis

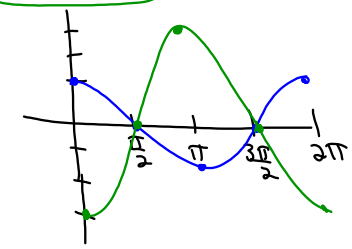
2. f(x)=cos 4x
   g(x)= -6 + cos 4x

amp = same 4
g(x) shifts ↓ 6
period $\frac{2\pi}{4} = \frac{\pi}{2}$

Sep 6-9:57 AM

Graph on the same coordinate plane.

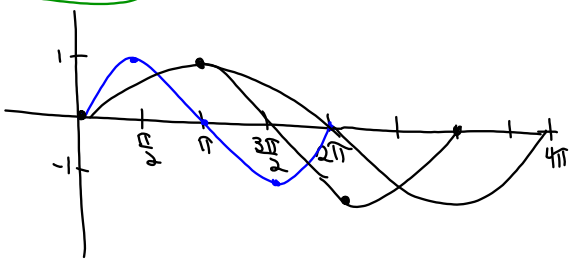
f(x) = cos x
g(x) = -3cos x



Sep 6-10:06 AM

Graph on the same coordinate plane.

f(x) = sin x
g(x) = $\sin\frac{x}{2}$



Sep 6-10:08 AM

HOMEWORK

...waves!

4.5a p. 304: 1, 2, 3-13 (odd), 17, 19, 23, 27, 28, 30

Circle Quiz #6 Tomorrow (10 minutes)
Come see me during RAO or after school if you're having troubles with these quizzes.

Sep 20-4:53 PM