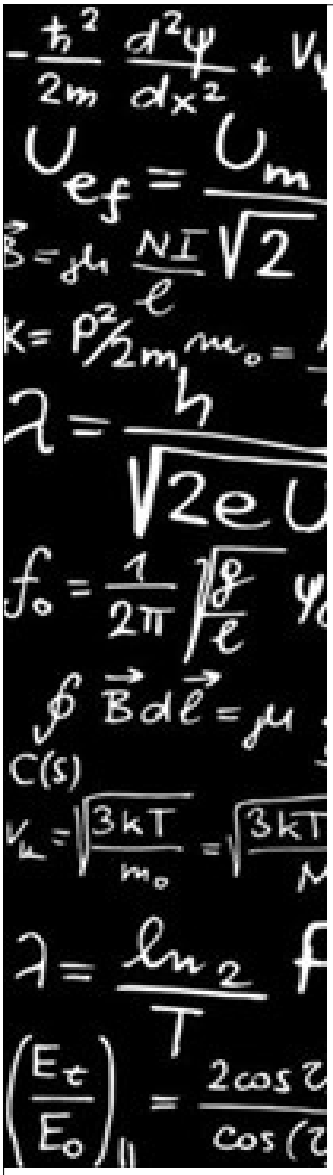


Unit 7 / Day 3

Transforming Trig Function Graphs

Objective:

Students will be able to accurately graph shifts (left, right, up and down) and stretches or compressions of the parent trig function graphs.

1. Graph $f(\theta) = \frac{1}{3}\cos\left[2\left(\theta + \frac{\pi}{4}\right)\right] + 1$

Vertical Shift: up/down	Phase Shift: left/right
up 1	left $\frac{\pi}{4}$
Period:	**Amplitude:**
π	$\frac{1}{3}$

cosθ = MiniM

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

$\frac{1}{2}(0) - \frac{\pi}{4}$

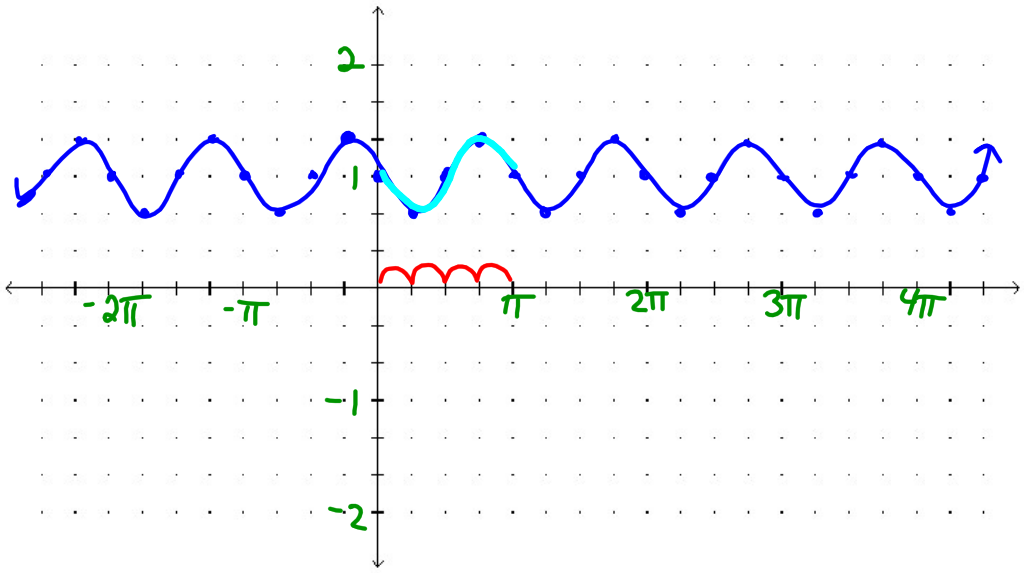
$\frac{1}{2}\left(\frac{\pi}{2}\right) - \frac{\pi}{4}$

$\frac{\pi}{4} - \frac{\pi}{4}$

$+\frac{\pi}{4}$

$\frac{4\pi}{4} = \pi$

$-\frac{1}{3} + 1$



2. Graph $f(\theta) = -2\sin\left(\frac{1}{2}\left(\theta - \frac{\pi}{3}\right)\right) + 2$

Vertical Shift:	Phase Shift:
up 2	right $\frac{\pi}{3}$
Period:	**Amplitude:**
4π	$\lvert -2 \rvert = 2$

$\sin\theta = \text{MIMI}$

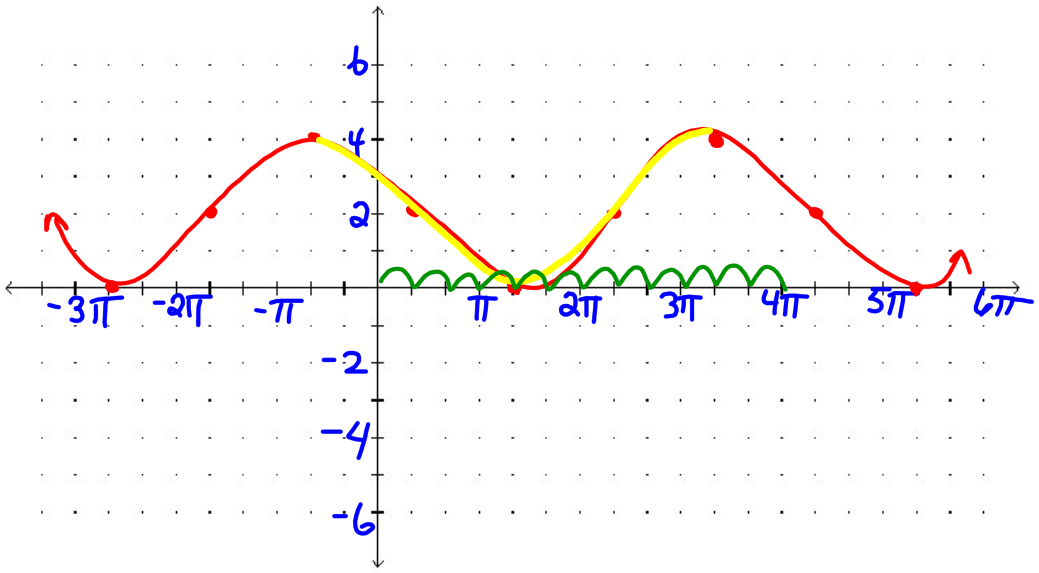
$2(0)+\frac{\pi}{3}$ $+\frac{3\pi}{3}$

$\frac{2}{1}\left(\frac{\pi}{2}\right)+\frac{\pi}{3}$

$\frac{3\pi}{3}+\frac{\pi}{3}$

$4\pi = \frac{12\pi}{3}$

$2\theta+\frac{\pi}{3}$	θ	y	$-2y+2$
$\frac{1\pi}{3}$	0	0	2
$\frac{4\pi}{3}$	$\frac{\pi}{2}$	1	0
$\frac{7\pi}{3}$	π	0	2
$\frac{10\pi}{3}$	$\frac{3\pi}{2}$	-1	4
$\frac{13\pi}{3}$	2π	0	2



3. Graph $f(\theta) = -\tan\left(\frac{1}{2}\left(\theta - \frac{\pi}{2}\right)\right) - 1$

Vertical Shift:	Phase Shift:
down 1	right $\frac{\pi}{2}$
Period:	**Amplitude:**
2π	N/A

$\tan\theta$ = unMu

$2\left(-\frac{\pi}{2}\right) + \frac{\pi}{2}$

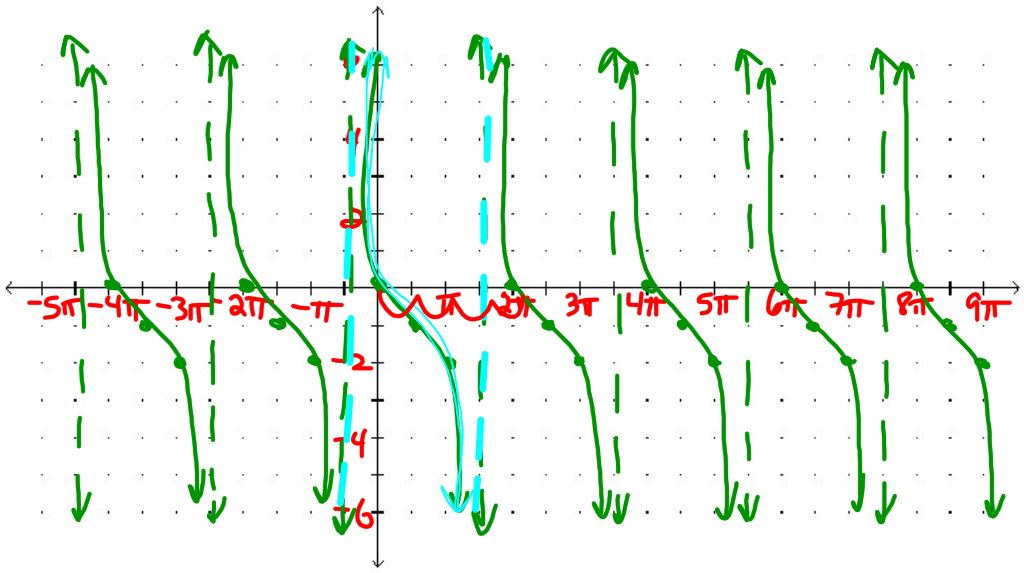
$-\frac{2\pi}{2} + \frac{\pi}{2}$

$\frac{\pi}{2}$

$2\left(-\frac{\pi}{4}\right) + \frac{\pi}{2}$

$-\frac{\pi}{2} + \frac{\pi}{2}$

$2\theta + \frac{\pi}{2}$	θ	y	$-y-1$
$-\frac{\pi}{2}$	$-\frac{\pi}{2}$	und	und
0	$-\frac{\pi}{4}$	-1	0
$\frac{\pi}{2}$	0	0	-1
$\frac{2\pi}{2} = \pi$	$\frac{\pi}{4}$	1	-2
$\frac{3\pi}{2}$	$\frac{\pi}{2}$	und	und



Let's Generalize...

$$y = a\sin\left(b\left(\theta - h\right)\right) + k$$

$$y = a\cos\left(b\left(\theta - h\right)\right) + k$$

$$y = a\tan\left(b\left(\theta - h\right)\right) + k$$

Vertical Shift:	Phase Shift:
up/down k	left/right opposite of h
Period: look at the graph or table	**Amplitude:** sinθ/cosθ = |a| tanθ = N/A

sinθ/cosθ:

* period = $\frac{2\pi}{b}$

tanθ:

period = $\frac{\pi}{b}$

Write an equation with the following characteristics.

4. Parent of $y = \cos\theta$ with a period of π, an amplitude of 3, translated $\frac{\pi}{2}$ units to the right and up 5 units.

$y = a\cos(b(\theta - h)) + k$

$y = 3\cos(2(\theta - \frac{\pi}{2})) + 5$

$\text{period} = \frac{2\pi}{b}$

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

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

$b = 2$

Write an equation with the following characteristics.

5. Parent of $y = \sin\theta$ with a period of $\frac{\pi}{2}$, an amplitude of ~~4~~ 2, translated $\frac{\pi}{6}$ units to the left, down 3 units, and reflected over the x-axis.

$y = a\sin(b(\theta - h)) + k$

$y = -2\sin(4(\theta + \frac{\pi}{6})) - 3$

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

$\frac{\pi b}{\pi} = \frac{4\pi}{\pi}$

$b = 4$

Nov 15-9:09 AM