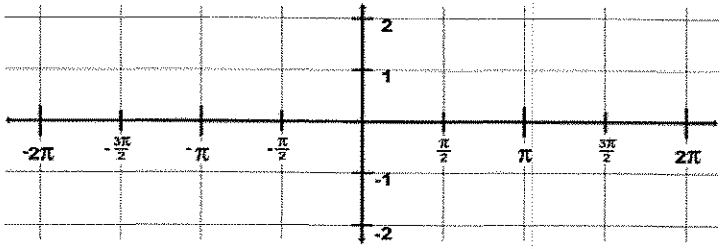
Graphing Sine and Cosine Name:_____

1. Let y = sin x where x = angle in RADIANS. Fill in the table of values and plot on the coordinate plane below.

x	-2π	-3π/2	-π	-π/2	0	π/2	π	3π/2	2π
y=sin x									

Connect these points in a SMOOTH curve. Do NOT make it pointy.
This is the shape of the **y = sinx** curve.



A periodic function is a function whose values repeat after a certain interval. The PERIOD refers to the length on the x axis that repeats itself.

Is **y = sin x** a PERIODIC function? If so, what is the period?

The AMPLITUDE of a function is found by $\frac{1}{2}$(max - min). What is the AMPLITUDE of y = sin x?

On your calculator, change the MODE to Radians (not degrees). Under Y= put in sin x. Go to ZOOM and choose #7 (ZTrig). Note that the x-axis is from [-2π, 2π].
This should have given you the graph you did above. Make sure it is correct and fix it if not.

Graph y =3sinx. Describe how this is different from y = sin x. What is the amplitude? Period?

Graph y =-4 sin x. Describe how this is different from y = sin x. What is the amplitude? Period?

Graph y = sin 2x. Describe how this is different from y = sin x. What is the amplitude? Period?

Graph y = sin $\frac{1}{2}$ x. Describe how this is different from y = sin x. What is the amplitude? Period?

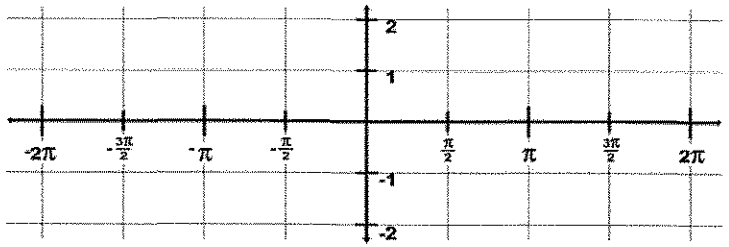
Let's generalize . . . if y = A sin Bx,

The AMPLITUDE is _____ **The PERIOD is** _____

2. Let y = cos x where x = angle in RADIANS. Fill in the table of values and plot on the coordinate plane below.

x	-2π	-3π/2	-π	-π/2	0	π/2	π	3π/2	2π
y=cos x									

Connect these points in a SMOOTH curve. Do NOT make it pointy. This is the shape of the y = cos x curve.



A periodic function is a function whose values repeat after a certain interval. The PERIOD refers to the length on the x axis that repeats itself.

Is **y = cos x** a PERIODIC function? If so, what is the period?

The AMPLITUDE of a function is found by $\frac{1}{2}$(max - min). What is the AMPLITUDE of y = cos x?

On your calculator, make sure your MODE is set to Radians (not degrees). Under Y= put in **cos x**. Go to ZOOM and choose #7 (ZTrig). This should have given you the graph you did above. Make sure it is correct and fix it if not. Note that the x-axis is from $[-2\pi, 2\pi]$.

Graph y =4 cos x. Describe how this is different from y = sin x. What is the amplitude? Period?

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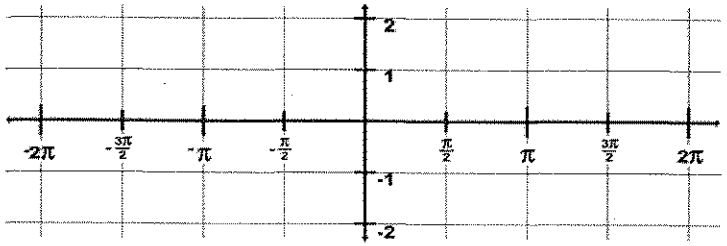
Graph y = cos $\frac{1}{2}$ x. Describe how this is different from y = sin x. What is the amplitude? Period?

Let's generalize . . . if y = A cos Bx,

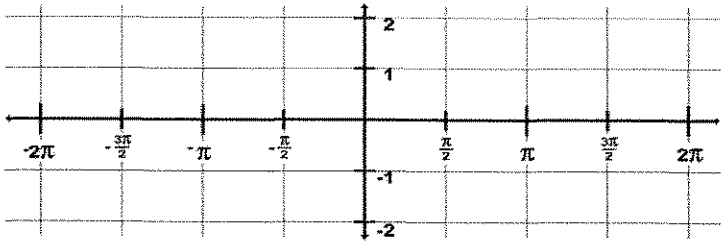
The AMPLITUDE is _____ **The PERIOD is** _____

SKETCH:

1. Y = 3 cos 2x **Describe the amplitude and period. Amp =** _____ **per=**_____



2. Y = -4 sin x **Describe the amplitude and period. Amp =** _____ **per=**_____

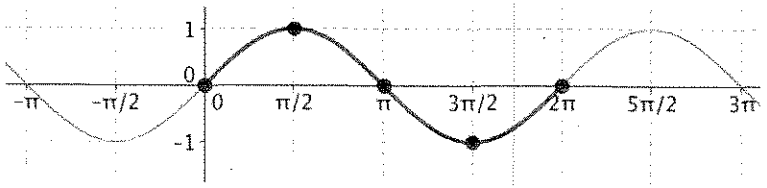


Give the amplitude and the period of the following:

1. Y = 2 cos(4x)
2. Y = $\sin(\frac{1}{3}x)$
3. Y = $-\frac{1}{5}\cos(3x)$

Graphing Sine

Sine Function: y = sinx (amplitude =1, period = 2π)



We will graph the angle measure (the x value) in radians.
To graph by hand we will find 5 key points. These points are the maximum, the minimum, and the x-intercepts. We will usually graph only 1 cycle.

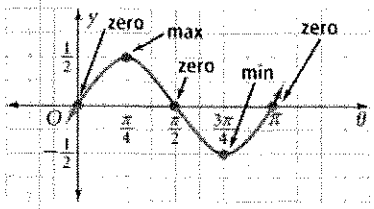
The graph of a sine function is called a **sine curve**.

For ***y = a sin bx*** with ***a≠ 0, b >0*** and **x in radians**:

- $|a|$ is the amplitude of the function
- if a is negative the graph flips over the x-axis
- b is the number of cycles in the interval 0 to 2π
- $\frac{2\pi}{b}$ is the period of the function

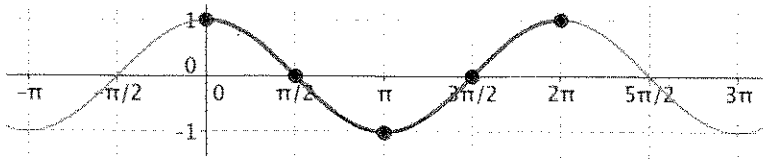
Example: Sketch one cycle of $y = \frac{1}{2}\sin 2x$

$|a|$ = ½, so the amplitude is ½
b = 2 so there are 2 cycles from 0 to 2π
$\frac{2\pi}{b} = \frac{2\pi}{2} = \pi$ so the period is π
Divide the period into fourths.
Using the values of the amplitude and period plot the pattern zero-max-zero-min-zero.



Graphing Cosine

Cosine Function: y = cos x (amplitude =1, period = 2π)



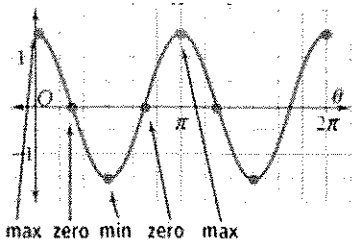
We will graph the angle measure (the x value) in radians.
To graph by hand we will find 5 key points. These points are the maximum, the minimum, and the x-intercepts. We will usually graph only 1 cycle.

For ***y = a cos bx*** with ***a≠ 0, b >0*** and **x in radians**:

- $|a|$ is the amplitude of the function
- if a is negative the graph flips over the x-axis
- b is the number of cycles in the interval 0 to 2π
- $\frac{2\pi}{b}$ is the period of the function

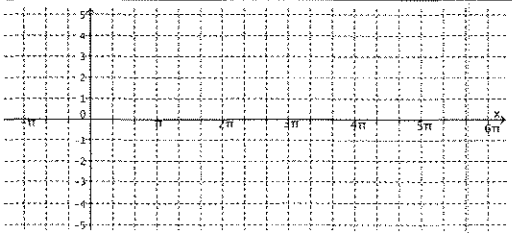
Example: Sketch one cycle of $y = 1.5\cos 2x$

$|a|$ = 1.5, so the amplitude is 1.5
b = 2 so there are 2 cycles from 0 to 2π
$\frac{2\neq}{b} = \frac{2\neq}{2} = \neq$ so the period is π
Divide the period into fourths.
Using the values of the amplitude and period plot the pattern zero-max-zero-min-zero.

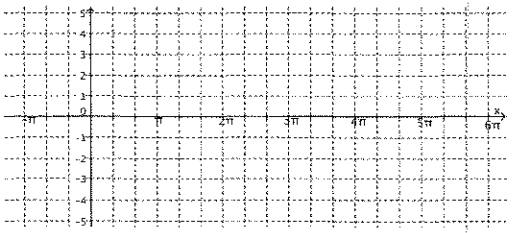


Graphing Sine and Cosine Practice – Amplitude & Period. Graph each function.

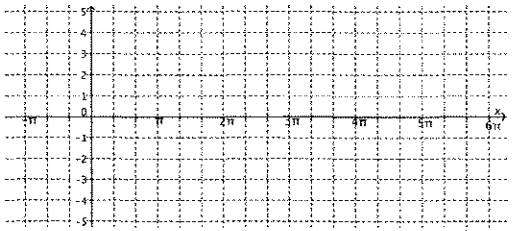
	Amplitude	b – value	period
1. $y = 3\sin x$			
2. $y = -2\cos x$			
3. $y = 0.5 \sin 2x$			
4. $y = 4 \cos (x/2)$			



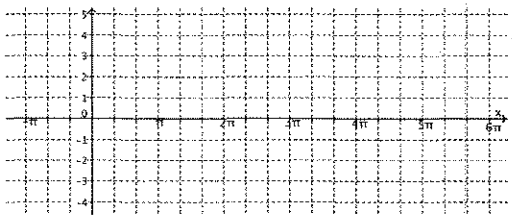
1. $y = 3\sin x$



2. $y = -2\cos x$



3. $y = 0.5 \sin 2x$



4. $y = 4 \cos (x/2)$

Translating Sine and Cosine Functions

For ***y = a sin bx + k*** or ***y = a cos bx + k***

- $|a|$ is the amplitude of the function
- if a is negative the graph flips over the x-axis
- b is the number of cycles in the interval 0 to 2π
- $\frac{2\pi}{b}$ is the period of the function
- k is the vertical shift

Example: Sketch the graph of $y = \sin 2x - \frac{3}{2}$ ← moves down $\frac{3}{2}$

$|a| = 1$, so the amplitude is 1

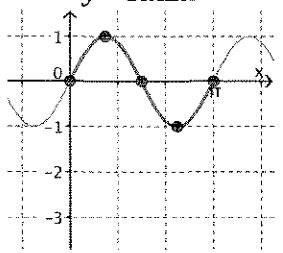
$b = 2$ so there are 2 cycles from 0 to 2π

$\frac{2\pi}{b} = \frac{2\pi}{2} = \pi$ so the period is π

Sketch one cycle of ***y = sin2x***

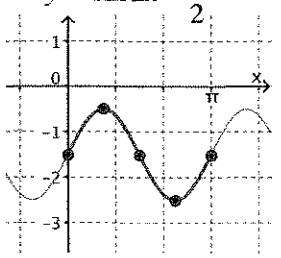
Use the 5 key points.

y = sin2x



Since $k = -\frac{3}{2}$ translate the graph $\frac{3}{2}$ units down. Sketch the final graph.

$y = \sin 2x - \frac{3}{2}$



Graphing Worksheet

I. Determine the amplitude, b value, and period for each function.

1. $y = -\frac{1}{2}cosx$
2. $y = 2cos6x$
3. $y = -4sin\frac{\pi}{4}x$
4. $y = 3sin\frac{3}{2}x$
5. $y = -5cos\frac{5\pi}{3}x$
6. $y = cos2x$

Amplitude	b – value	period

7. $y = 3sinx$
8. $y = 5cosx$
9. $y = 4cos2x$
10. $y = -2sin\frac{1}{2}x$
11. $y = -cos3x$
12. $y = 2sin\frac{1}{3}x$

Amplitude	b-value	period

III. Determine the amplitude, b value, period, and vertical shift for each function.

13. $y = cos2x - 5$
14. $y = 3\cos\frac{\pi}{2} + 4$
15. $y = -\cos 3x - 2$
16. $y = -2\sin\pi x + 1$
17. $y = 4\sin\frac{x}{4} + 2$
18. $y = 3sin6x - 3$

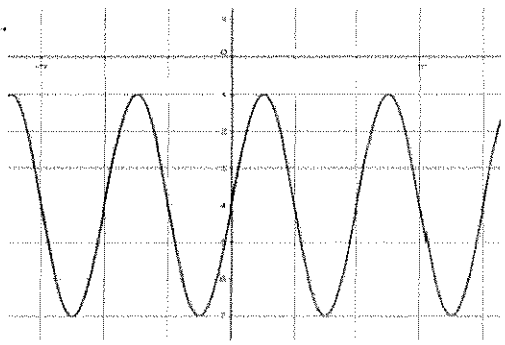
Amplitude	b-value	period	Vertical Shift

Writing Equations from Graphs

Write the indicated equation for each graph.

HONORS

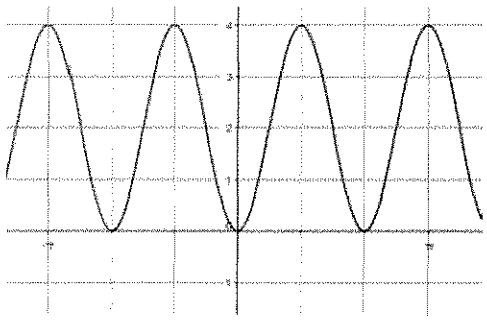
1.



Write a sine equation.

_____

2.



Write a cosine equation.

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