3.1 The rest of the inverse trig functions...　　　　　Name: __Key__

Remember... csc is the reciprocal of __sine__. Sec is the reciprocal of __cosine__.

Part 1. If the restricted range of the inverse sine function is $[-\frac{\pi}{2}, \frac{\pi}{2}]$___, what is the restricted range of the inverse cosecant function? $[-\frac{\pi}{2}, \frac{\pi}{2}]$

Fill in the table with the appropriate cosecant values

x	Csc(x)
$-\frac{\pi}{2}$	-1
0	undef.
$\frac{\pi}{2}$	1

Remember, to find an inverse of a function, switch your x & y values.

x	Csc^{-1}(x)
-1	$-\frac{\pi}{2}$
1	$\frac{\pi}{2}$

x=0, horizontal asymptote

If a function value is undefined, what attribute will appear on the graph? HINT: think of the graph of normal cosecant. What happens every π radians? An asymptote.

Sketch the graph of $y = \csc^{-1}(x)$ below. Label each critical point and any horizontal asymptotes.
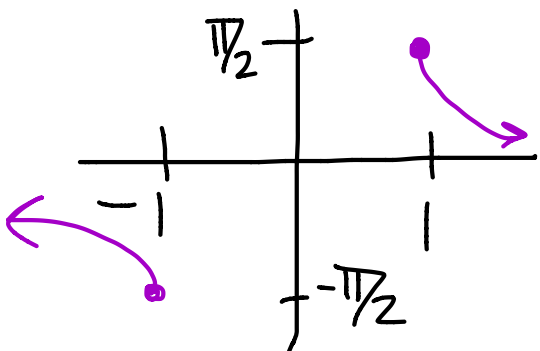
What value does the function approach as x approaches positive infinity? What value does the function approach as x approaches negative infinity?

$x \to +\infty, y \to 0$

$x \to -\infty, y \to 0$

Part 2. If the restricted range of the inverse cosine function is __$[0, \pi]$__, what is the restricted range of the inverse secant function? $[0, \pi]$

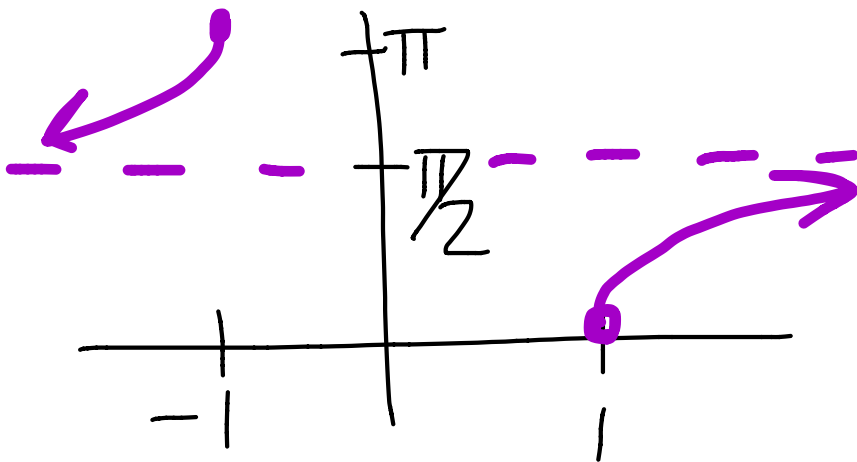Fill in the table with the appropriate secant values

x	sec(x)
0	1
$\dfrac{\pi}{2}$	U
π	-1

Find your inverse critical values and fill in the table below.

x	sec^{-1}(x)
1	0
-1	π
HA @ x= $\pi/2$	

What happens at $x = \dfrac{\pi}{2}$? Horizontal Asymptote

Sketch the graph of $y = \sec^{-1}(x)$ below. Label each critical point and any horizontal asymptotes.

What value does the function approach as x approaches positive infinity? What value does the function approach as x approaches negative infinity?

$x \to +\infty, \ y \to \pi/2$

$x \to -\infty, \ y \to \pi/2$

Part 3. The restricted range of the inverse cotangent function is $(0, \pi)$. What do the parenthesis tell you will happen at those end points? **Asymptotes**

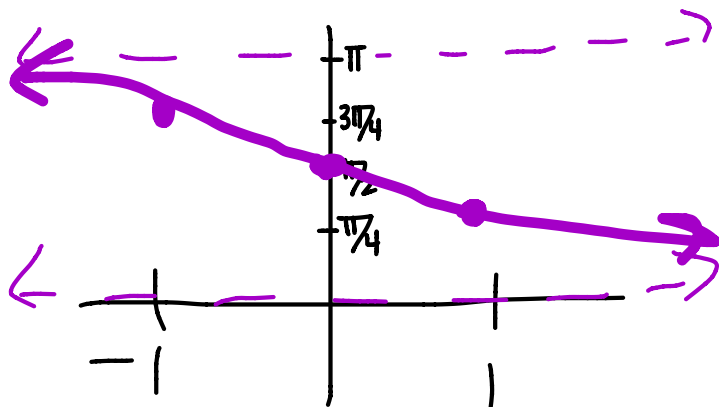Fill in the table with the appropriate cotangent values

x	cot(x)
0	u
$\dfrac{\pi}{4}$	I
$\dfrac{\pi}{2}$	0
$\dfrac{3\pi}{4}$	-1
π	u

Find your inverse critical values and fill in the table below.

x	cot⁻¹(x)
HA @ x=0	
1	$\pi/4$
0	$\pi/2$
-1	$3\pi/4$
HA @ x=π	

What happens at $x=0$ and $x=\pi$? **Horizontal Asymptotes**

Sketch the graph of $y = \cot^{-1}(x)$ below. Label each critical point and any horizontal asymptotes.

What value does the function approach as x approaches positive infinity? What value does the function approach as x approaches negative infinity?

$x \to +\infty, \ y \to 0$

$x \to -\infty, \ y \to \pi$