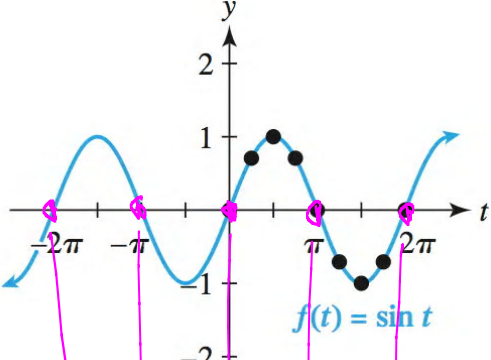
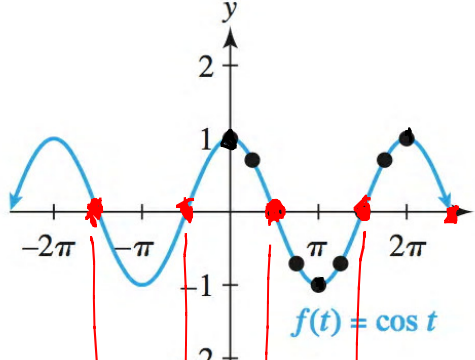
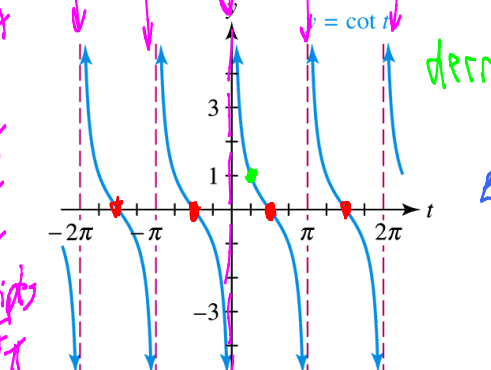
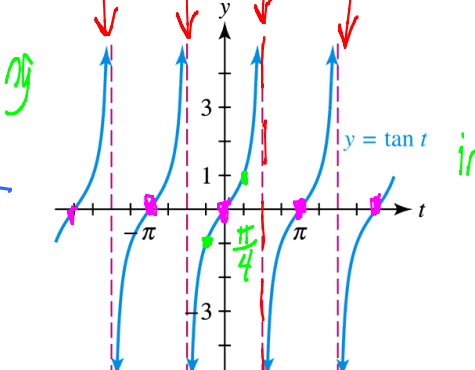
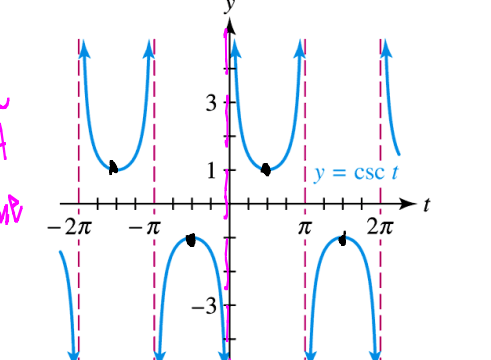
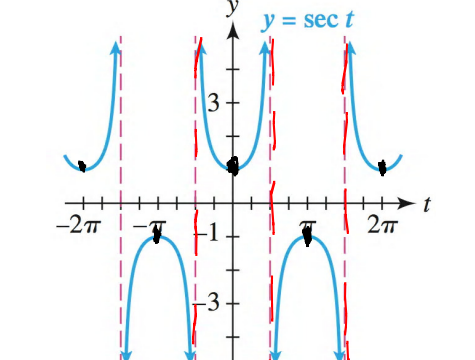


**PreCalculus Class Notes TFG7 Graphs of Tangent, Cotangent, Secant, Coscant**

**Basic Graphs**

$y = \sin x$	$y = \cos x$	period
 <p><math>f(t) = \sin t</math></p>	 <p><math>f(t) = \cos t</math></p>	$\frac{2\pi}{b}$
$y = \cot x = \frac{\cos x}{\sin x} = 0 \rightarrow \text{zero}$ $\sin x = 0 \rightarrow \text{VA}$	$y = \tan x = \frac{\sin x}{\cos x} = 0 \rightarrow \text{zero}$ $\cos x = 0 \rightarrow \text{VA}$	
 <p><math>y = \cot t</math></p> <p>decreasing</p> <p>VA at <math>0, \pi, 2\pi, 3\pi, 4\pi</math> multiples of <math>\pi</math></p>	 <p><math>y = \tan t</math></p> <p>increasing</p> <p>VA at <math>\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}</math></p>	$\frac{\pi}{b}$
$y = \csc x = \frac{1}{\sin x} \rightarrow \text{no zeros}$ $\sin x = 0 \rightarrow \text{VA}$	$y = \sec x = \frac{1}{\cos x} \rightarrow \text{no zeros}$ $\cos x = 0 \rightarrow \text{VA}$	
 <p><math>y = \csc t</math></p> <p>VA at <math>0, \pi, 2\pi, 3\pi, 4\pi</math> same as <math>\cot</math></p>	 <p><math>y = \sec t</math></p> <p>VA at <math>\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}</math> same as <math>\tan</math></p>	$\frac{2\pi}{b}$

odd multiples of  $\frac{\pi}{2}$

$\frac{\pi}{2}$

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

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

$\frac{7\pi}{2}$

same VA

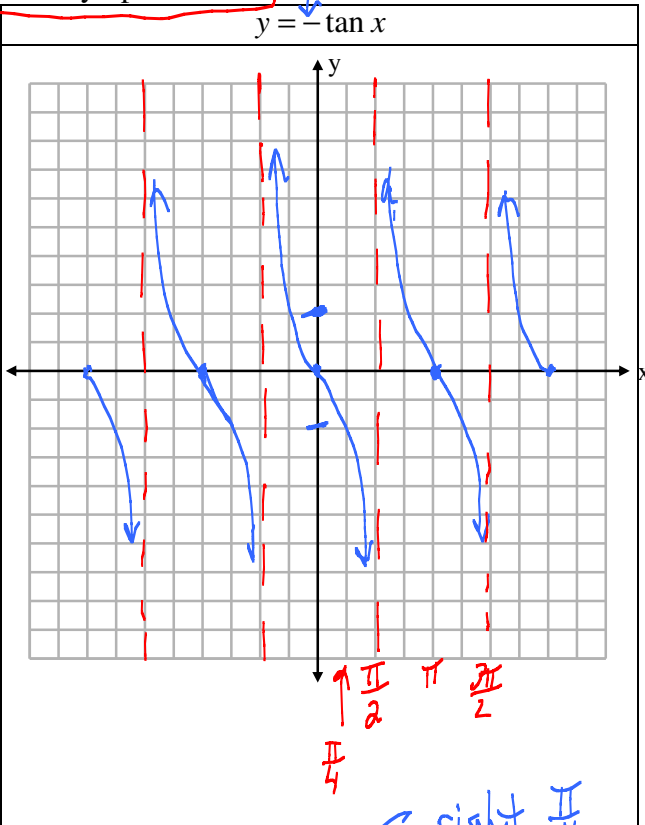
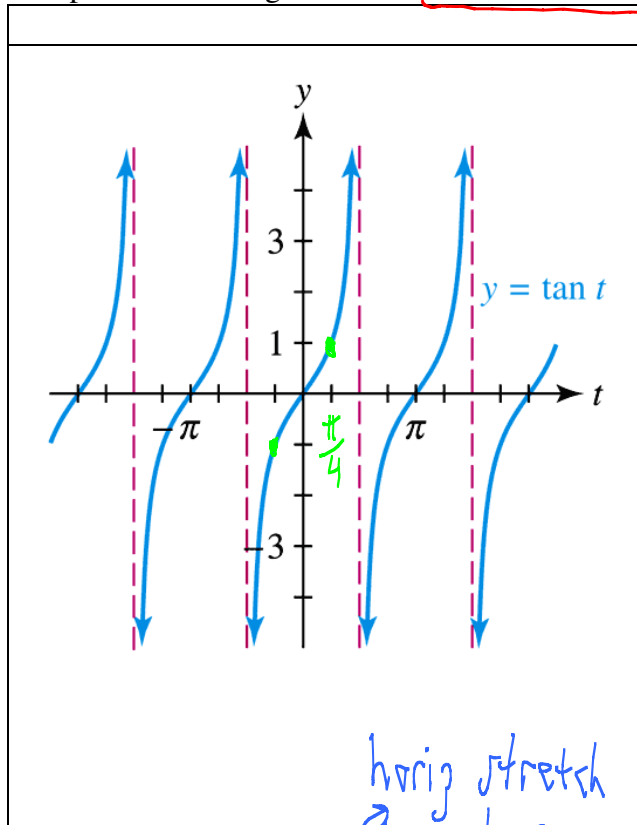
$\frac{\pi}{2}$

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

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

Graph the following functions. Hint: sketch vertical asymptotes first.

$x$ -axis

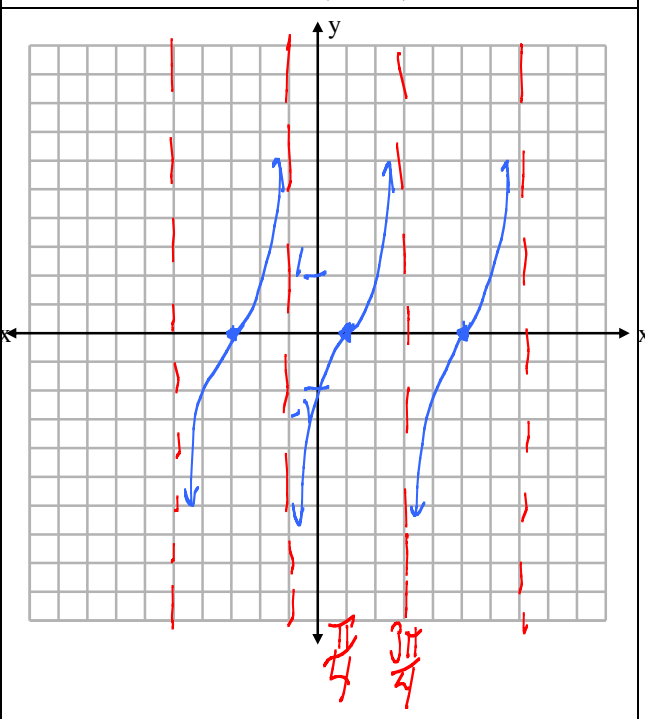
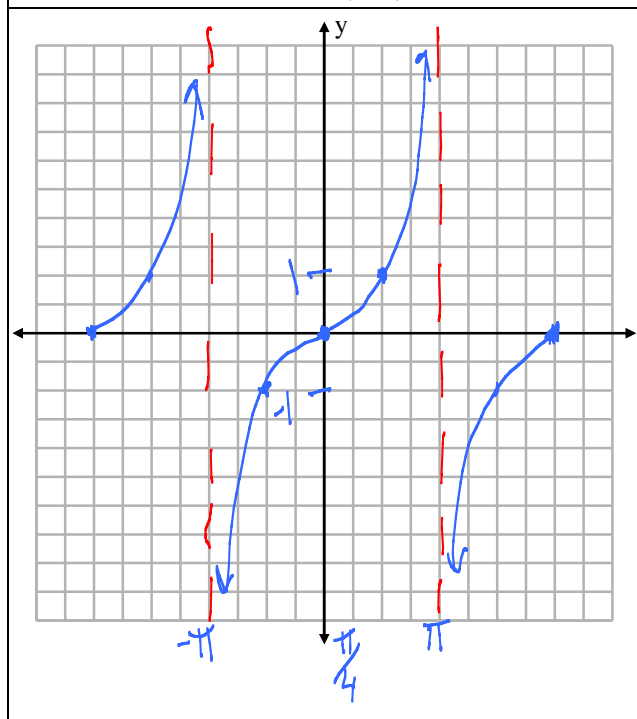


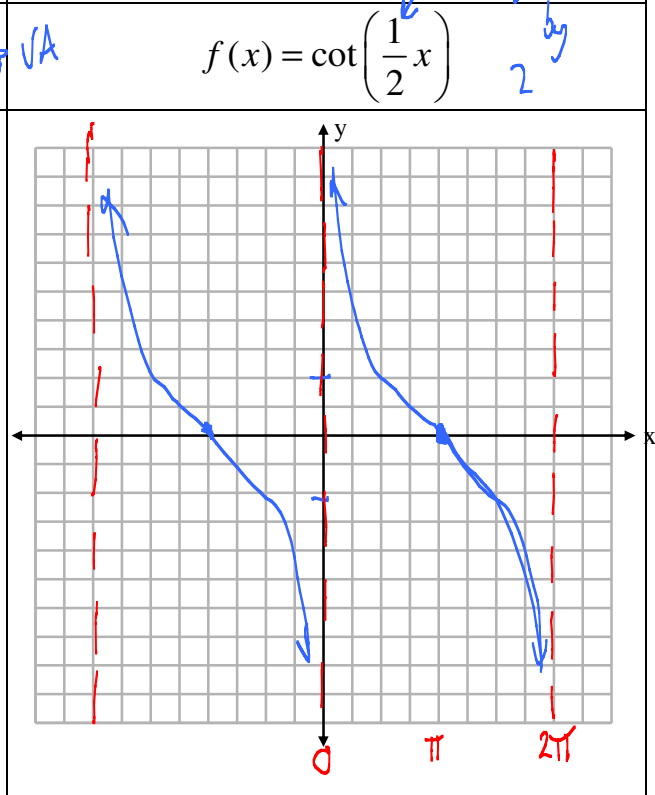
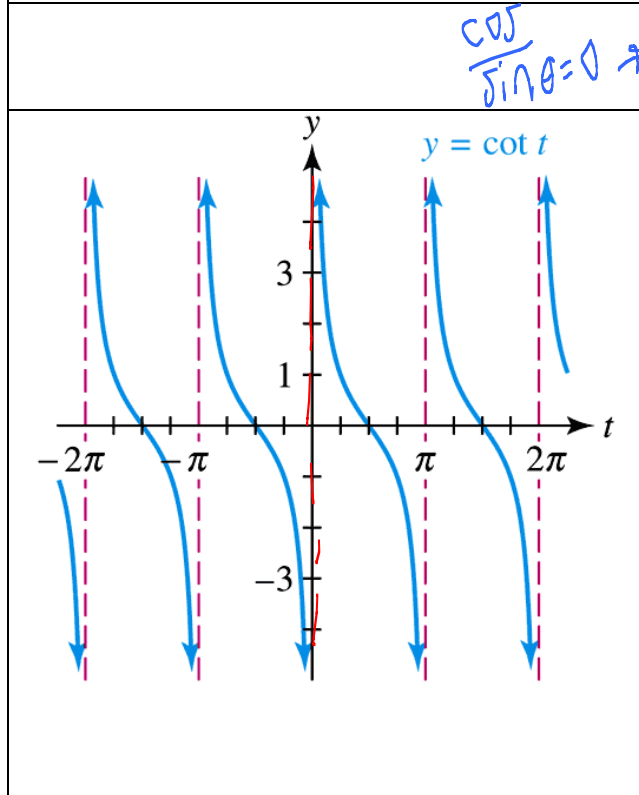
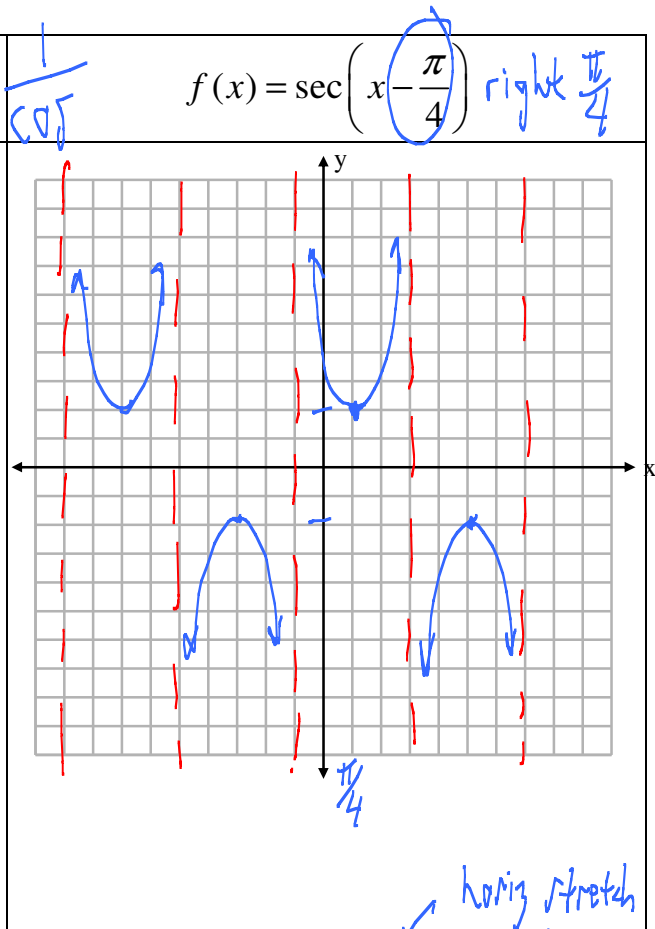
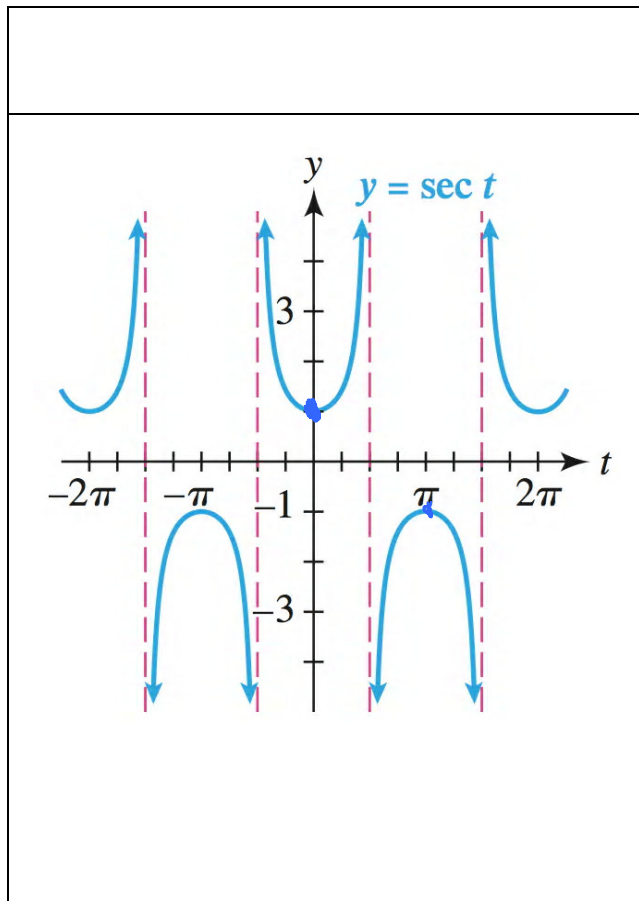
horiz stretch by 2

$$y = \tan\left(\frac{1}{2}x\right)$$

right  $\frac{\pi}{4}$

$$y = \tan\left(x - \frac{\pi}{4}\right)$$





$\frac{1}{\sin \theta} = 0 \rightarrow \text{USA}$

$\Gamma$  x-axis  
 horiz shrink by  $\frac{1}{2}$

$f(t) = -\csc 2t$

