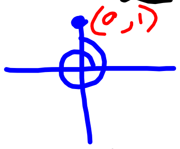
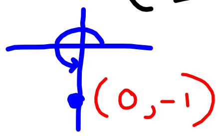
Review: Evaluate the following trigonometric expressions.

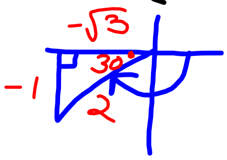
$\tan\frac{5\pi}{2} = \frac{1}{0} = \boxed{\text{undefined}}$



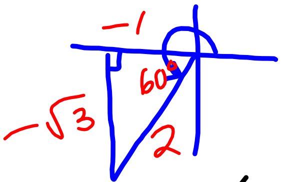
$\sec\left(\frac{3\pi}{2}\right) = \frac{1}{0} = \boxed{\text{undefined}}$



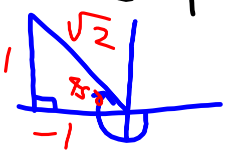
$\sin\left(-\frac{5\pi}{6}\right) = -\frac{1}{2}$



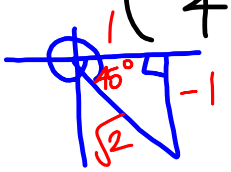
$\csc\left(\frac{4\pi}{3}\right) = -\frac{2}{\sqrt{3}}$



$\cos\left(-\frac{5\pi}{4}\right) = -\frac{1}{\sqrt{2}}$



$\cot\left(-\frac{9\pi}{4}\right) = -1$



$y = a \cdot f(bx)$

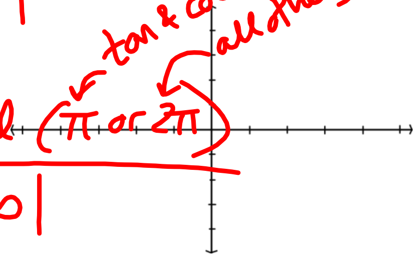
amplitude:

$|a|$

period:

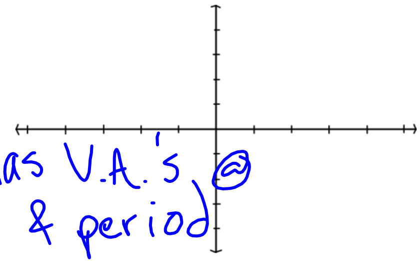
original (π or 2π) — tan & cot / all others

$\overline{\qquad |b| \qquad}$



amplitude:

period:



cot has V.A.'s @ 0 & period

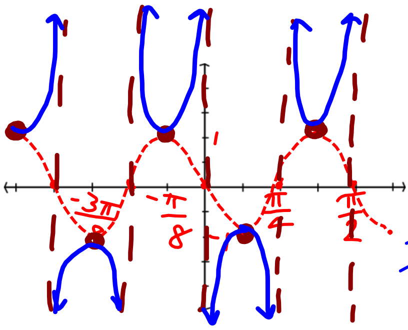
$y = -\csc(4x)$

amplitude:

1

period:

$\frac{2\pi}{4} = \frac{\pi}{2}$



$y = -3\cot\frac{\pi}{2}x$

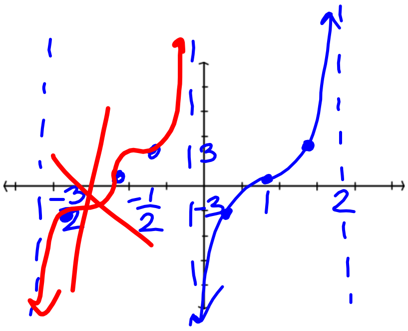
amplitude:

3

period:

$\frac{\pi}{\frac{\pi}{2}}$

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



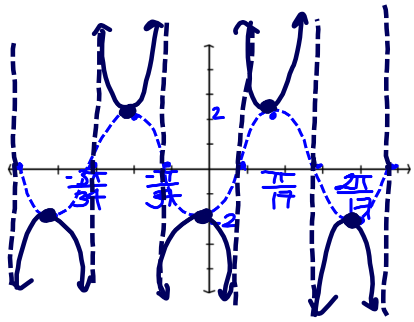
$y=-2\sec 17x$

amplitude:

2

period:

$\frac{2\pi}{17}$



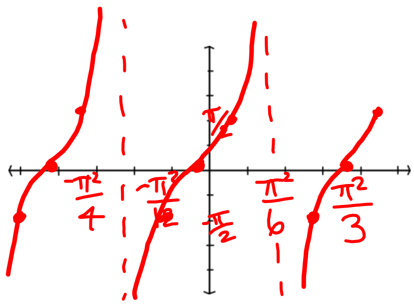
$y=\frac{\pi}{2}\tan\left(\frac{3}{\pi}x\right)$ V.A.'s @ $\pm\frac{1}{2}$ the period

amplitude:

$\frac{\pi}{2}$

period:

$\frac{\pi}{3/\pi}=\frac{\pi^2}{3}$



$y=-\frac{2}{3}\sin\left(\frac{5}{\sqrt{2}}x\right)$

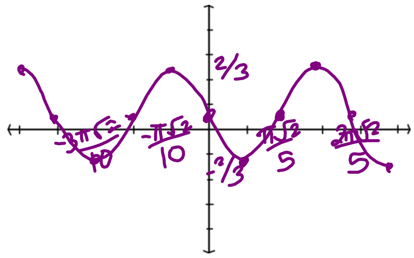
amplitude:

$2/3$

period:

$\frac{2\pi}{5/\sqrt{2}}=$

$\frac{2\pi\cdot\sqrt{2}}{5}$



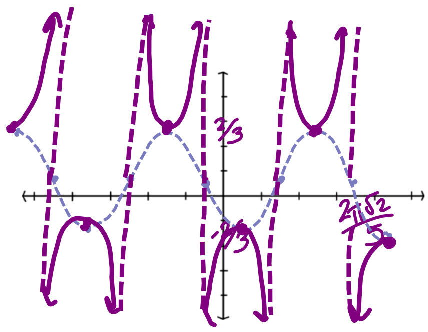
$y=-\frac{2}{3}\csc\left(\frac{5}{\sqrt{2}}x\right)$

amplitude:

$2/3$

period:

$\frac{2\pi\sqrt{2}}{5}$



Goal: Transform a trigonometric function of the form $y=f(x)$ to one of the form $y=af(bx+c)+d$ by observing changes in amplitude and period, as well as horizontal and vertical shifts.

Recall:

- Constants that are multiplied (divided) result in a stretching/scaling of the graph (amplitude/period changes), that we show by changing the scale on our axes
- Constants that are added (subtracted) result in shifting of the graph
- Constants outside the function (a & d) affect it vertically, as we would expect
- Constants inside the function (b & c) affect it horizontally, opposite of what we would expect

$y=af(bx)$ ✓ scaling

$y=f(x+c)+d$ shifting

$y = f(x+c)+d$ shifting

outside - vertically as we would expect

inside - horizontally, opposite

d = vertical shift ↕

$d>0$ up

$d<0$ down

c = horizontal shift ↔

$c>0$ left

$c<0$ right

$y=\cos(x-\frac{\pi}{2})-1$

amplitude:

1

period:

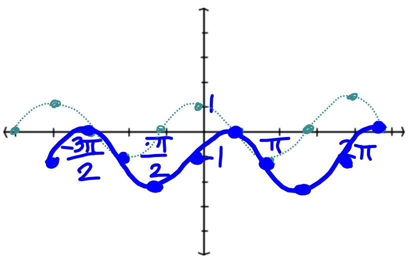
2π

horiz. shift:

right $\pi/2$

vert. shift:

down 1



$y=\cot(x+\frac{\pi}{2})-\frac{1}{2}$

amplitude:

1

period:

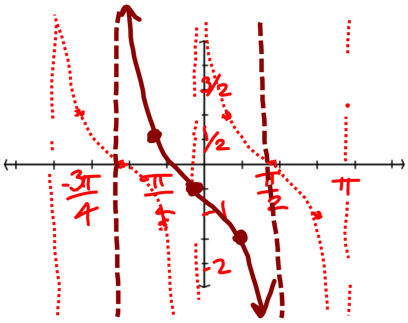
π

horiz. shift:

left $\pi/2$

vert. shift:

down $1/2$



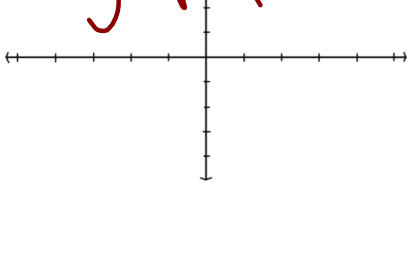
amplitude:

$y=-\tan x-\frac{1}{2}$ has same graph

period:

horiz. shift:

vert. shift:



<u>Homework #4 due Friday</u>:
Graphing worksheet
problems #1-48

Quiz - Thursday 12/05
Test #2 - Thurs 12/12?