

LESSON #2: HOW DOES AMPLITUDE AFFECT SINE AND COSINE GRAPHS?

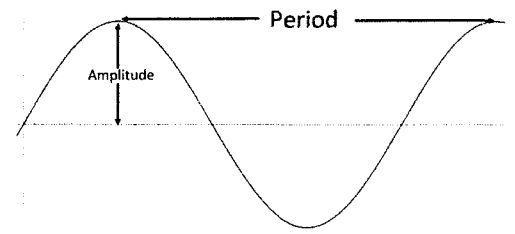
Do Now:

1. Define the word amplitude: <u>HEIGHT!</u>	2. What is the range of the sine and cosine curve? <u>$[-1, 1]$</u>
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General Form of Sine and Cosine Curves:

$$y = A \sin(Bx)$$

$$y = A \cos(Bx)$$



* The **AMPLITUDE** of the sine or cosine function is length difference of the distance between the

maximum point and the minimum point of the graph of the function.

a) What is the amplitude of $y = 3 \sin 2x$?

3

b) What is the amplitude of $y = -2 \cos 5x$?

2 *never negative!

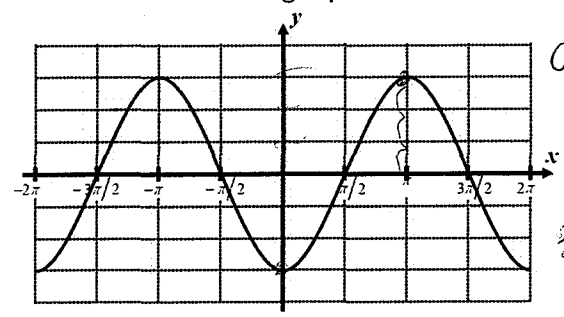
c) Find the maximum value of $y = -4 \sin \frac{1}{2}x$

4

d) State the range of $y = 8 \cos 2x$

$[-8, 8]$

1. Which of the following equations describes the graph shown below?



A **negative sign** in front of the amplitude value causes the graph to:

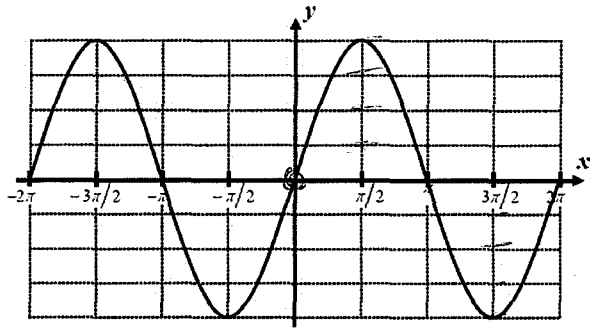
$$y = -A \sin(Bx)$$

$$y = -A \cos(Bx)$$

- (1) $y = 3 \cos x$
- (2) $y = -3 \cos x$
- (3) $y = 3 \sin x$
- (4) $y = -3 \sin x$

has to be \cos b/c it starts @ max/min
 has to be \ominus b/c it starts @ min

2. Which of the following equations describes the graph shown below?



starts @ 0 \rightarrow $\sin \theta$

amp = 4

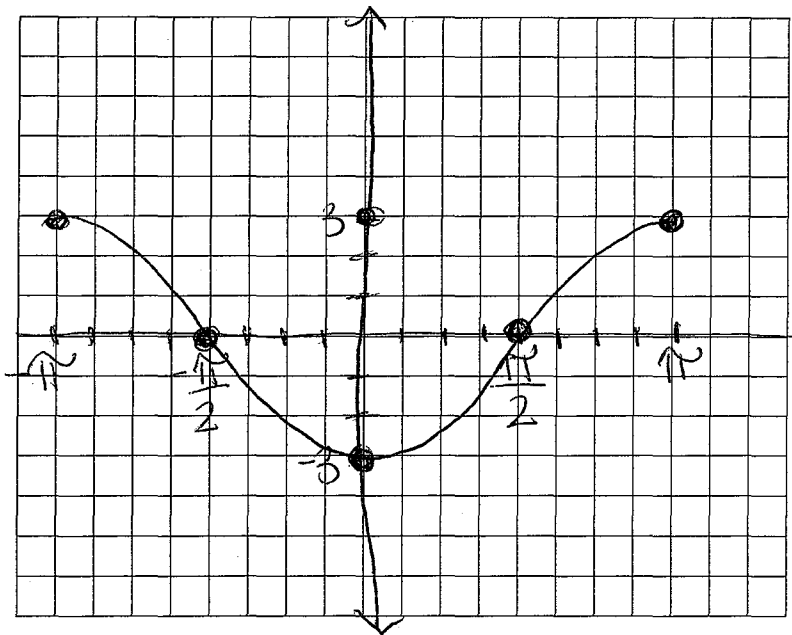
~~(1)~~ $y = 4 \cos x$

(3) $y = 4 \sin x$

~~(2)~~ $y = -4 \cos x$

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

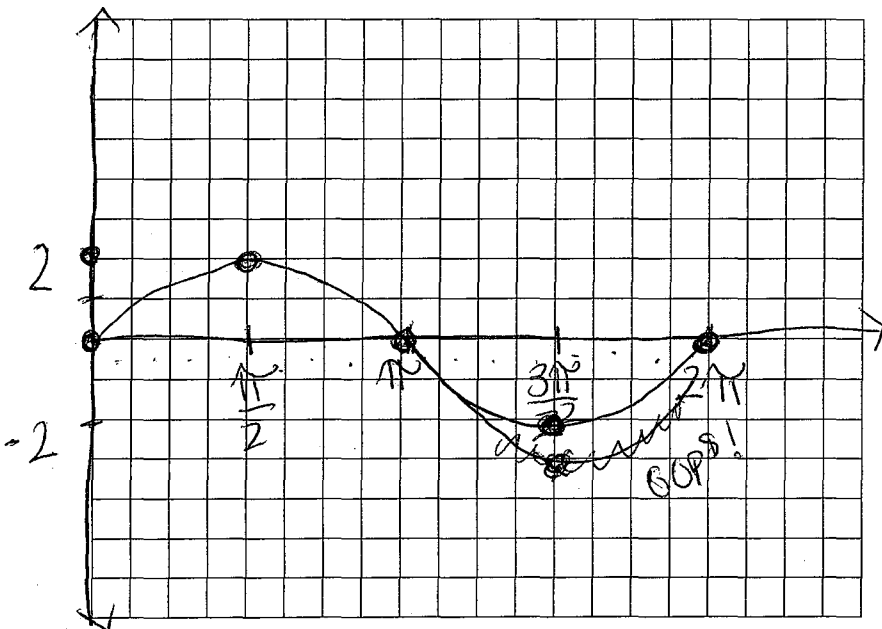
3. Graph $y = -3 \cos x$ from $-\pi \leq x \leq \pi$ \rightarrow \ominus start @ min



Window

Xmin	$-\pi$
Xmax	π
Xscl	$\pi/2$
Ymin	-3
Ymax	3
Yscl	1

4. Graph $y = 2 \sin x$ from $0 \leq x \leq 2\pi$ $\sin \theta$ start @ 0



Window

Xmin	0
Xmax	2π
Xscl	$\pi/2$
Ymin	-2
Ymax	2
Yscl	1

CALCULATOR NOTES

- **Radian Mode**
- **Look at the interval (domain) to determine your Xmin and Xmax.**
 - **Example:** $-2\pi \leq x \leq 2\pi$
 - **Xmin:** -2π
 - **Xmax:** -2π
- **Label the x-axis every 4 (or 2) boxes with the radian measures:** $\frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$
- **The Xscl is always $\frac{\pi}{2}$!** (until we get to real life trig graphs)
- **Look at the amplitude (range) to determine your Ymin and Ymax.**
 - **Example:** $y = 4 \cos x$
 - **Ymin:** -4
 - **Ymax:** 4

Name: _____

Date: _____

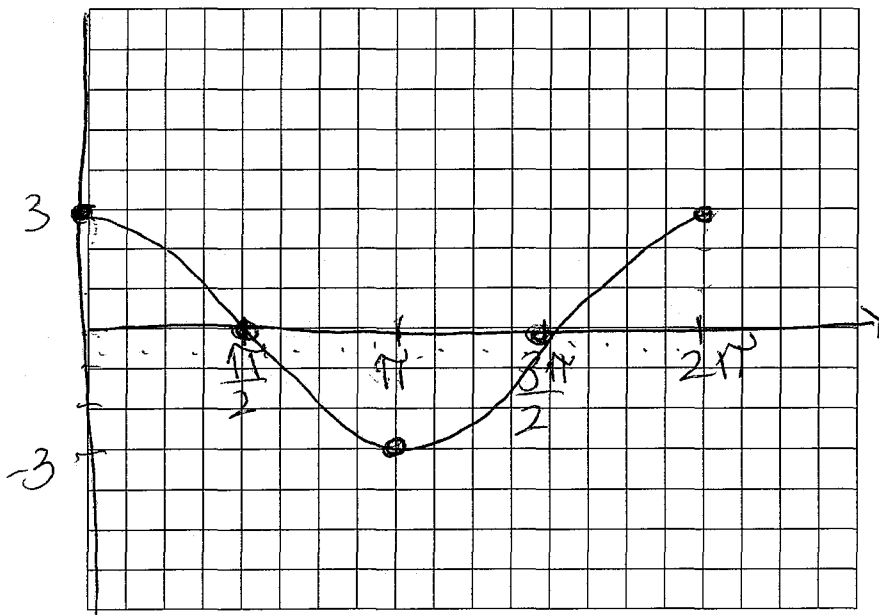
CC ALGEBRA 2

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LAB #1

Use your notes to help you graph! Check your mode and your window!

1. Graph $y = 3\cos x$ from $0 \leq x \leq 2\pi$ (⊕ start @ max)

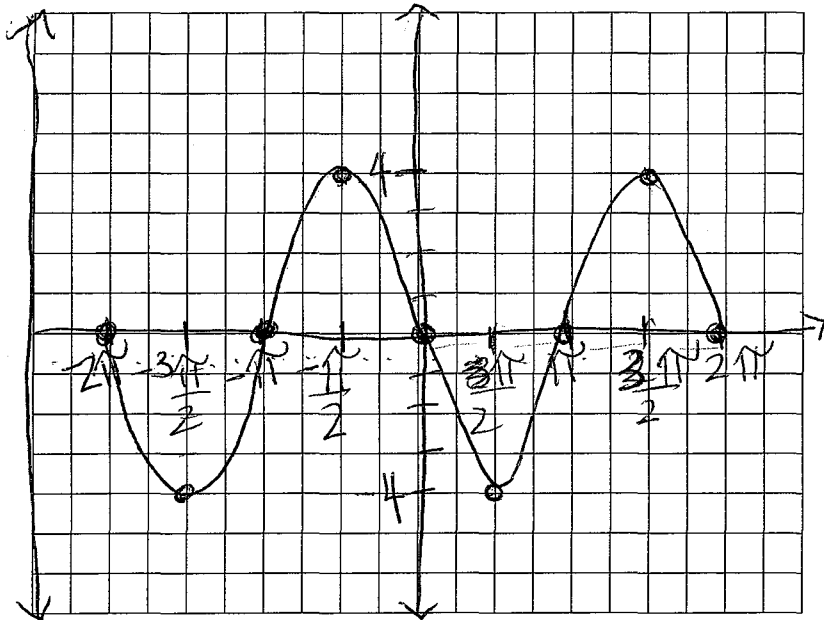


Window

Xmin	0
Xmax	2π
Xscl	$\frac{\pi}{2}$
Ymin	-3
Ymax	3
Yscl	1

2. Graph $y = -4 \sin x$ from $-2\pi \leq x \leq 2\pi$

⊖ start down



Window	
Xmin	-2π
Xmax	2π
Xscl	$\frac{\pi}{2}$
Ymin	-4
Ymax	4
Yscl	1

3. What is the amplitude of the graph of the equation $y = -2 \sin \frac{1}{2} x$?

- 1) $\frac{1}{2}$
- 2) 2
- 3) -2
- 4) 2π

4. What is the minimum value for the function $y = \frac{1}{3} \sin 5x$ is:

- 1) $-\frac{1}{3}$
- 2) $\frac{1}{3}$
- 3) $\frac{1}{5}$
- 4) -5

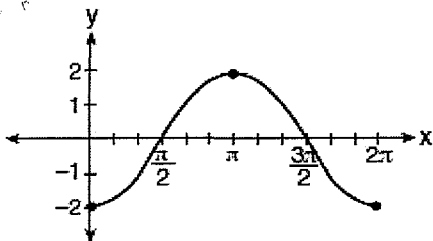
5. Which type of symmetry does the equation $y = \cos x$ have?

- (1) line symmetry with respect to the x-axis
- (2) line symmetry with respect to $y = x$
- (3) point symmetry with respect to the origin
- (4) line symmetry with respect to the y-axis

6. Which type of symmetry does the equation $y = \sin x$ have?

- (1) line symmetry with respect to the x-axis
- (2) line symmetry with respect to $y = x$
- (3) point symmetry with respect to the origin
- (4) line symmetry with respect to the y-axis

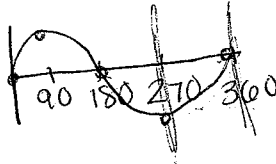
7. The accompanying graph shows a trigonometric function. State an equation of this function.



$$y = -2 \cos x$$

8. As angle x increases from 270° to 360° , which of the following is true?

- (1) $\sin x$ decreases from 0 to -1
- (2) $\sin x$ increases from 0 to 1
- (3) $\sin x$ increases from -1 to 0
- (4) $\sin x$ decreases from 1 to 0



9. Given: $y = -5 \cos 3x$

a. State the domain.

$$(-\infty, \infty)$$

b. State the range.

$$[-5, 5]$$

10. Factor: $x^{12} - 125$

SOAP! $a = x^4$

$$b = -5$$

$$(a-b)(a^2+ab+b^2)$$

$$(x^4-5)((x^4)^2+5x^4+(5)^2)$$

$$(x^4-5)(x^8+5x^4+25)$$