

4.2 Inverse Parent Functions

Warm-Up Friday

1. Find the inverse of $y = 4x + 1$

Flip x & y
solve for y

$$x = 4y + 1$$

$$x - 1 = 4y$$

$$\frac{x - 1}{4} = y$$

$$y = \frac{x - 1}{4}$$

2. How would you solve the equation for θ ?

$$\cos \theta = \frac{1}{2}$$

$$\cos^{-1}(\cos \theta) = \cos^{-1}\left(\frac{1}{2}\right)$$

About Me

$$\theta = \cos^{-1}\left(\frac{1}{2}\right)$$

$$(\sqrt{x})^2 = (4)^2$$

1. Would you rather be without elbows or be without knees?
2. Would you rather never laugh again or never use your smartphone again?

4.2 Inverse Parent Functions

EQ: What are the **restricted ranges** of each inverse trig function?

Finding an inverse...

switch x & y , then solve for y

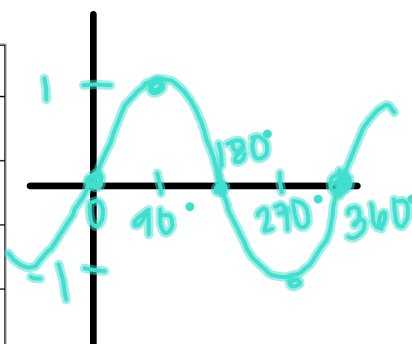
4.2 Inverse Parent Functions

EQ: What are the restricted ranges of each inverse trig function?

Inverse Sine

SINE $y = \sin x$

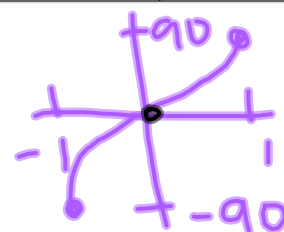
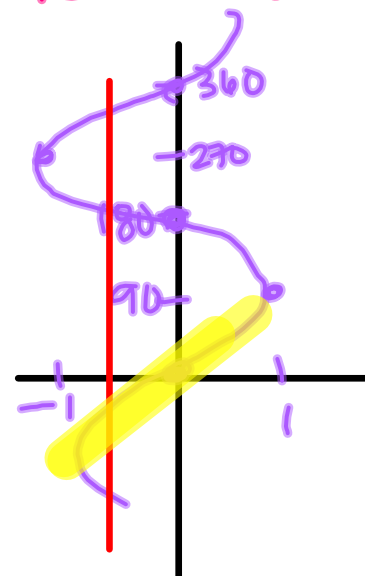
x	y
0°	0
90°	1
180°	0
270°	-1
360°	0



$y = \sin^{-1}(x)$

x	y
0	0°
1	90°
0	180°
-1	270°
0	360°

fails V.L.T



$y = \sin^{-1}(x)$

Restricted Range:

$$[-90^\circ, 90^\circ] \text{ or } \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$$

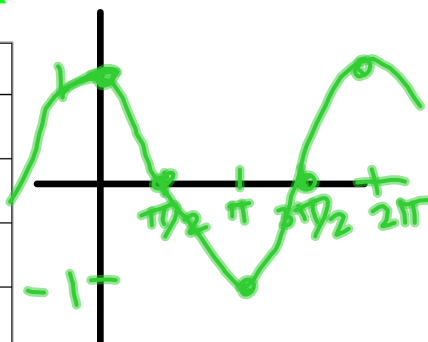
4.2 Inverse Parent Functions

EQ: What are the restricted ranges of each inverse trig function?

Inverse Cosine

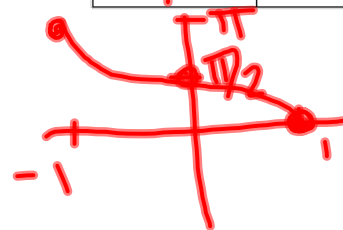
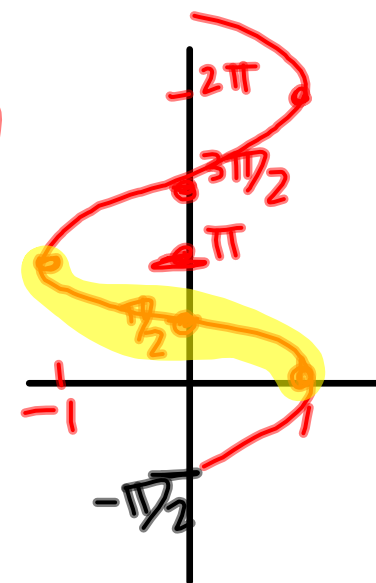
SINE $y = \cos x$

x	y
0	1
$\pi/2$	0
π	-1
$3\pi/2$	0
2π	1



$$y = \cos^{-1}(x)$$

x	y
1	0
0	$\pi/2$
-1	π
0	$3\pi/2$
1	2π



Restricted Range:

$$[0, \pi] \text{ or } [0^\circ, 180^\circ]$$



4.2 Inverse Parent Functions

EQ: What are the restricted ranges of each inverse trig function?

Inverse Tangent

SINE $y = \tan x$

x	y
0	0
$\pi/4$	1
$\pi/2$	U
$3\pi/4$	-1
π	0

0 1 0
1 0 U
0 -1 0
-1 0 0

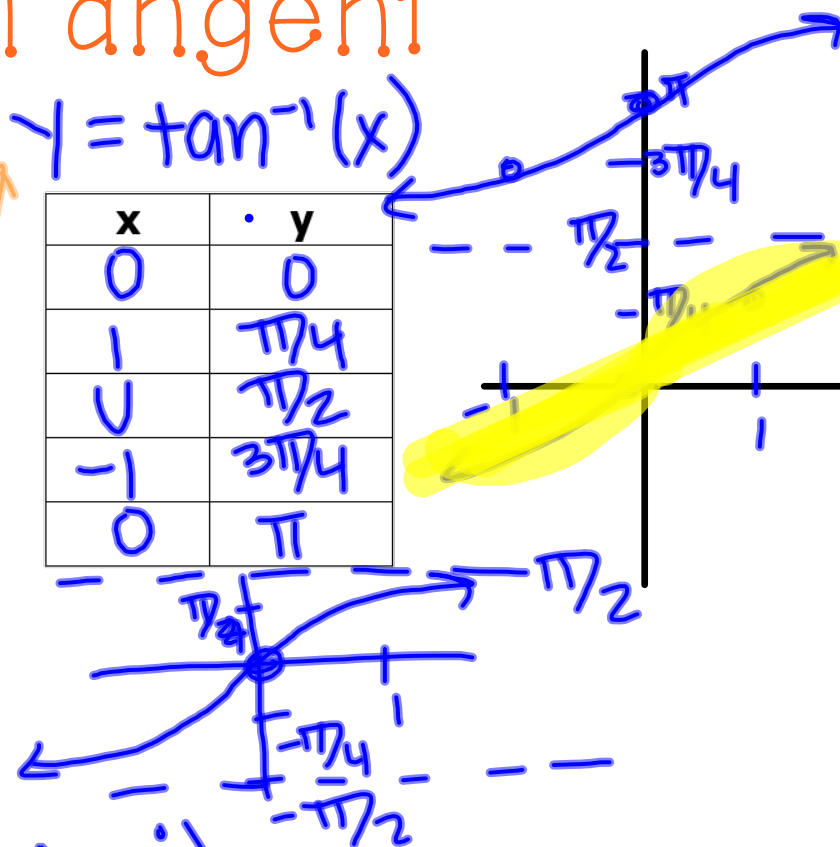
$$\tan \frac{\pi}{4} = 1$$

Restricted Range:

$$(-\pi/2, \pi/2) \text{ or } (-90^\circ, 90^\circ)$$

$$y = \tan^{-1}(x)$$

x	y
0	0
1	$\pi/4$
U	$\pi/2$
-1	$3\pi/4$
0	π



$$\frac{-\frac{\pi}{2}, \frac{\pi}{2}}{\sin^{-1}} \\ \csc^{-1} \\ \tan^{-1}$$

$$\frac{0, \pi}{\cos^{-1}} \\ \sec^{-1} \\ \cot^{-1}$$

TURN IN WARMUPS 😊

4.2 The rest of the inverse trig functions...

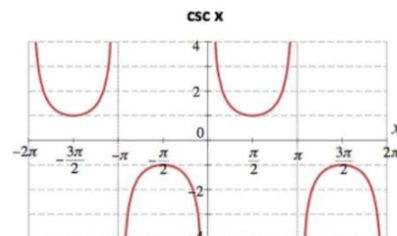
Name: _____

Remember... csc is the reciprocal of _____. Sec is the reciprocal of _____.

Part 1. If the restricted range of the inverse sine function is _____, what is the restricted range of the inverse cosecant function?

Fill in the table with the appropriate cosecant values

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



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

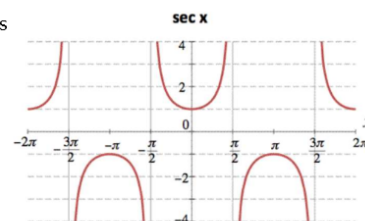
x	$\text{Csc}^{-1}(x)$

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

Part 2. If the restricted range of the inverse cosine function is _____, what is the restricted range of the inverse secant function?

Fill in the table with the appropriate secant values

x	sec(x)
0	
$\frac{\pi}{2}$	
π	



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

x	$\sec^{-1}(x)$

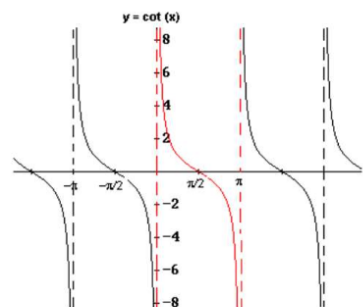
What happens at $x = \frac{\pi}{2}$?

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

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?

Fill in the table with the appropriate cotangent values

x	$\cot(x)$
0	
$\frac{\pi}{4}$	
$\frac{\pi}{2}$	
$\frac{3\pi}{4}$	
π	



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

x	$\cot^{-1}(x)$

What happens at $x=0$ and $x=\pi$?

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

Turn in your warmups (write your name!)

Find ONE partner!

Due by the end of the period (12:20)

