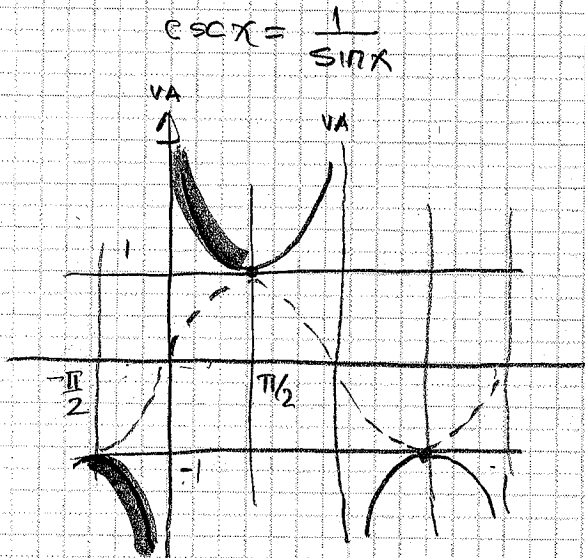


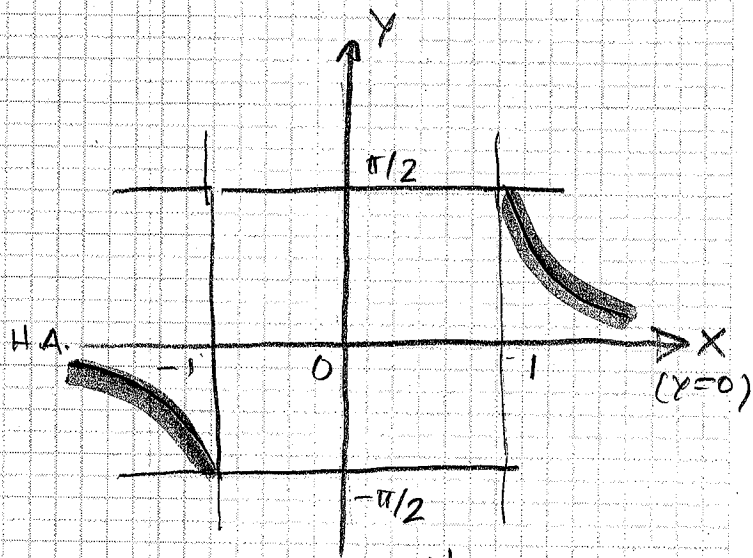
# THE INVERSE COSECANT FUNCTION



$y = \csc x$  restricted to  
 $[-\pi/2, \pi/2]$

Domain =  $[-\pi/2, 0) \cup (0, \pi/2]$

Range =  $(-\infty, -1] \cup [1, +\infty)$



$y = \csc^{-1} x$

Domain =  $(-\infty, -1] \cup [1, +\infty)$

Range =  $[-\pi/2, 0) \cup (0, \pi/2]$

$$\boxed{\csc^{-1}(\csc x) = x}$$

if  $-\frac{\pi}{2} \leq x < 0$  or  $0 < x \leq \frac{\pi}{2}$

if  $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$  and  $x \neq 0$

$$\boxed{\csc(\csc^{-1} x) = x}$$

if  $x \leq -1$  or  $x \geq 1$

Ex: Find  $\csc^{-1}(\csc(\pi/4)) = \pi/4$ ? Yes

Ex: Find  $\csc^{-1}(\csc(3\pi/4)) = 3\pi/4$ ? NO

$$\csc(3\pi/4) = \csc(\pi/4)$$

$$\csc^{-1}(\csc(3\pi/4)) = \csc^{-1}(\csc(\pi/4)) = \pi/4$$

