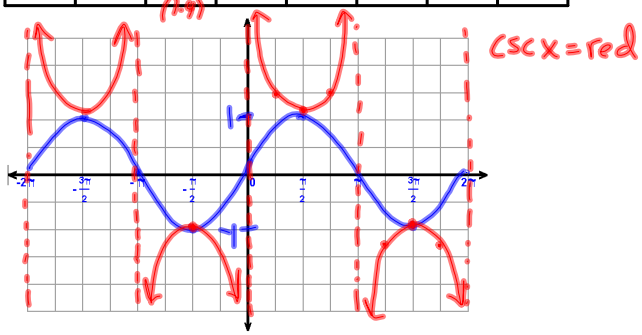
4.5 Graphs of TAN, COT, SEC, CSC

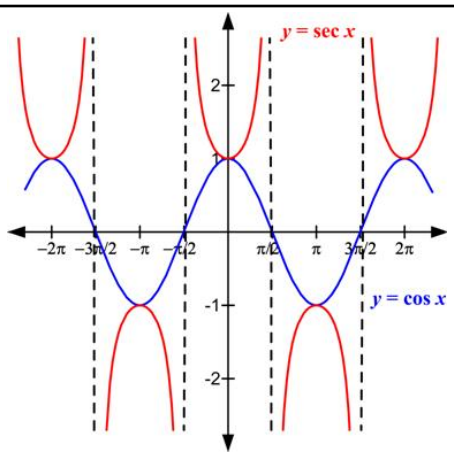
x	-2π	$-\frac{7\pi}{4}$	$-\frac{3\pi}{2}$	$-\frac{5\pi}{4}$	$-\pi$	$-\frac{3\pi}{4}$	$-\frac{\pi}{2}$	$-\frac{\pi}{4}$	0
sin x	0	$\sqrt{2}/2$	1	$\sqrt{2}/2$	0	$-\sqrt{2}/2$	-1	$-\sqrt{2}/2$	0
csc x	UN	$\sqrt{2}$	1	$\sqrt{2}$	UN	$-\sqrt{2}$	-1	$-\sqrt{2}$	UN

	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π
sin x	$\sqrt{2}/2$	1	$\sqrt{2}/2$	0	$-\sqrt{2}/2$	-1	$-\sqrt{2}/2$	0
csc x	$\sqrt{2}$	1	$\sqrt{2}$	UN	$-\sqrt{2}$	-1	$-\sqrt{2}$	UN



Domain	$x \neq \pi n$
Range	$(-\infty,-1]\cup[1,\infty)$
Period	2π
Asymptotes	$x = \pi n$
Symmetry	ODD

Mar 21-8:14 AM



Domain	$x \neq \frac{\pi}{2} + \pi n$
Range	$(-\infty,-1]\cup[1,\infty)$
Period	2π
Asymptotes	$x = \frac{\pi}{2} + \pi n$
Symmetry	EVEN

Mar 21-8:28 AM

1.) $y = \csc\left(\frac{1}{2}x\right) - 1$ OTOBO

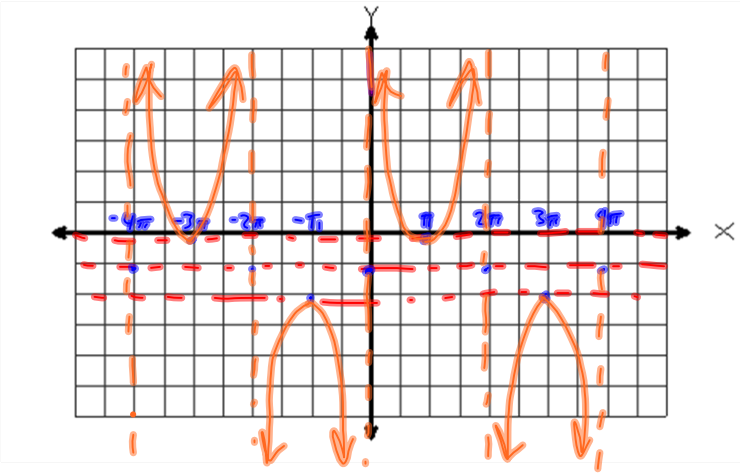
$a = 1$

Period: $\frac{2\pi}{1/2} = 4\pi$

Intervals: π

Phase Shift: None

Vertical Shift: $\downarrow 1$



Mar 21-8:20 AM

2.) $y = \csc(2x - \pi)$

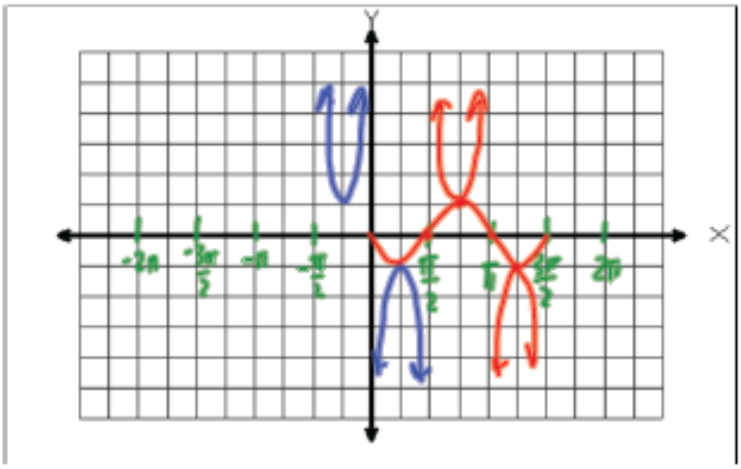
$a = 1$

$b = 2$

Period = π

*Intervals: $\frac{\pi}{4}$

P.S. $\frac{\pi}{2}$



Mar 21-8:32 AM

3.) $y = 2\sec(3x+\pi)+1$

TOBOT

$a = 2$

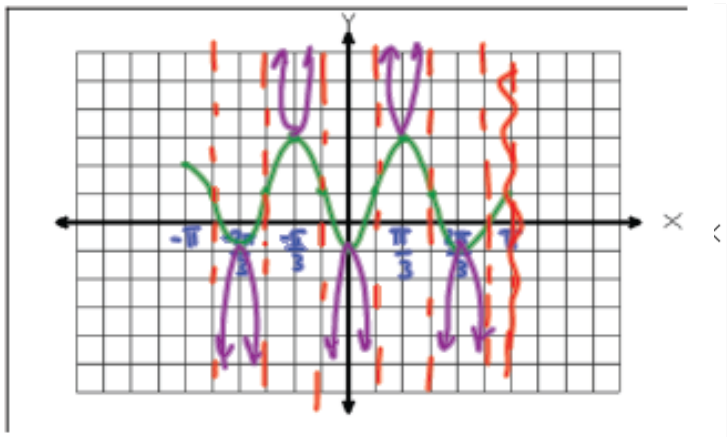
$b = 3$

Period: $\frac{2\pi}{3}$

Intervals: $\pi/6$

P.S. $\frac{-\pi}{3}$

$d = 1$



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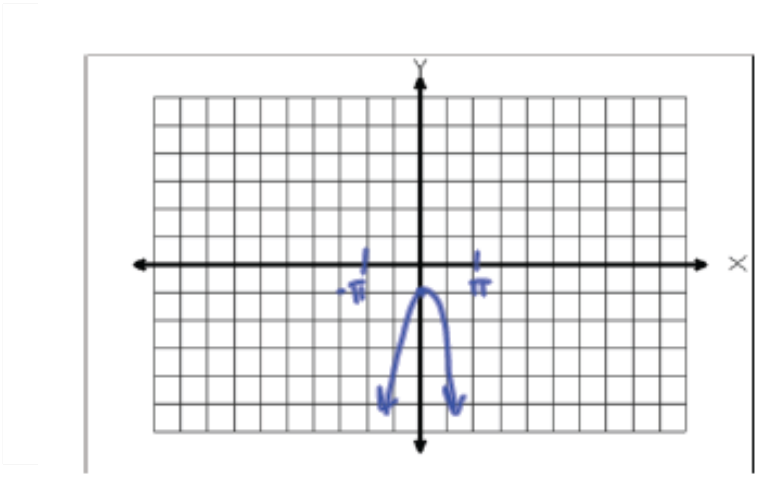
4.) $y = -\sec\left(\frac{1}{2}x\right)$



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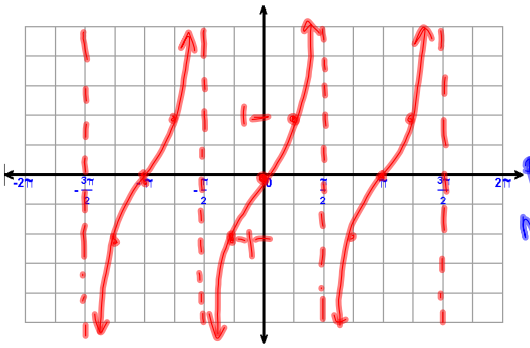
x	-2π	$-\frac{7\pi}{4}$	$-\frac{3\pi}{2}$	$-\frac{5\pi}{4}$	$-\pi$	$-\frac{3\pi}{4}$	$-\frac{\pi}{2}$	$-\frac{\pi}{4}$	0
tan x	0	1	UN	-1	0	1	UN	-1	0

	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π
tan x	1	UN	-1	0	1	UN	-1	0



TANBOT

Phase Shift moves middle point $bx+c=0$

First asymptote $bx+c=\frac{\pi}{2}$

Domain	
Range	
Period	
Asymptotes	
Symmetry	

Dec 3-11:25 AM

5.) $y=2\tan\left(2x+\frac{\pi}{4}\right)$

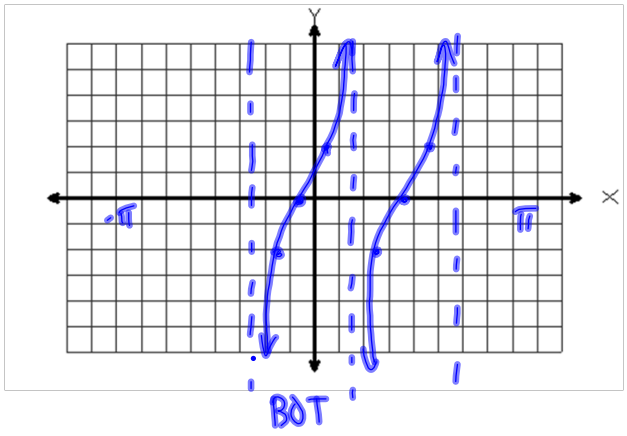
$a=2$

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

Intervals: $\frac{\pi}{8}$

P.S. $2x+\frac{\pi}{4}=0$

$x=\frac{-\pi}{8}$



Asymptotes: $2x+\frac{\pi}{4}=\frac{\pi}{2}$

$x=\frac{\pi}{8}+\frac{\pi}{2}n$

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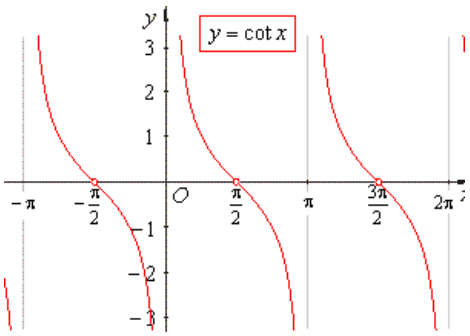
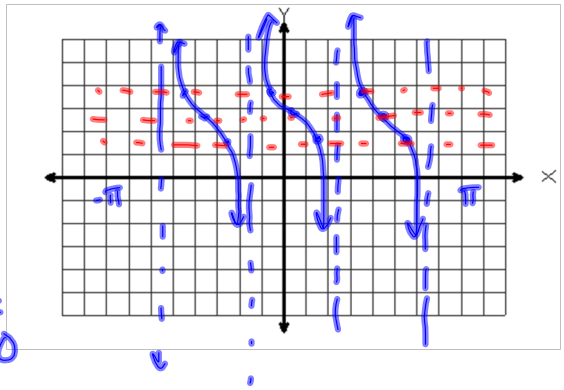


Domain	$x \neq \pi n$
Range	$(-\infty, \infty)$
Period	π
Asymptotes	$x = \pi n$
Symmetry	ODD

Dec 3-11:34 AM

6.) $y = \cot\left(2x - \frac{\pi}{2}\right) + 3$ TOB



$a = 1$

Period: $\frac{\pi}{2}$

Intervals: $\frac{\pi}{8}$

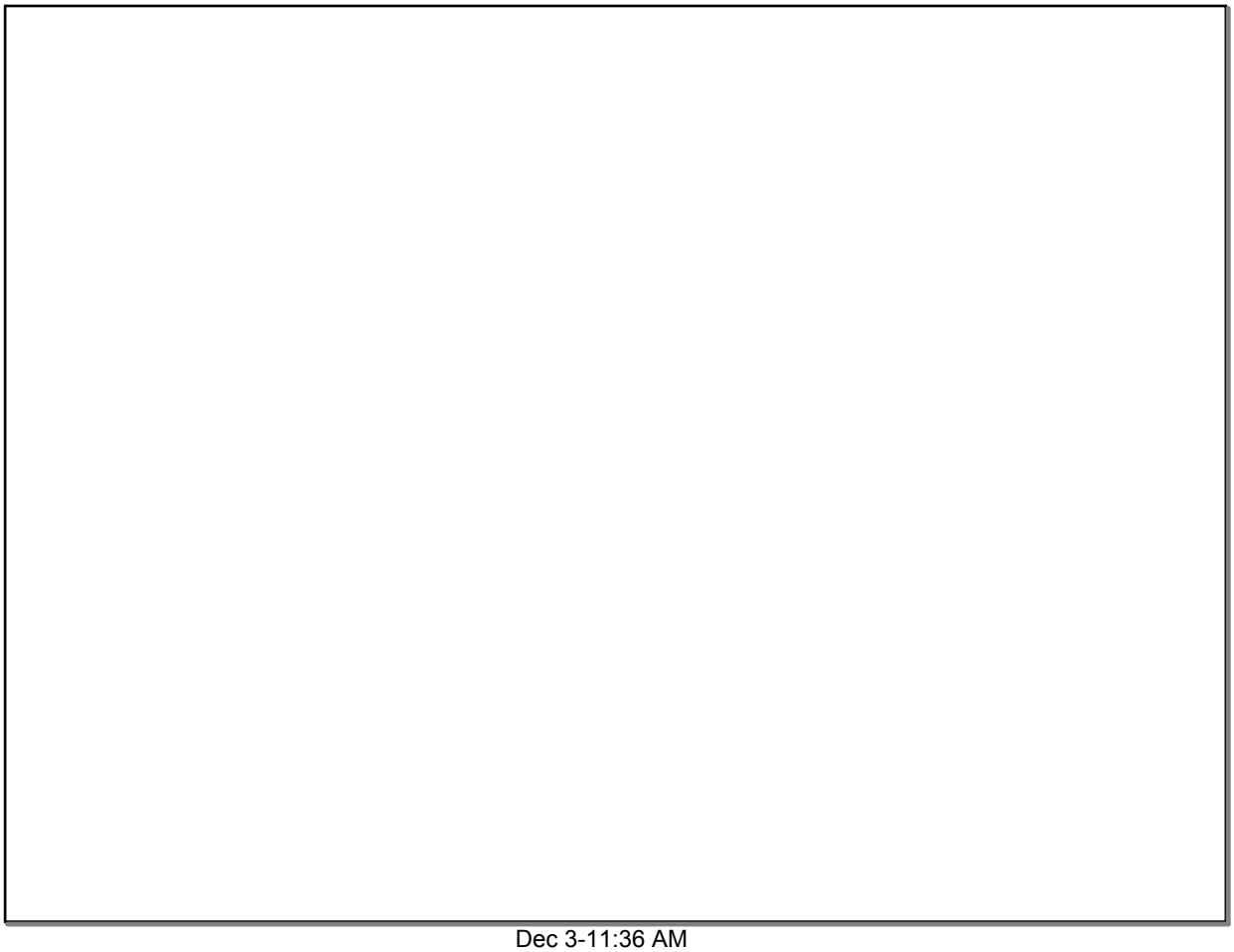
$d = 3$

P.S.: $2x - \frac{\pi}{2} = 0$

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

$x = \frac{\pi}{4} + \frac{\pi}{2}n$

Dec 3-11:34 AM



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