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CC ALGEBRA 2

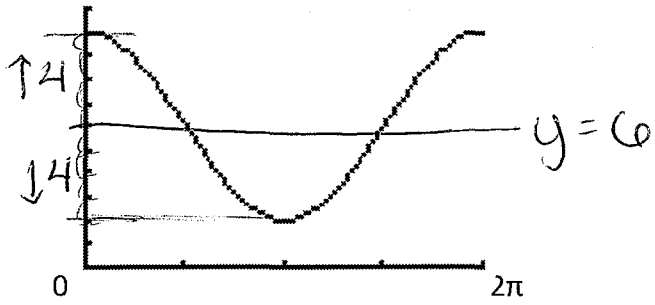
Date: 2/9/18
TROICI

LESSON #6: WRITING A TRIGONOMETRIC MODEL (DAY 1)

Do Now:

a. Write the equation of the graph below in the form $y = a\cos bx + d$.

(*Remember to draw your "midline" to get started*)



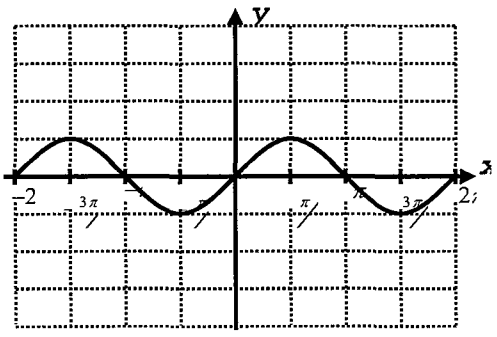
$a = 4$
$b = 1$
$c = \emptyset$
$d = 6$

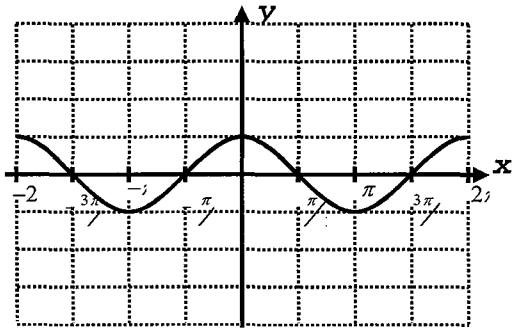
$y = 4\cos x + 6$

Graphs of sine and cosine functions are called ***sinusoids.***

When you write a sine or cosine function for a sinusoid, you need to use the equations:

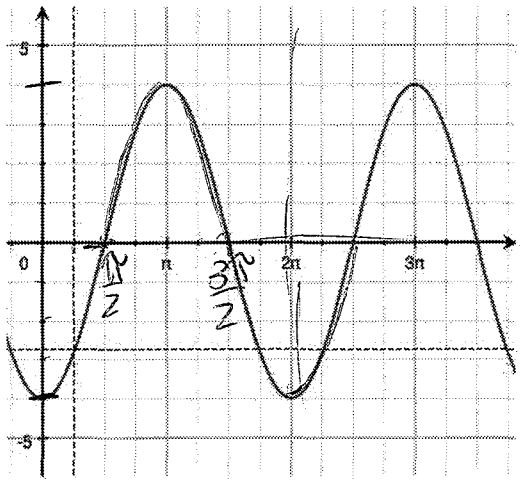
$$y = a\sin b(x \pm c) \pm d \quad \text{or} \quad y = a\cos b(x \pm c) \pm d$$





MODEL 1

Write a function in the form $y = a\sin b(x \pm c) \pm d$ and $y = a\cos b(x \pm c) \pm d$ for the graph shown:



$y = a\cos b(x+c) + d$
$a = 4$
$b = 1$ * only between 0 and 2π!
$c = \emptyset$
$d = 0$

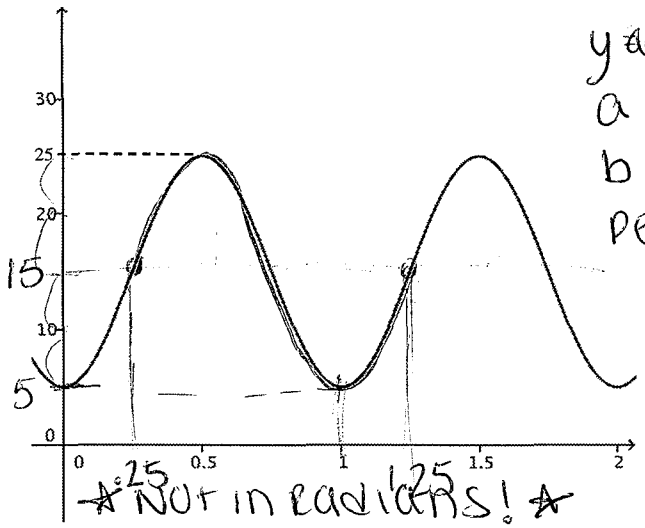
$y = -4\cos x$

$y = a\sin(x+c)+d$
$a = 4$
$b = 1$
$c = \emptyset$ Right $\frac{\pi}{2}$ $(-\frac{\pi}{2})$
$d = 0$

$y = 4\sin(x - \frac{\pi}{2})$

MODEL 2

Write a function in the form $y = a\sin b(x \pm c) \pm d$ and $y = a\cos b(x \pm c) \pm d$ for the graph shown.



$y = a\cos b(x+c)+d$
$a = 10$
$b = ?$
$\text{period} = \frac{1}{1} = \frac{2\pi}{b}$
$b = 2\pi$
$c = \emptyset$
$d = 15$

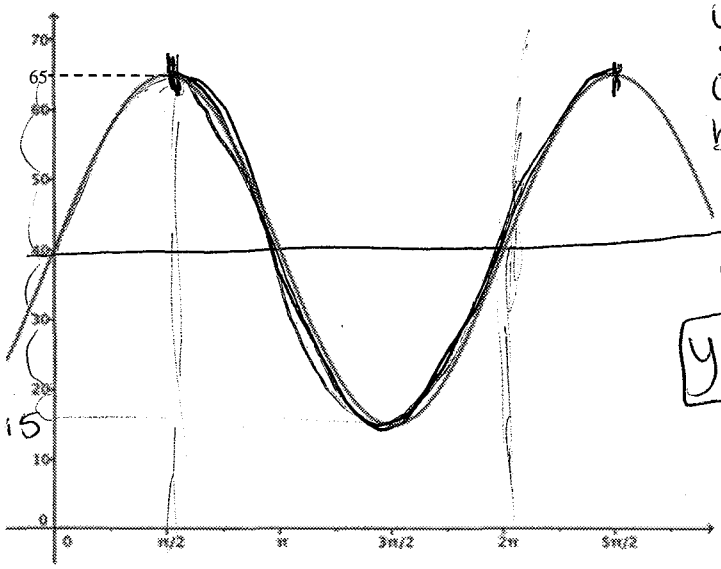
$y = a\sin b(x+c)+d$
$a = 10$
$b = 2\pi$
$c = \text{Right } .25 \; (-.25)$
$d = 15$
$y = 10\sin 2\pi(x-.25)+15$

.25 NOT in radians! .25

PRACTICE: $y = -10\cos 2\pi x + 15$

Write a function in the form $y = a\sin b(x \pm c) \pm d$ and $y = a\cos b(x \pm c) \pm d$ for each graph shown:

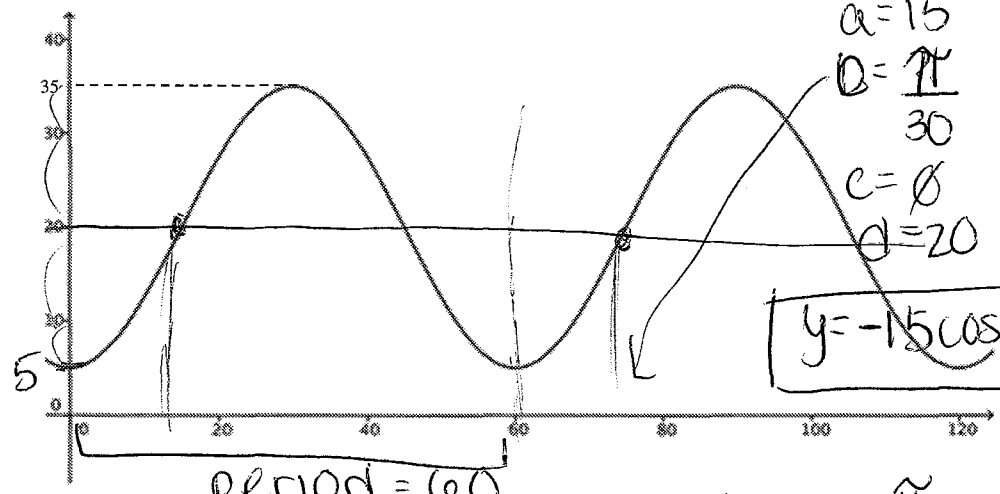
1)



$y = a\cos b(x+c)+d$
$a = 25$
$b = 1$
$c = \text{Right } \frac{\pi}{2}, \left(-\frac{\pi}{2}\right)$
$d = 40$
$y = 25\cos\left(x-\frac{\pi}{2}\right)+40$

$y = a\sin b(x+c)+d$
$a = 25$
$b = 1$
$c = \emptyset$
$d = 40$
$y = 25\sin x + 40$

2)



$\cos x$
$a = 15$
$b = \frac{\pi}{30}$
$c = \emptyset$
$d = 20$
$y = -15\cos\frac{\pi}{30}x + 20$

$\sin x$
$a = 15$
$b = \frac{\pi}{30}$
$c = \text{Right } 10$
-10
$d = 20$
$y = 15\sin\frac{\pi}{30}(x-10)+20$

$\text{period} = 60$
$\frac{60}{1} = \frac{2\pi}{b}$
$\frac{2\pi}{60} = \frac{60b}{60} \rightarrow b = \frac{\pi}{30}$