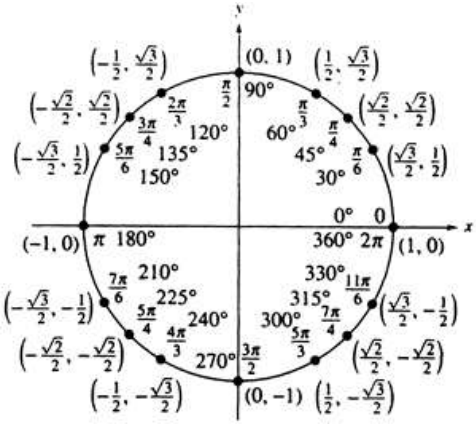
Unit 4.7 A

Bell Work



Evaluate:

1. csc5π/4
2. tan0
3. sin270°
4. cos135°
5. sec 7π/6
6. sin225°
7. tan11π/6
8. tan90°
9. sinπ/4
10. cot240°

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

$$y = \sin\theta$$

How do you find in inverse?

$$\theta = \sin y$$

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

Definition of Inverse Sine Function

The inverse sine function is defined by

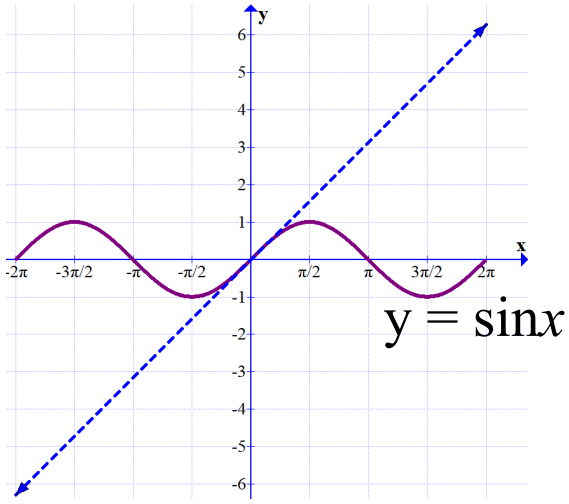
$y = \arcsin x$ if and only if $\sin y = x$

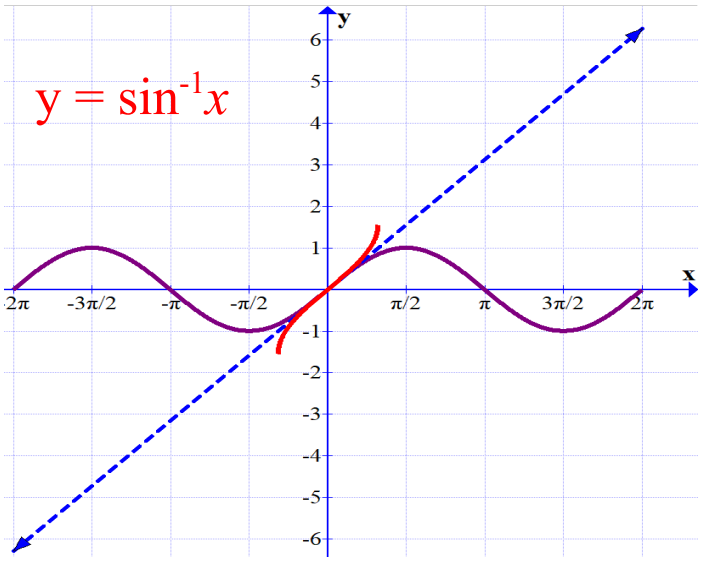
where $-1 \le x \le 1$ and $-\pi/2 \le y \le \pi/2$.

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

What would the inverse look like?

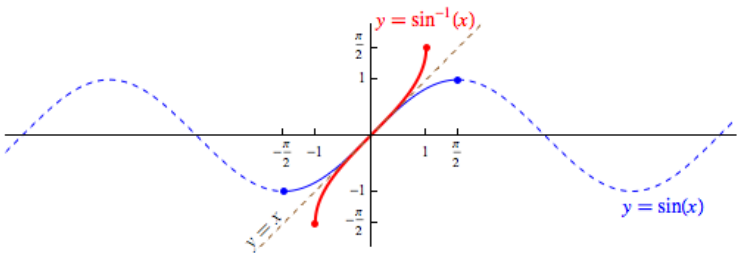
$y = \arcsin x$ or $y = \sin^{-1} x$

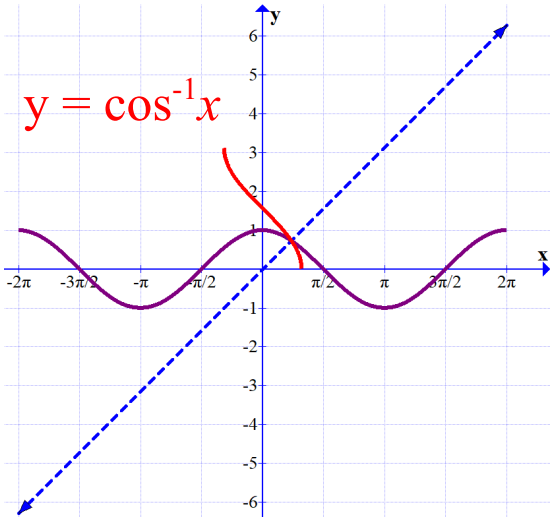




Domain: $-1 \le x \le 1$

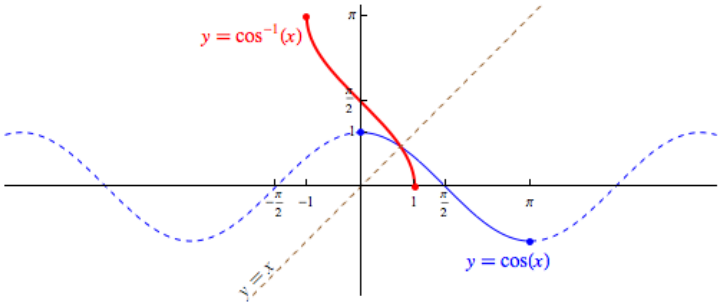
Range: $-\pi/2 \le y \le \pi/2$

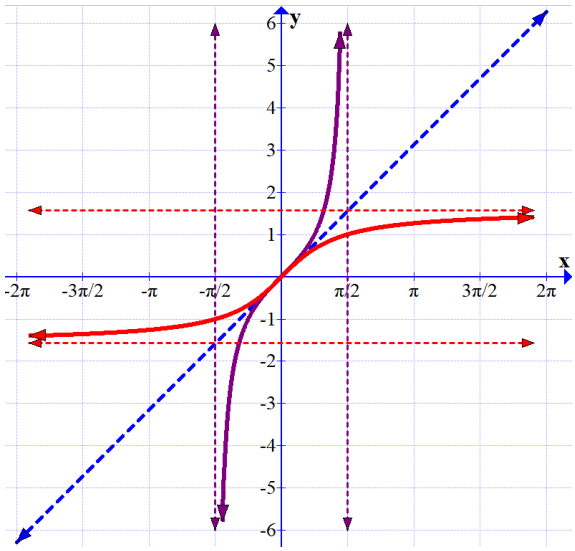




Domain: $-1 \le x \le 1$

Range: $0 \le y \le \pi$

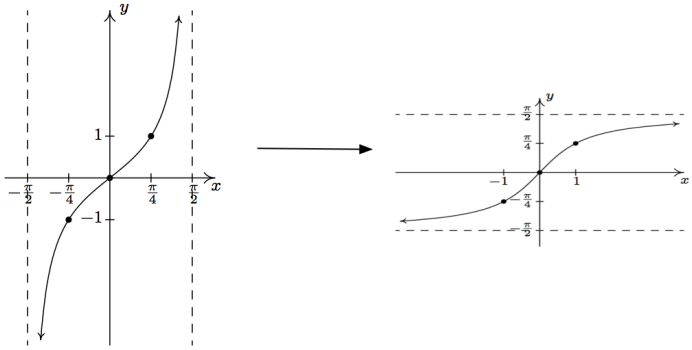




$y = \tan^{-1}x$

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

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

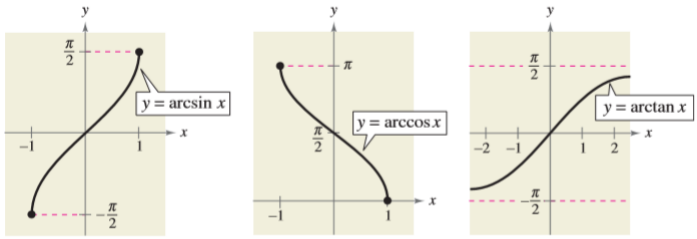


$y = \sin^{-1}x$ $\qquad$ $y = \cos^{-1}x$ $\qquad$ $y = \tan^{-1}x$

*Quad I & IV $\qquad$ *Quad I & II $\qquad$ *Quad I & IV

Definitions of the Inverse Trigonometric Functions

Function	*Domain*	*Range*
$y = \arcsin x$ if and only if $\sin y = x$	$-1 \le x \le 1$	$-\frac{\pi}{2} \le y \le \frac{\pi}{2}$
$y = \arccos x$ if and only if $\cos y = x$	$-1 \le x \le 1$	$0 \le y \le \pi$
$y = \arctan x$ if and only if $\tan y = x$	$-\infty < x < \infty$	$-\frac{\pi}{2} < y < \frac{\pi}{2}$



DOMAIN: $[-1, 1]$
RANGE: $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

DOMAIN: $[-1, 1]$
RANGE: $[0, \pi]$

DOMAIN: $(-\infty, \infty)$
RANGE: $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

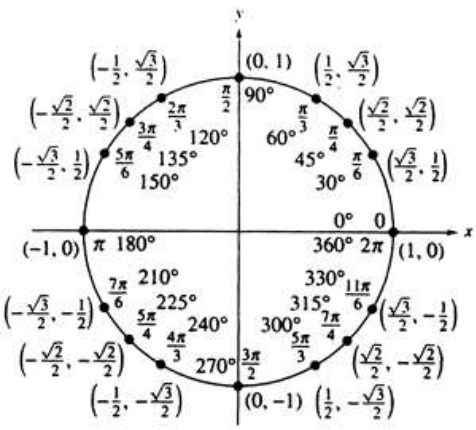
How does this work on the calculator?

check the mode (degrees or radians)

$y = \sin 30^\circ$

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

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



Find the exact value:

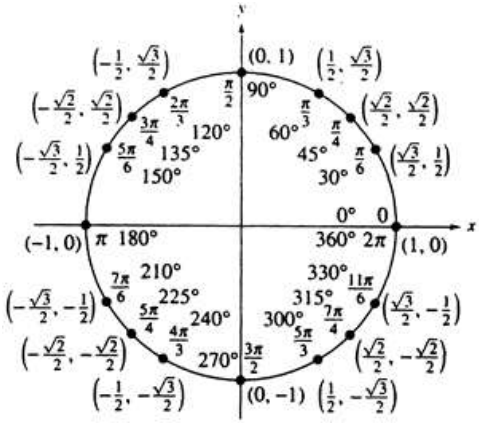
a) $\sin^{-1}(1/2)$

b) $\sin^{-1}(-\sqrt{3}/2)$

c) $\arcsin(\pi/2)$

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

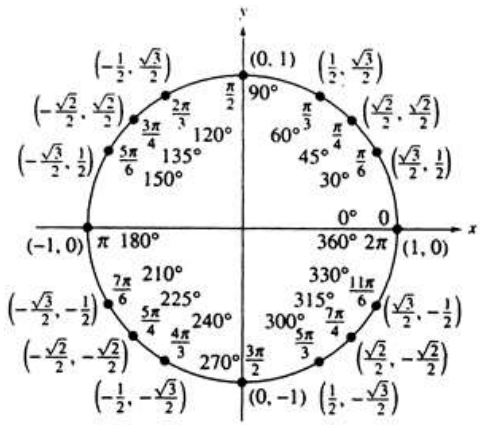
e) $\sin^{-1}(\sin(5\pi/6))$



Find:

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

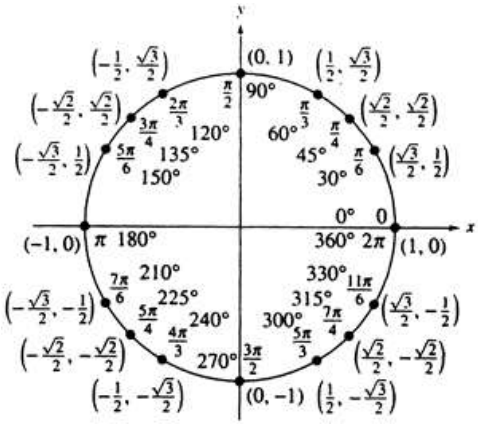
$\arccos(\cos(-1.1))$



Find:

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

$\arctan(-5.5)$

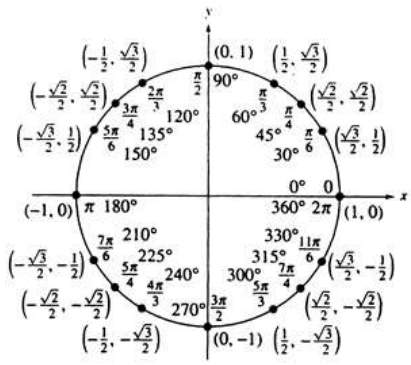


Find the exact value without a calculator.

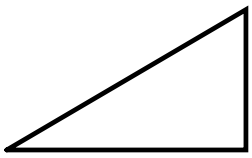
$\sin(\tan^{-1}1)$

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

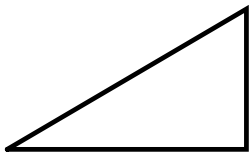
$\sin(\tan^{-1}(-1))$



Find an algebraic expression equivalent to the given expression.

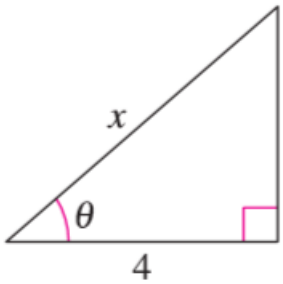


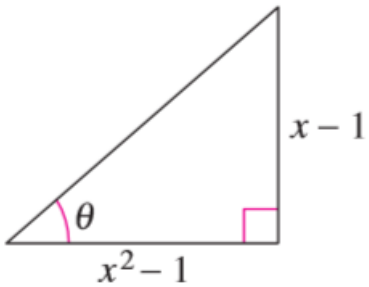
$\cot(\arccos x)$



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

Use an inverse trig function to write θ as a function of x.





Section 4.7A Pgs. 324-327

#5 - 17 odd, 21-35 odd, 39-43 odd, 45-67 odd