

Day 10 Notes

Wednesday, January 21, 2015 7:35 PM

Precalculus
4.7A Inverse Trig

Warm Up! Evaluate without a calculator:

a. $\cos 45^\circ$
 $\frac{\sqrt{2}}{2}$

b. $\sin \frac{5\pi}{3}$
 $-\frac{\sqrt{3}}{2}$

Name: $\tan^{-1}(-\sqrt{3})$
 $\tan(-78^\circ)$
 $\tan(-42^\circ)$
 $\tan(300)$
 $\tan(66)$
 $-\sqrt{3}$
 d. $\sec \pi$ -1

Evaluating Inverse Trig Functions.

Think about it! Find an angle (in degrees) whose sine value is $\frac{1}{2}$.

$36 \pm 360n$
 $150 \pm 360n$

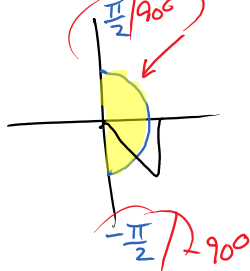
$\sin x = \frac{1}{2}$

$x = \sin^{-1}(\frac{1}{2})$

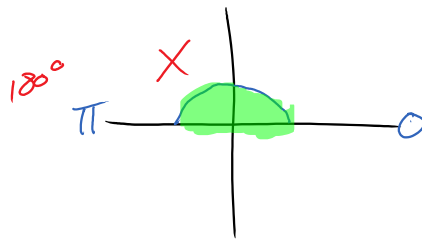
$x = \frac{\pi}{6} + 2\pi n$ $\frac{5\pi}{6} + 2\pi n$
 Radians

So that we only have one unique angle each time we evaluate an inverse trig function, we restrict the domain:

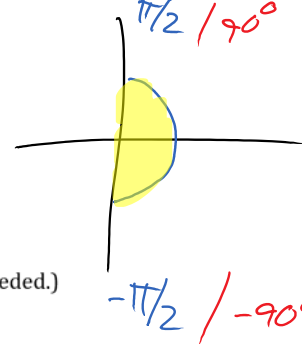
Inverse Sine or Cosecant



Inverse Cosine or Secant



Inverse Tangent or Cotangent



Let's try it! Without using your calculator, evaluate the following. (Draw a picture if needed.)

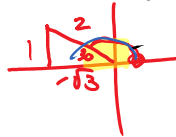
1) $\cos^{-1}(\frac{\sqrt{2}}{2})$

$\cos x = \frac{\sqrt{2}}{2}$



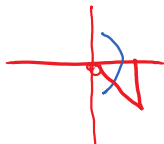
45° or $\frac{\pi}{4}$

2) $\cos^{-1}(-\frac{\sqrt{3}}{2})$



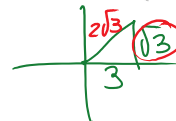
150° or $\frac{5\pi}{6}$

3) $\tan^{-1}(-1)$



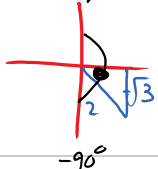
-45° or $-\frac{\pi}{4}$
 315°

4) $\tan^{-1}(\frac{\sqrt{3}}{3})$



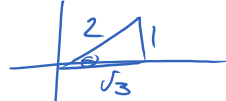
30° or $\frac{\pi}{6}$

5) $\sin^{-1}(-\frac{\sqrt{3}}{2})$

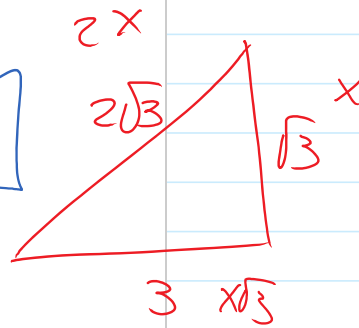


-60° or $-\frac{\pi}{3}$
 300°

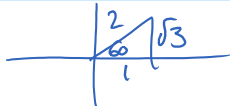
6) $\cot[\sin^{-1}(\frac{1}{2})]$



$\cot(30^\circ) = \sqrt{3}$




7) $\sin\left(\cos^{-1}\frac{1}{2}\right)$




$\sin(60) = \frac{\sqrt{3}}{2}$

8) $\tan\left[\sin^{-1}\left(-\frac{1}{2}\right)\right]$




$\tan[-30] = -\frac{\sqrt{3}}{3}$ or $-\frac{1}{\sqrt{3}}$

9) $\sec\left(\arccos\frac{1}{2}\right)$



$\sec(60) = 2$

10) $\csc(\tan^{-1}1)$



$\csc(45) = \sqrt{2}$


$\sec x = 1.99$

Use your calculators to evaluate the following. Round your answer to the nearest hundredth.

$\cot x = -6.1$

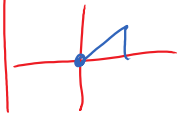
11) $\cot^{-1}(-6.1)$

$\tan^{-1}\left(\frac{1}{-6.1}\right) = -9.31^\circ$



12) $\cos^{-1}\left(\frac{2}{3}\right)$

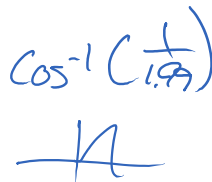
48.19°



13) $\sec^{-1}(1.99)$

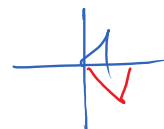
59.83°

$\cos^{-1}\left(\frac{1}{1.99}\right)$



14) $\tan^{-1}\left(\frac{5}{7}\right)$

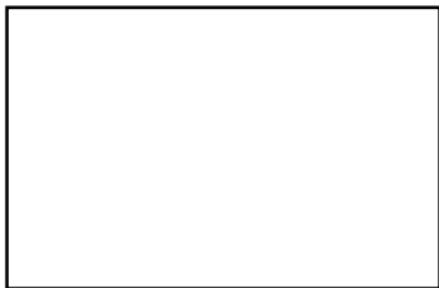
35.54°



Graphing Inverse Trig Functions.

What happens when we graph an inverse function?

Let's examine the graph $y = \cos x$ and $y = \cos^{-1} x$.



Domain:
Range:



Domain:
Range: