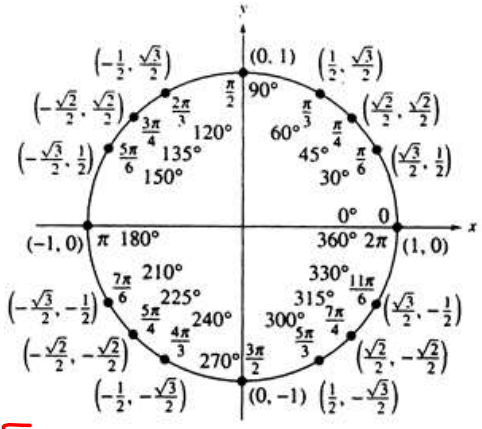
Unit 4.7 A

Bell Work



Evaluate:

1. csc5π/4 $= \frac{-2}{\sqrt{2}} \frac{\sqrt{2}}{\sqrt{2}} = -\sqrt{2}$
2. tan0 $= \frac{0}{1} = 0$
3. sin270° $= -1$
4. cos135° $\frac{-\sqrt{2}}{2}$
5. sec 7π/6 $\frac{-2}{\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}} = \frac{-2\sqrt{3}}{3}$
6. sin225° $-\frac{\sqrt{2}}{2}$
7. tan11π/6 $\frac{-1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$
8. tan90° $\frac{1}{0}$ = undef
9. sinπ/4 $\frac{\sqrt{2}}{2}$
10. cot240° $\frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

What is the input and output? What does each variable represent?

ratio
sides
$y = \sin\theta$

How do you find in inverse?

$\theta = \sin y$

Definition of Inverse Sine Function

The inverse sine function is defined by

$y = \arcsin x$ if and only if $\sin y = x$

where $-1 \le x \le 1$ and $-\pi/2 \le y \le \pi/2$.

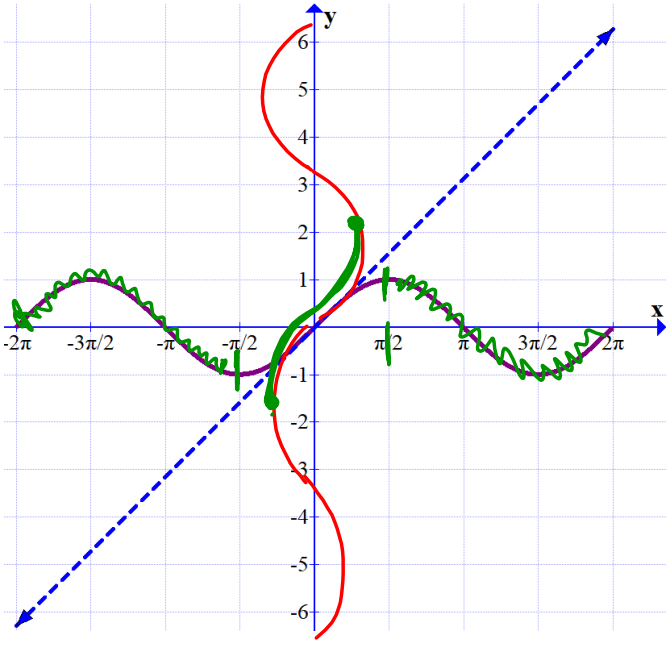
The domain of $y = \sin x$ is $[-1, 1]$, and the range is $[-\pi/2, \pi/2]$.

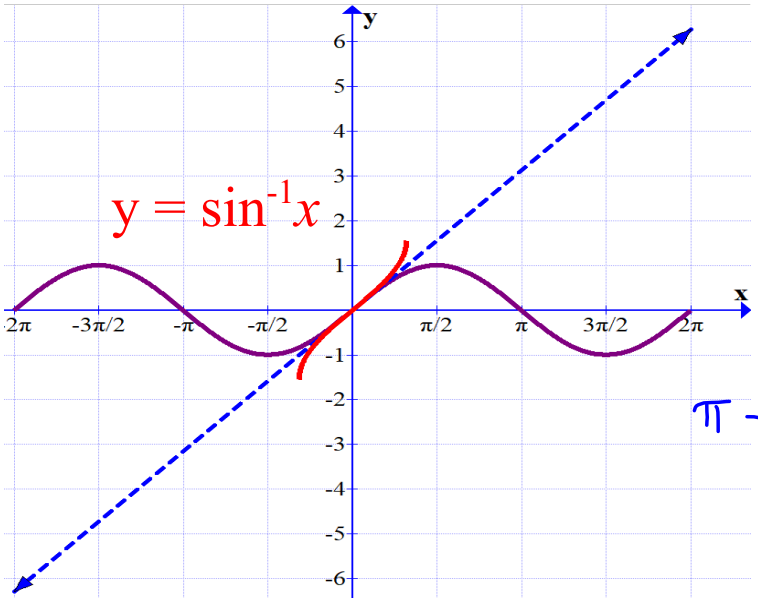
$y = \arcsin x$ or $y = \sin^{-1} x$

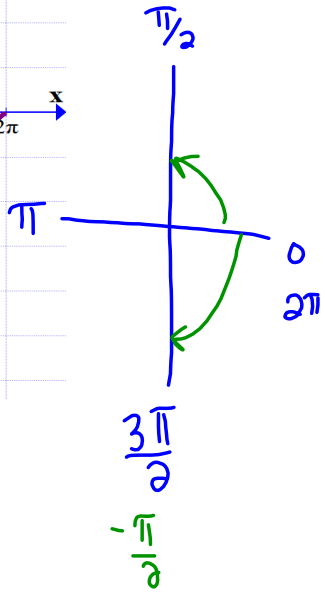
What would the inverse look like?

$y = \arcsin x$ or $y = \sin^{-1} x$

$y = \sin x$







Domain: $-1 \le x \le 1$

Range: $-\pi/2 \le y \le \pi/2$.

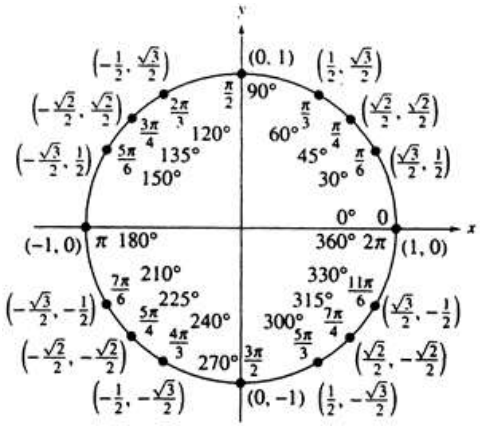
How does this work on the calculator?

check the mode

$y = \sin 30^\circ$

$y = \sin(\pi/6)$

$y = \sin^{-1}(1/2)$ or $y = \arcsin(1/2)$



Find the exact value:

a) $\sin^{-1}(1/2) = 30^\circ \quad \frac{\pi}{6}$

b) $\sin^{-1}(-\sqrt{3}/2) = -60^\circ = -\frac{\pi}{3}$

$\sin^{-1}(1.57)$

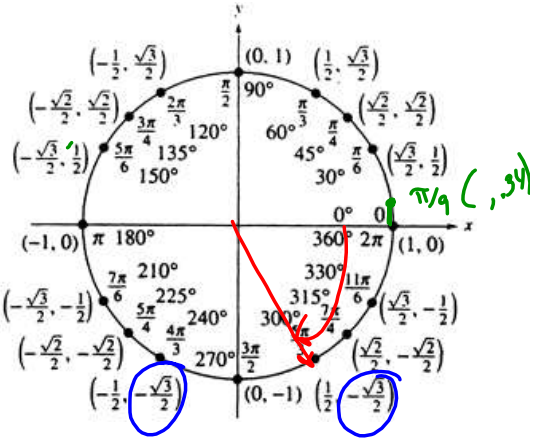
c) $\sin^{-1}(\pi/2)$ = undefined

Ratio Sides

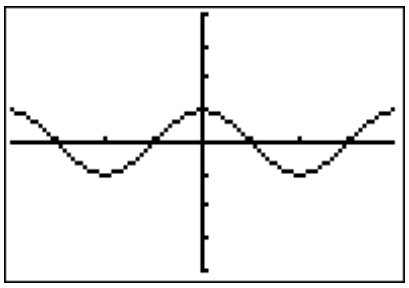
d) $\sin^{-1}(\sin(\pi/9)) = \frac{\pi}{9}$

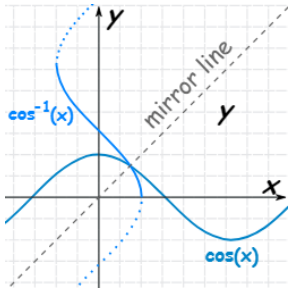
.34

e) $\sin^{-1}(\sin(5\pi/6)) = \frac{\pi}{6}$

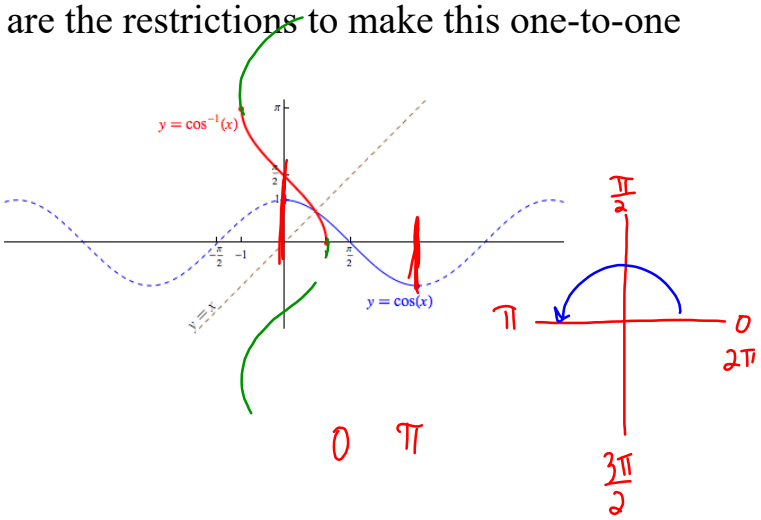


Inverse Cosine

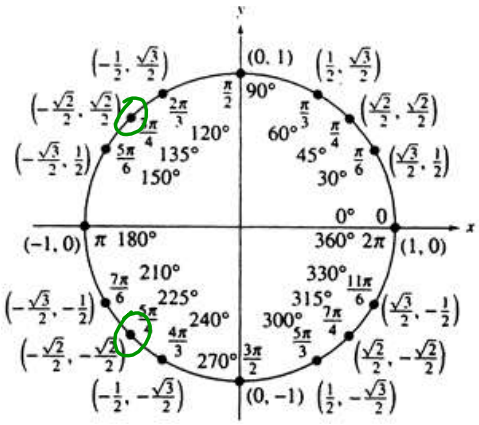




what are the restrictions to make this one-to-one



Find:



$\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right) = \frac{3\pi}{4}$

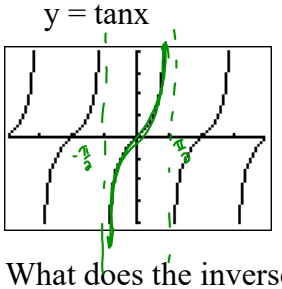
$\arccos\left(-\frac{\sqrt{2}}{2}\right)$

$\cos^{-1}(\cos(-1.1))$

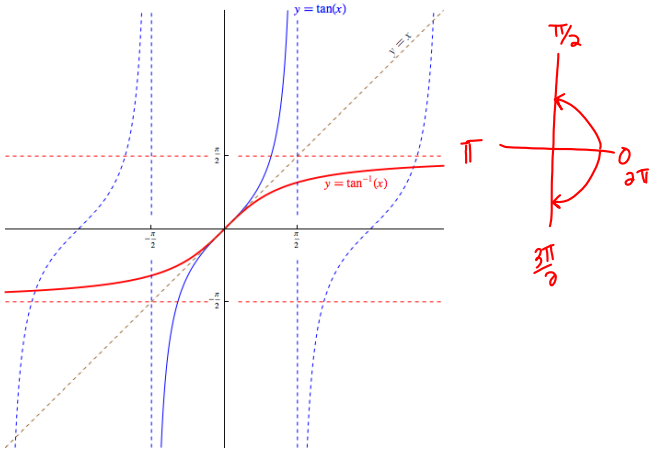
angle

$\cos^{-1}(-60^\circ) = 1.1$

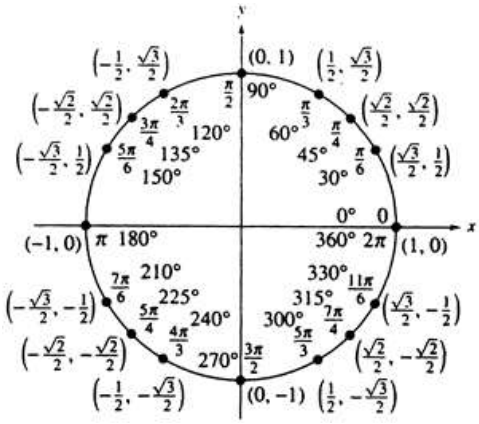
y = tanx



What does the inverse look like?
Do we need to restrict to make one-to-one?



Find:



$\tan^{-1}\sqrt{3} = \theta$

$\theta = 60°$ or $\pi/3$

$\tan^{-1}(-12.5)$

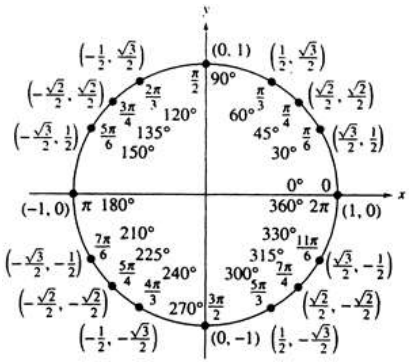
arc tan (-5.5)

$\tan^{-1}(-5.5) = \theta$

$\theta = -1.39$

$-79.6°$

Find the exact value without a calculator.



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

$\sin(\pi/4) = \frac{\sqrt{2}}{2}$

$\cos^{-1}(\cos 7\pi/4)$

$\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = \pi/4$

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

$\frac{7\pi}{4}$

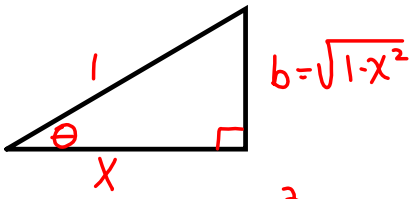
$\sin(7\pi/4) = -\frac{\sqrt{2}}{2}$

Find an algebraic expression equivalent to the given expression.

$\cot(\arccos x)$

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

$\cot(\theta) = \frac{x}{\sqrt{1-x^2}}$

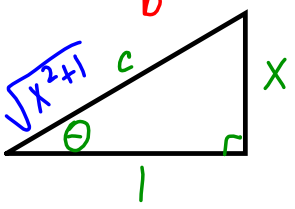


$b^2 + x^2 = 1^2$

$b^2 = 1 - x^2$

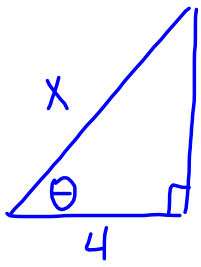
$\cos(\tan^{-1}x)$

$\cos(\theta) = \frac{1}{\sqrt{x^2+1}}$



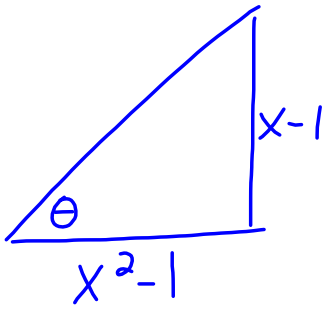
$1^2 + x^2 = c^2$

$c = \sqrt{1+x^2}$



$\cos\theta = \frac{4}{x}$

$\cos^{-1}\left(\frac{4}{x}\right) = \theta$



$\tan\theta = \frac{x-1}{x^2-1} = \frac{1}{x+1}$

$(x-1)(x+1)$

$\tan^{-1}\left(\frac{1}{x+1}\right) = \theta$