Name: Key Hour: ____ Date: _____

Writing Equations of Sine/Cosine Graphs Notes

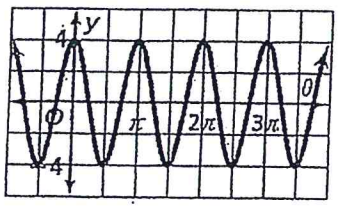
Part 1 – From a Given Graph

- The main difference between the sine and cosine function (that we'll be seeing in Algebra 2):

Sine goes through the origin, cosine does not!

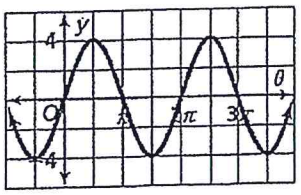
Determine if the given graph is a sine or cosine graph, and whether it is positive or negative.

a)



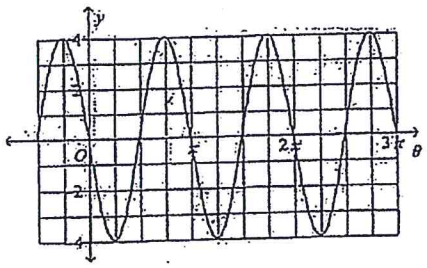
Cosine

b)



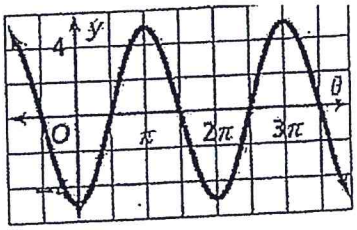
Sine

c)



Sine

d)

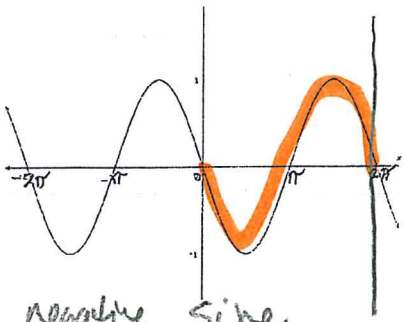


Cosine

Steps to determine the equation of the function from the given graph:

1. Determine pos/neg and cos/sin
2. identify "a"
3. find b (the # of cycles between 0 and 2π)

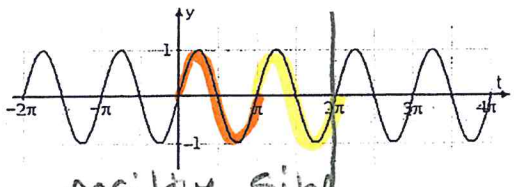
Write an equation to match the following graphs.



negative sine

a = -1 b = 1

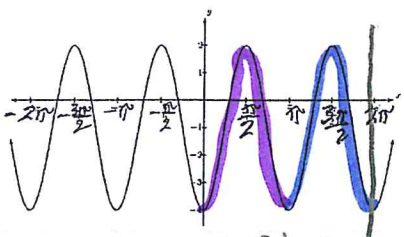
$y = -\sin\theta$



positive sine

a = 1 b = 2

$y = \sin 2\theta$



Negative cosine

a = -4 b = 2

$y = -4\cos 2\theta$

Part 2 – From a Given Description

Steps to write the equation of a periodic function from a description:

1. Determine pos/neg and sine/cosine
2. identify a
3. Calculate b $\quad b = \frac{2\pi}{P}$ ← period

Write a periodic function from the given information.

1) Positive sine function with amplitude 3 and a period of 2.

$y = a\sin b\theta$

$a = 3$

$b = \frac{2\pi}{P} = \frac{2\pi}{2} = \pi$

$\boxed{y = 3\sin \pi\theta}$

2) Negative cosine function with amplitude of 5 and a period of 4π.

$y = -a\cos b\theta$

$a = -5$

$b = \frac{2\pi}{P} = \frac{2\pi}{4\pi} = \frac{1}{2}$

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

3) Positive cosine function with amplitude of 0.5 and a period of $\frac{\pi}{2}$.

$y = a\cos b\theta$

$a = 0.5$

$b = \frac{2\pi}{P} = \frac{2\pi}{1} \cdot \frac{2}{\pi} = 4$

$\boxed{y = 0.5\cos 4\theta}$

4) Negative sine function with amplitude of 7 and a period of $\frac{2\pi}{3}$.

$y = -a\sin b\theta$

$a = 7$

$b = \frac{2\pi}{P} = \frac{2\pi}{1} \cdot \frac{3}{2\pi} = 3$

$\boxed{y = -7\sin 3\theta}$