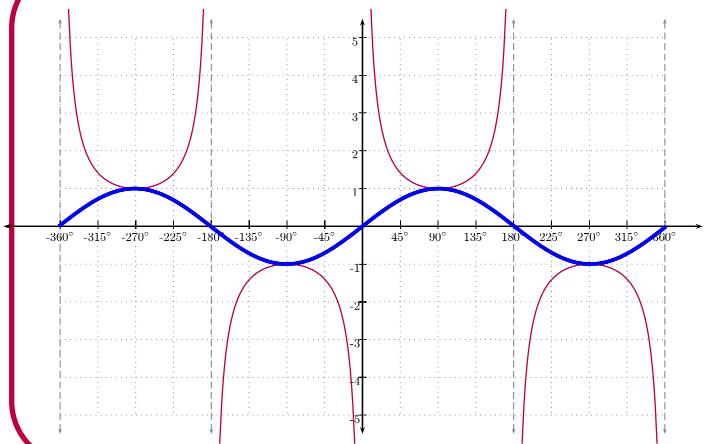
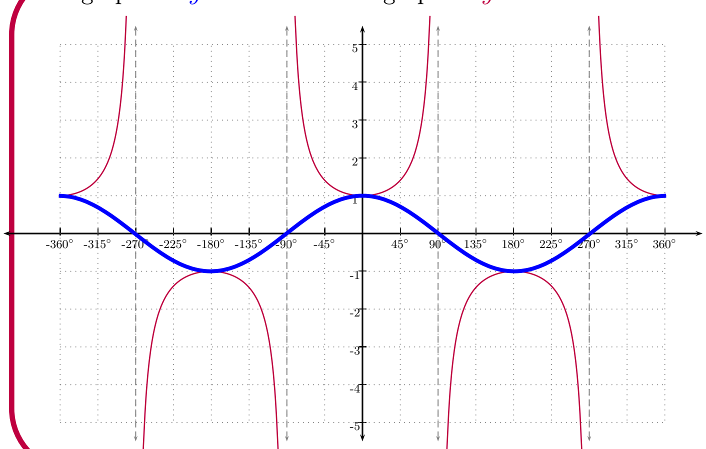
Graphs: $\sin x$ & $\csc x$

The graphs of $y = \sin x$ and the graph of $y = \csc x$



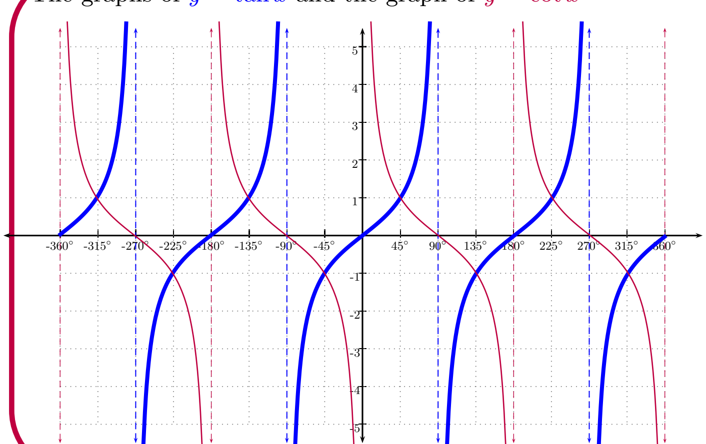
Graphs: $\cos x$ & $\sec x$

The graphs of $y = \cos x$ and the graph of $y = \sec x$



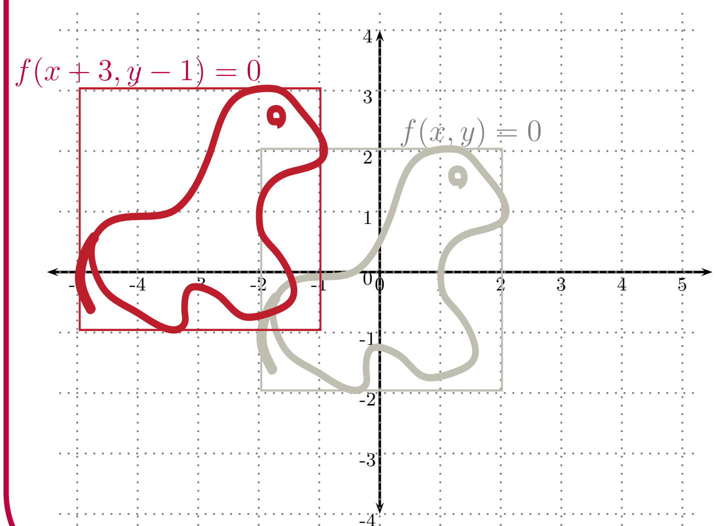
Graphs: $\tan x$ & $\cot x$

The graphs of $y = \tan x$ and the graph of $y = \cot x$



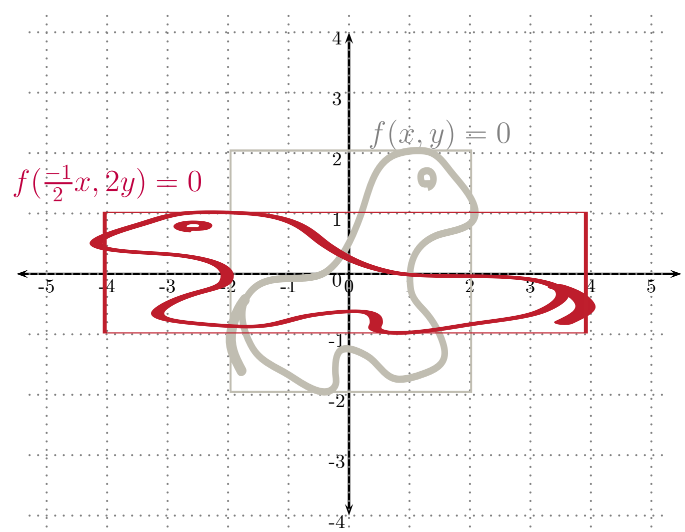
Graphs: Shifting Principle

Let $f : \mathbb{R}^2 \to \mathbb{R}$ and $h, k \in \mathbb{R}^+$. The graph of $f(x-h, y-k) = 0$ is the same as the shifted graph of $f(x,y) = 0$, h units to the right and k units up. Similarly, the graph of $f(x+h, y+k) = 0$ is the same as the shifted graph of $f(x,y) = 0$, h units to the left and k units down.



Graphs: Scale/Reflect Principle

Let $f : \mathbb{R}^2 \to \mathbb{R}$ and $h, k \in \mathbb{R}^+$. The graph of $f(hx, ky) = 0$ is the same as the compressed/stretched graph of $f(x,y) = 0$, by a factor of $\frac{1}{h}$ horizontally, and $\frac{1}{k}$ vertically. If h is negative, the graph is reflected about the y-axis. Similarly if k is negative.

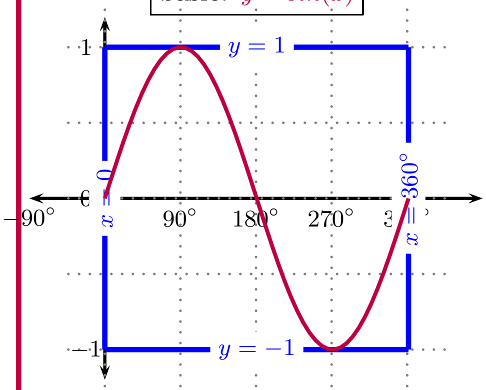


Use the Scale, & Shift principles to graph

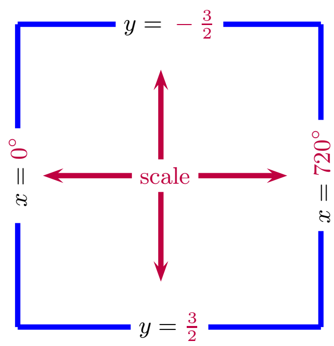
$$-\frac{2}{3}\left(y-2\right)=sin\left[\frac{1}{2}\left(x+90^{\circ}\right)\right]$$

Solution:

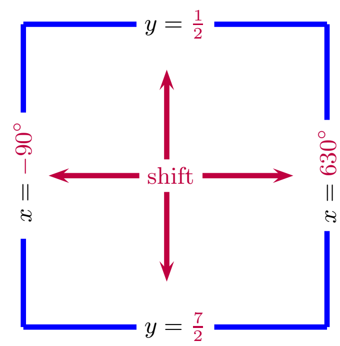
basic: $y=sin(x)$



scale: $-\frac{2}{3}y=sin\left(\frac{1}{2}x\right)$



shift: $-\frac{2}{3}\left(y-2\right)=sin\frac{1}{2}\left(x+90^{\circ}\right)$



Final [one period of] graph for

$$-\frac{2}{3}\left(y-2\right)=sin\left[\frac{1}{2}\left(x+90^{\circ}\right)\right]$$