Accelerated Pre-Calculus Name _____ Key

2.12 Quiz Review: Graphing Sec, Csc, Tan and Cot with Transformations

State the period, phase shift, and vertical shift of each function below. Then, graph at least one period of the function. **Label the axes.**

1. $y = \cot\left(3\theta - \frac{5\pi}{2}\right) + 1$ $\quad y = \cot\left[3\left(\theta - \frac{5\pi}{3\cdot 2}\right)\right] + 1 \rightarrow y = \cot\left[3\left(\theta - \frac{5\pi}{6}\right)\right] + 1$

Vertical Stretch: none Period: $\pi/3$ Interval Increments: $\pi/12$ Phase Shift: right $5\pi/6$ Vertical Shift: up 1

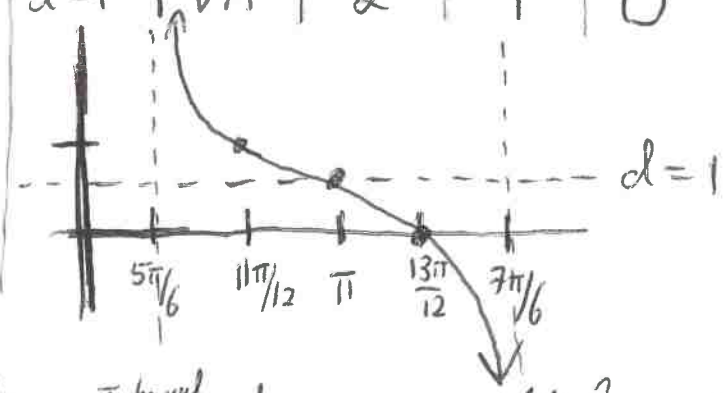
Asymptotes: $5\pi/6 + \frac{\pi}{3}n,\ n \in \mathbb{Z}$

$b = 3$

$P = \frac{\pi}{b} \rightarrow \frac{\pi}{3}$

$I = \frac{P}{4} \rightarrow \frac{\pi/3}{4} \rightarrow \frac{\pi}{3}\cdot\frac{1}{4} = \pi/12$

θ	$5\pi/6$	$11\pi/12$	π	$13\pi/12$	$7\pi/6$
	$0 + \frac{10\pi}{12}$	$\pi/12 + \frac{10\pi}{12}$	$2\pi/12 + \frac{10\pi}{12}$	$3\pi/12 + \frac{10\pi}{12}$	$4\pi/12 + \frac{10\pi}{12}$
$\cot\theta$	VA	1	0	-1	VA
$d = 1$	VA	2	1	0	VA



think cosine

2. $y = -2\sec\left(\frac{\pi}{2}\theta + \frac{\pi}{3}\right) + 1$

Vertical Stretch: 2 Period: 4 Interval Increments: 1 Phase Shift: left $\frac{2}{3}$ Vertical Shift: up 1

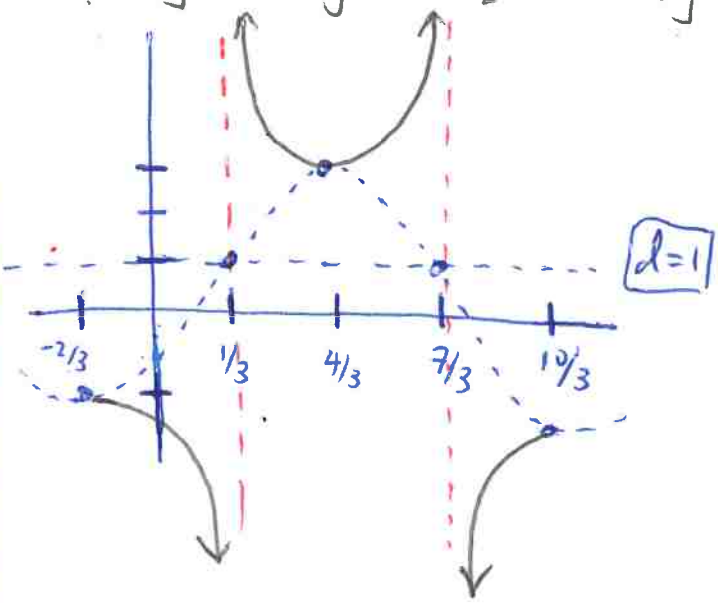
Asymptotes: $\frac{1}{3} + 2n$, $n \in \mathbb{Z}$ $\quad y = -2\cos\left[\frac{\pi}{2}\left(\theta + \frac{2\cdot\pi}{\pi\cdot 3}\right)\right] + 1 \rightarrow y = -2\cos\left[\frac{\pi}{2}\left(\theta + \frac{2}{3}\right)\right] + 1$

$b = \pi/2$

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

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

θ	$-2/3$	$1/3$	$4/3$	$7/3$	$10/3$
	$0 - 2/3$	$1 - 2/3$	$2 - 2/3$	$3 - 2/3$	$4 - 2/3$
$\cos\theta$	1	0	-1	0	1
$-2\cos\theta$	-2	0	2	0	-2
$d = 1$	-1	1	3	1	-1



3. $y = 3\tan\left(\frac{\theta}{2} - \frac{4\pi}{3}\right) - 1$ $y=3\tan\left[\frac{1}{2}\left(\theta - \frac{2\cdot 4\pi}{3}\right)\right]-1 \rightarrow y=3\tan\left[\frac{1}{2}\left(\theta-\frac{8\pi}{3}\right)\right]-1$

Vertical Stretch: 3 Period: 2π Increments: $\pi/2$ Phase Shift: right $8\pi/3$ Vertical Shift: down 1

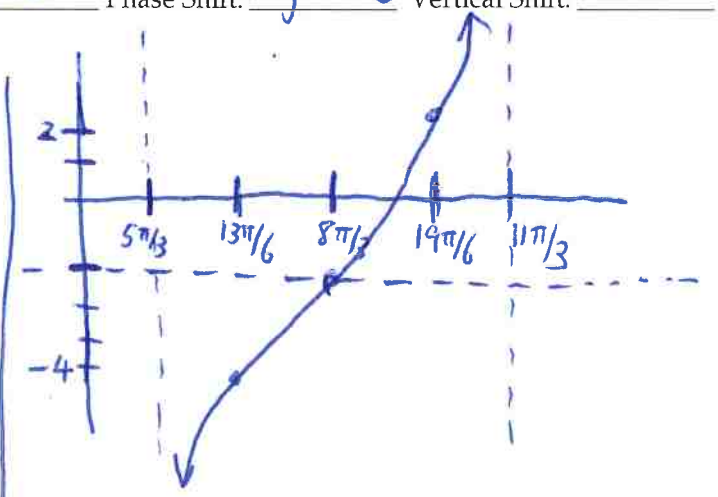
Asymptotes: $\frac{5\pi}{3} + 2\pi n$, $n \in \mathbb{Z}$

$b = 1/2$

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

$I = \frac{P}{4} \rightarrow \frac{2\pi}{4} = \pi/2$

θ	$5\pi/3$: $-\pi + 8\pi/3$	$13\pi/6$: $-\pi/2 + 8\pi/3$	$8\pi/3$: $0 + 8\pi/3$	$19\pi/6$: $\pi/2 + 8\pi/3$	$11\pi/3$: $\pi + 8\pi/3$
$\tan\theta$	VA	-1	0	1	VA
$3\tan\theta$	VA	-3	0	3	VA
$d=-1$	VA	-4	-1	2	VA



4. Write the equation of a cotangent function with a period = $\frac{\pi}{6}$ that is shifted up 3 units and left 9π units.

$y = a\cot[b(\theta + c)] + d$

$a = 1$

$P = \pi/6$

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

$\frac{\pi}{6} = \frac{\pi}{b}$

$b\pi = 6\pi$

$b = 6$

$d = 3$

$c = (+)9\pi$

$$y = 1\cot[6(\theta + 9\pi)] + 3$$