

16 – Graphing (co)secant and (co)tangent

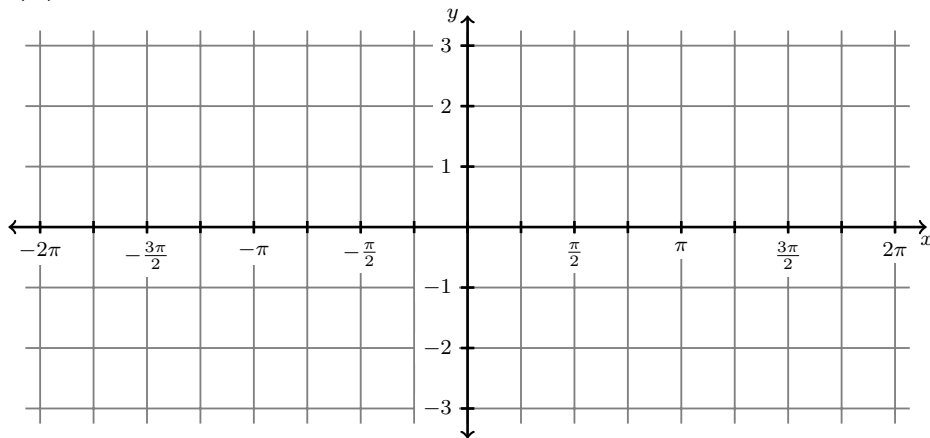
1. Let's work to graph $\csc x$ by following the steps below. Remember that $\csc x = \frac{1}{\sin x}$.

(a) Graph $\sin x$ below.

(b) Determine the values of $\csc(-\frac{3\pi}{2})$, $\csc(-\frac{\pi}{2})$, $\csc(\frac{\pi}{2})$, and $\csc(\frac{3\pi}{2})$. *Plot them below.*

(c) Explain why $\csc x$ has vertical asymptotes at $x = -2\pi, -\pi, 0, \pi, 2\pi$. *Draw them below.*

(d) Sketch the graph of $\csc x$ below.



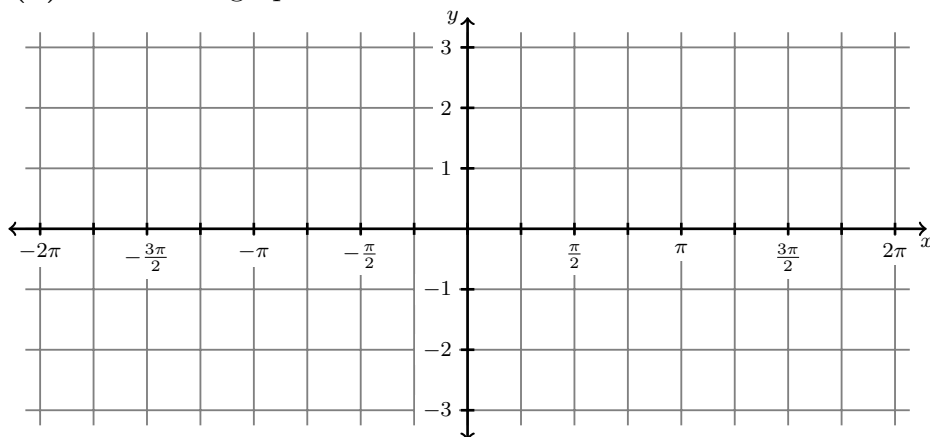
2. Let's work to graph $\tan x$ by following the steps below. Remember that $\tan x = \frac{\sin x}{\cos x}$.

(a) Explain why $\tan x$ has zeros at $x = -2\pi, -\pi, 0, \pi, 2\pi$. *Plot them below.*

(b) Explain why $\tan x$ has vertical asymptotes at $x = -\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$. *Draw them below.*

(c) Label the intervals on the x -axis below where $\tan x$ is positive and where it's negative.

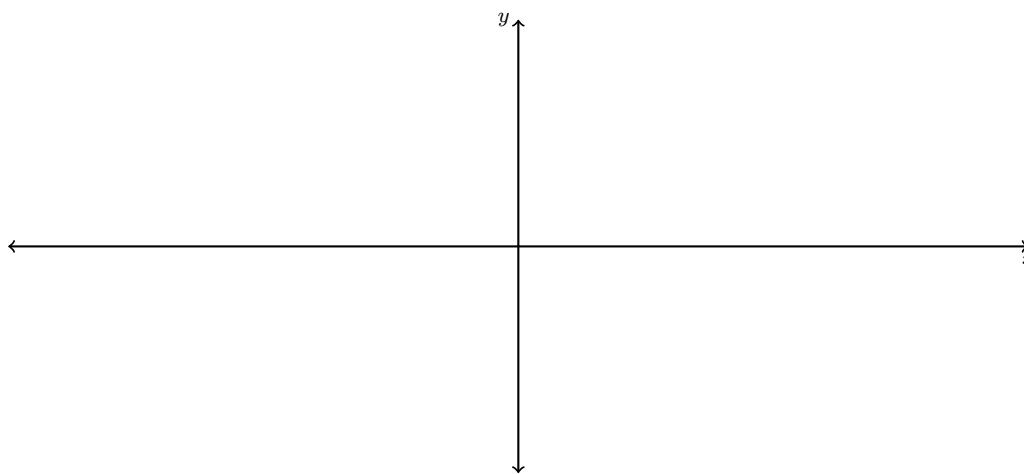
(d) Sketch the graph of $\tan x$ below.



Theorem: Domain, range, asymptotes, and period of the trig. functions

Function	Domain	Range	VA's	Period
$\sin x$				
$\cos x$				
$\tan x$				
$\csc x$				
$\sec x$				
$\cot x$				

3. Graph $y = \frac{3}{2} \sec\left(\frac{1}{2}x\right)$ below. Draw at least two full periods, and label several points.



4. Graph $y = -2 \tan\left(x - \frac{\pi}{2}\right)$ below. Draw at least two full periods, and label several points.

