

Name: _____ Hour: _____ Date: _____

Honors – Vertical Translations of Trig Functions Notes

Do you remember vertical translations from first semester?

move the graph up or down

- Moving Up:

$$y = a \sin bx + K$$

$$y = a \cos bx + K$$

$$y = a \tan bx + K$$

- Moving Down:

$$y = a \sin bx - K$$

$$y = a \cos bx - K$$

$$y = a \tan bx - K$$

Which values in the parent function are changed?

We will change y-values

Examples: Sketch a graph of one cycle of the following functions.

1) $y = 2 \sin(4\theta) + 3$

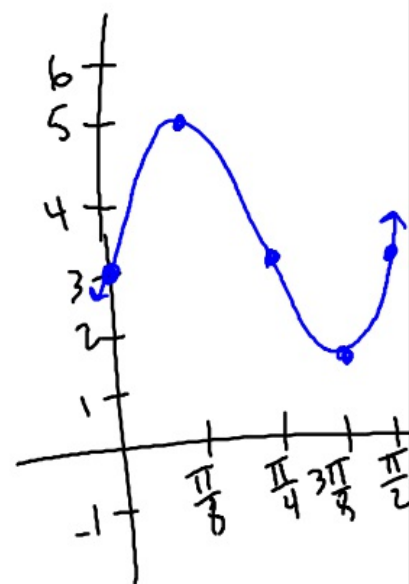
$$a = 2$$

$$b = 4$$

$$\text{Period} = \frac{\pi}{2}$$

$$\text{up } 3$$

θ	$y + 3$
$0(\frac{\pi}{2}) = 0$	$0 + 3 = 3$
$\frac{1}{4}(\frac{\pi}{2}) = \frac{\pi}{8}$	$2 + 3 = 5$
$\frac{1}{2}(\frac{\pi}{2}) = \frac{\pi}{4}$	$0 + 3 = 3$
$\frac{3}{4}(\frac{\pi}{2}) = \frac{3\pi}{8}$	$-2 + 3 = 1$
$1(\frac{\pi}{2}) = \frac{\pi}{2}$	$0 + 3 = 3$



$$2) y = 5 \cos\left(\frac{\theta}{3}\right) - 2$$

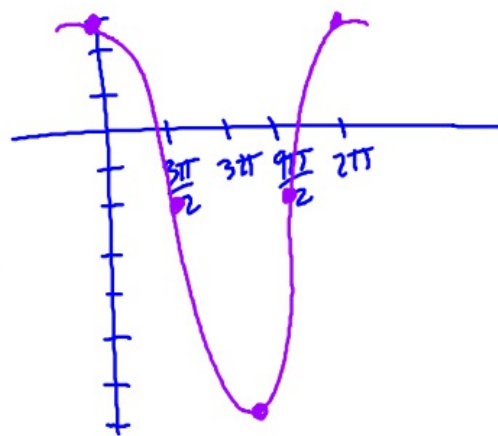
$$a = 5$$

$$b = \frac{1}{3}$$

$$\text{Period} = 6\pi$$

down 2

θ	$y - 2$
0	$5 - 2 = 3$
$\frac{3\pi}{2}$	$0 - 2 = -2$
3π	$-5 - 2 = -7$
$\frac{9\pi}{2}$	$0 - 2 = -2$
6π	$5 - 2 = 3$



$$3) y = -4 \sin\left(\frac{3\pi}{4}\theta\right) + 1$$

$$4) y = -2 \tan(4\theta) - 4$$

$$a = -2 \quad b = 4$$

$$\text{Period: } \frac{\pi}{4}$$

θ	$y - 4$
0	$0 - 4 = -4$
$\frac{\pi}{8}$	und.
$\frac{\pi}{4}$	$0 - 4 = -4$
$\frac{3\pi}{8}$	und.
$\frac{\pi}{2}$	$0 - 4 = -4$

