Accel Pre-Calculus
Graphing Sine and Cosine Functions
2.02 Amplitude and Period Notes

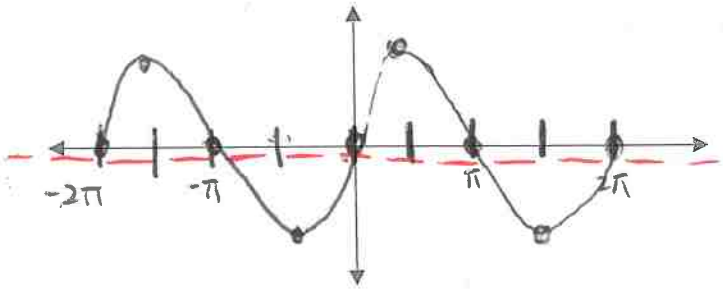
Name: _____

Date: _____

Remember the patterns and the shape of the graphs for the sine and cosine function:

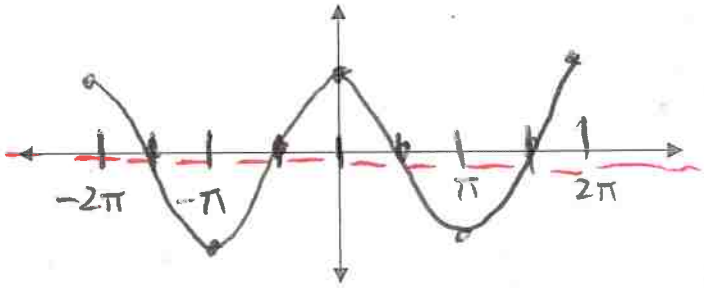
$y = sin\theta$ $y=1\sin\theta$ $a=1$

θ	0	$\pi/2$	π	$3\pi/2$	2π
$sin\theta$	0	1	0	-1	0



$y = cos\theta$ $y=1\cos\theta$ $a=1$

θ	0	$\pi/2$	π	$\frac{3\pi}{2}$	2π
$cos\theta$	1	0	-1	0	1



Given $y = asinb\theta$ and $y = acosb\theta$ we define the Amplitude as: a-value

* distance from "center" to max height "from rest to crest"

Examples:

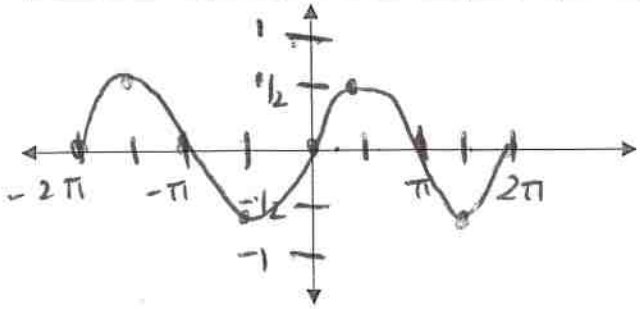
1) $y = \frac{1}{2}sin\theta$ $a = \frac{1}{2}$ Amplitude = $\frac{1}{2}$

2) $y = -4cos\theta$ $a = -4$ Amplitude = 4

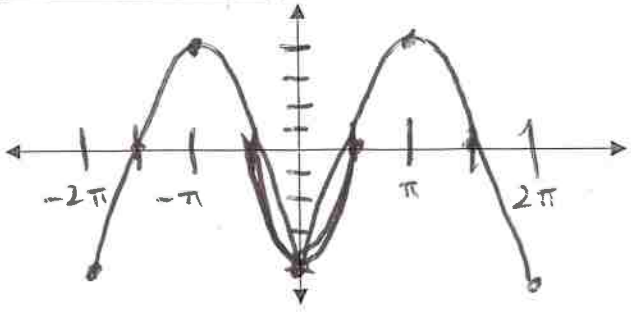
reflection over x-axis

|a|

θ	0	$\pi/2$	π	$3\pi/2$	2π
$sin\theta$	0	1	0	-1	0
$y = \frac{1}{2}sin\theta$	0	$\frac{1}{2}$	0	$-\frac{1}{2}$	0



θ	0	$\pi/2$	π	$3\pi/2$	2π
$cos\theta$	1	0	-1	0	1
$y = -4cos\theta$	-4	0	4	0	-4



We defined the period of the graph as: Cycle length of a graph

Given $y = asin(b\theta)$ and $y = acos(b\theta)$ we use "b" to determine the change to the period of the graph:

$\frac{2\pi \cdot 2}{1/2 \cdot 2} = 4\pi$

$Period\ (P) = \frac{2\pi}{b}$. Likewise, if you know the Period (P) you can find b: $b = \frac{2\pi}{P}$

Once we determine the period of the graph, we divide the period by 4 to determine the Interval in order to label the x-axis: $Interval\ (I) = \frac{P}{4}$

$I = \frac{P}{4}$

$I = \frac{1}{4}P$

Examples:

3) $y = sin(2\theta)$ $b = 2$

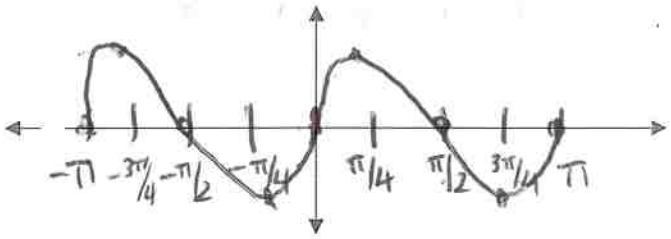
Period = $\frac{2\pi}{2} = \pi$ Interval = $\pi/4$

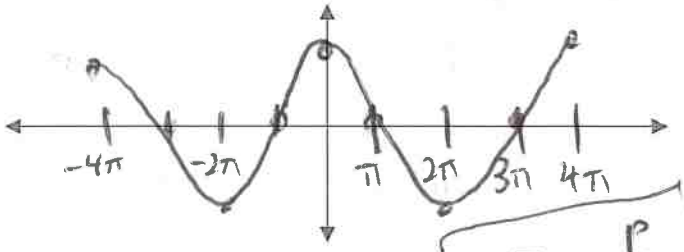
4) $y = cos\frac{\theta}{2}$ $b = 1/2$ → $y = cos(\frac{1}{2}\theta)$

Period = 4π Interval = $\frac{4\pi}{4} = \pi$

θ	0	$\pi/4$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π
$y = sin2\theta$	0	1	0	-1	0

θ	0	π	2π	3π	4π
$y = cos\frac{\theta}{2}$	1	0	-1	0	1





Let's try to graph sine and cosine with changes to both the amplitude and the period.

Examples:

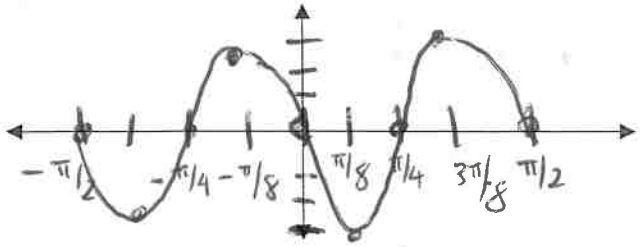
$y = 2cos(\frac{1}{3}\theta)$

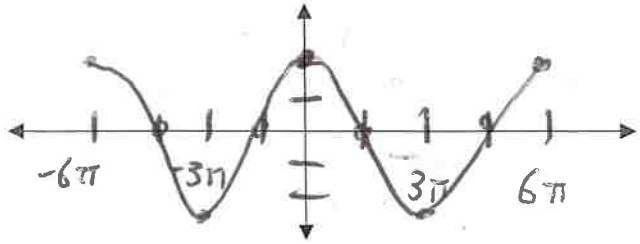
5) $y = -3sin4\theta$ $a = -3$ Amplitude = 3 6) $y = 2cos\frac{\theta}{3}$ $a = 2$ Amplitude = 2

$b = 4$ Period = $\frac{2\pi}{4} = \frac{\pi}{2}$ Interval = $\frac{1}{4} \cdot \frac{\pi}{2} = \frac{\pi}{8}$ $b = \frac{1}{3}$ Period = $\frac{2\pi}{1/3} = 6\pi$ Interval = $\frac{6\pi}{4}$ $\frac{3\pi}{2}$

θ	0	$\frac{\pi}{8}$	$\frac{\pi}{4}$	$\frac{3\pi}{8}$	$\pi/2$
$sin\theta$	0	1	0	-1	0
$y = -3sin4\theta$	0	-3	0	3	0

θ	0	$\frac{3}{2}\pi$	3π	$\frac{9}{2}\pi$	6π
$cos\theta$	1	0	-1	0	1
$y = 2cos\frac{\theta}{3}$	2	0	-2	0	2





2.02 Practice- Graphing Sin and Cos - Amplitude and Period Date: _____

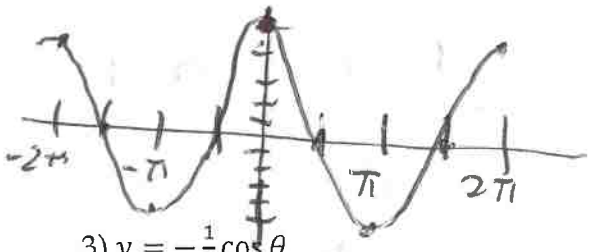
For each function, state the amplitude and period. Then label the axes appropriately and sketch the graph.

1) $y = 5\cos\theta$

Amplitude: 5

Period: 2π

θ	0	$\pi/2$	π	$3\pi/2$	2π
$y=\cos\theta$	1	0	-1	0	1
$y=5\cos\theta$	5	0	-5	0	5

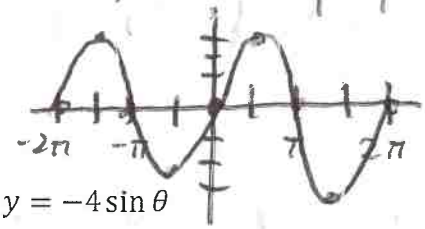


2) $y = 3\sin\theta$

Amplitude: 3

Period: 2π

θ	0	$\pi/2$	π	$3\pi/2$	2π
$\sin\theta$	0	1	0	-1	0
$3\sin\theta$	0	3	0	-3	0

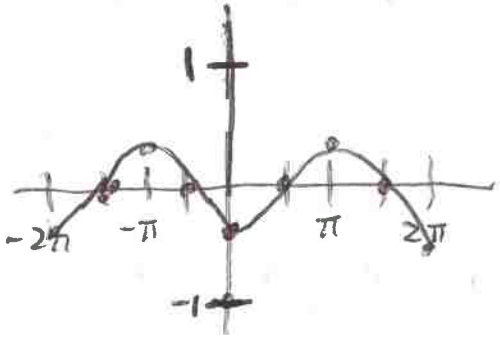


3) $y = -\frac{1}{3}\cos\theta$

Amplitude: 1/3

Period: 2π

θ	0	$\pi/2$	π	$3\pi/2$	2π
$\cos\theta$	1	0	-1	0	1
$-\frac{1}{3}\cos\theta$	-1/3	0	1/3	0	-1/3

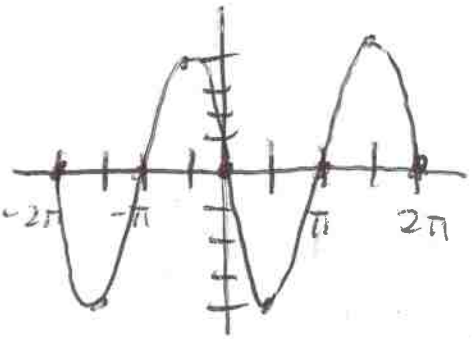


4) $y = -4\sin\theta$

Amplitude: 4

Period: 2π

θ	0	$\pi/2$	π	$3\pi/2$	2π
$\sin\theta$	0	1	0	-1	0
$-4\sin\theta$	0	-4	0	4	0



$y = a\sin\theta$

$y = a\cos\theta$

Write an equation of the function with the given properties:

5) A sine function with an amplitude of 0.4

$y = 0.4\sin\theta$

6) A cosine function with an amplitude of 7.5

$y = 7.5\cos\theta$

7) A sine function with an amplitude of $\frac{1}{4}$

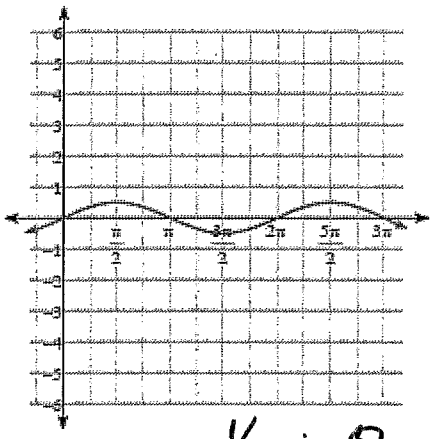
$y = \frac{1}{4}\sin\theta$

8) A cosine function with an amplitude of $\frac{2}{5}$

$y = \frac{2}{5}\cos\theta$

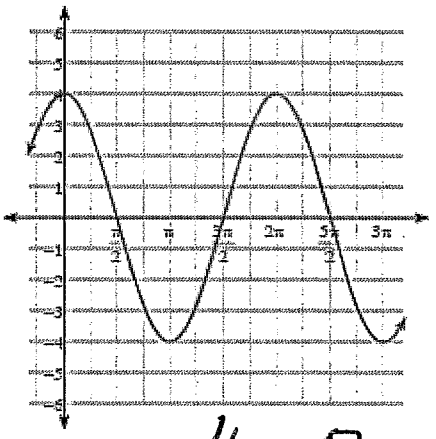
Write an equation for each graph below:

9)



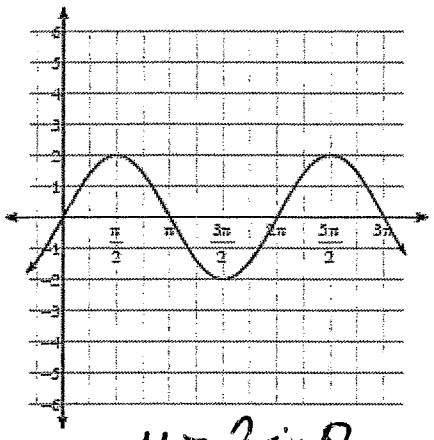
$y = \frac{1}{2}\sin\theta$

10)



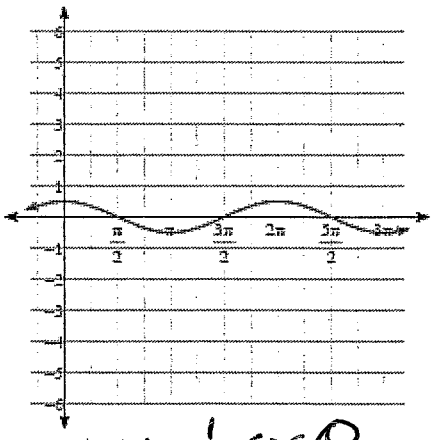
$y = 4\cos\theta$

11)



$y = 2\sin\theta$

12)



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