

Key

Graphing Sine and Cosine Functions Study Guide

*Review the characteristics of Sine and Cosine Functions (Day 1).

*Be able to distinguish how each transformation affects domain or range.

For #1-5, find the amplitude, period, phase shift, vertical shift, and decide if there is a reflection.

Function	Amplitude	Period	Phase Shift	Vertical Shift	Reflection
$f(x) = -2 \sin(3x) - 5$	2	$2\pi/3$	none	-5 (down)	yes
$f(x) = \frac{3}{4} \cos\left(\frac{x}{4} - \frac{3\pi}{4}\right) + 1$	$3/4$	8π	$\frac{3\pi/4}{1/4} = 3\pi$	1 (up)	no
$f(x) = -\cos\left(\frac{2x}{3} + \frac{\pi}{4}\right) - 6$	1	3π	$\frac{\pi/4}{2/3} = -\frac{3\pi}{8}$	-6 (down)	yes
$f(x) = 4 \sin\left(\theta - \frac{\pi}{2}\right)$	4	2π	$\pi/2$	none	no
$f(x) = \frac{7}{5} \sin(2\theta) - 3$	$7/5$	π	none	-3 (down)	no

Determine the midline and find the range.

6. $f(x) = \cos(3x) + 2$

$y = 2$
Range $1 \leq y \leq 3$

Write the equation for the graph.

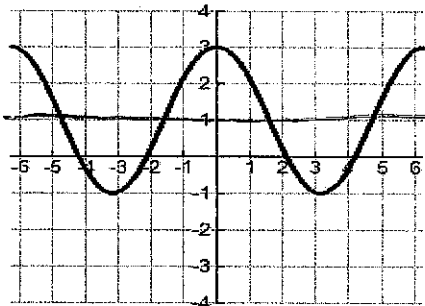
7. $f(x) = 3 \sin(2x) - 5$

$y = -5$
Range $-5-3 \leq y \leq -5+3$
 $-8 \leq y \leq -2$

8. $f(x) = -2 \sin \theta + 4$

$y = 4$
Range $4-2 \leq y \leq 4+2$
 $2 \leq y \leq 6$

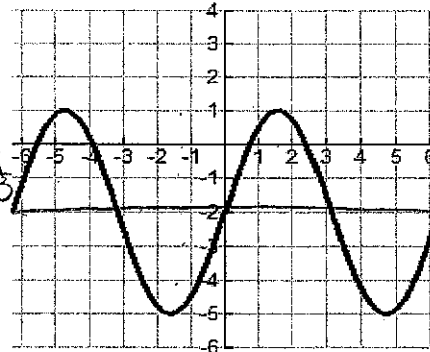
9.



Midline $y = 1$

$y = \pm 2 \cos \frac{\pi}{3}x + 1$

10.

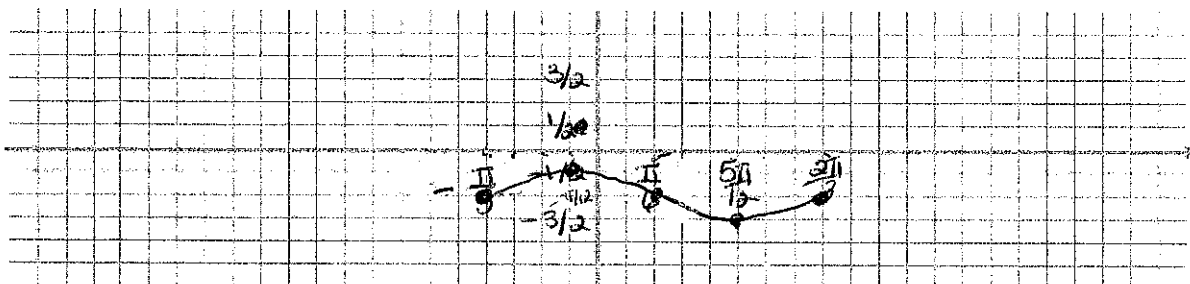


Midline $y = -2$

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

11. Using the function $y = \frac{1}{2} \sin 2\left(\theta + \frac{3\pi}{4}\right) - 1$, find the following and graph the function.

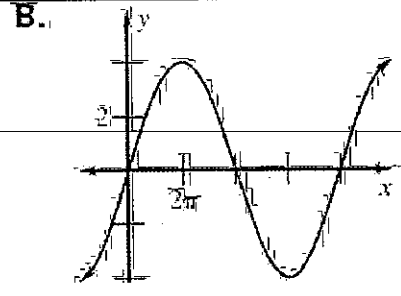
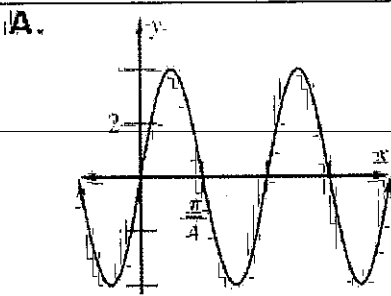
Amp $\frac{1}{2}$ Period $\frac{2\pi}{2} = \pi$ PS $-\frac{\pi}{4}$ vs -1 Inc $= \frac{\pi}{4}$



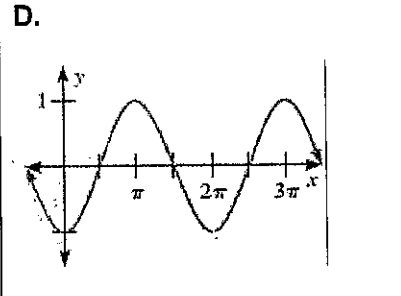
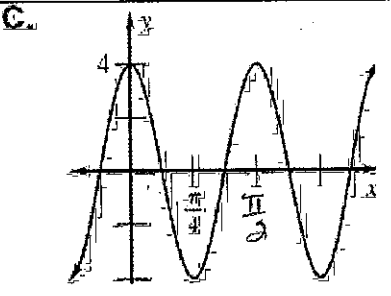
X	Y
$-\frac{\pi}{4}$	$0(\frac{1}{2}) - 1 = -1$
$-\frac{\pi}{2}$	$1(\frac{1}{2}) - 1 = -\frac{1}{2}$
$\frac{\pi}{4}$	$0(\frac{1}{2}) - 1 = -1$
$\frac{3\pi}{4}$	$-1(\frac{1}{2}) - 1 = -\frac{3}{2}$
$\frac{5\pi}{4}$	$0(\frac{1}{2}) - 1 = -1$

Directions: Match the graph with its equation by writing the appropriate letter next to the equation.

12. $y = 4 \sin 4x$ A
 per $\frac{2\pi}{4} = \frac{\pi}{2}$



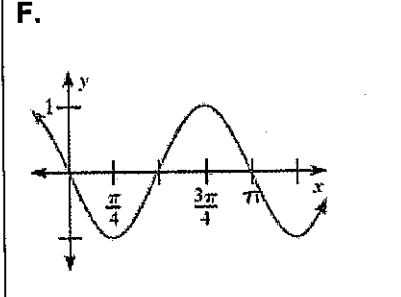
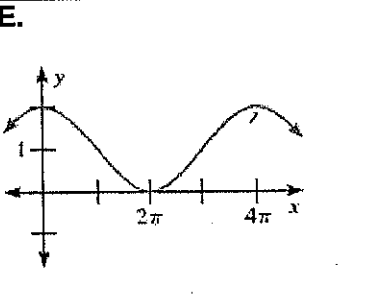
13. $y = \cos(x + \pi)$ D
 per = 2π



14. $y = 4 \cos 4x$ C
 per $\frac{2\pi}{4} = \frac{\pi}{2}$

15. $y = 4 \sin \frac{1}{4}x$ B
 per $\frac{2\pi}{1/4} = 8\pi$

16. $y = \sin 2\left(x + \frac{\pi}{2}\right)$ F
 per = $\frac{2\pi}{2} = \pi$



17. $y = \cos x - 2$ G
 per 2π

18. $y = \cos \frac{1}{2}x + 1$ E
 per = $\frac{2\pi}{1/2} = 4\pi$

