

Section 6.2

The Inverse Trigonometric Functions (Continued)

OBJECTIVE 1

1 Find the Exact Value of Expressions Involving the Inverse Sine, Cosine, and Tangent Functions

EXAMPLE

Finding the Exact Value of Expressions Involving Inverse Trigonometric Functions

Find the exact value of: $\sin^{-1}\left(\sin \frac{5\pi}{4}\right)$

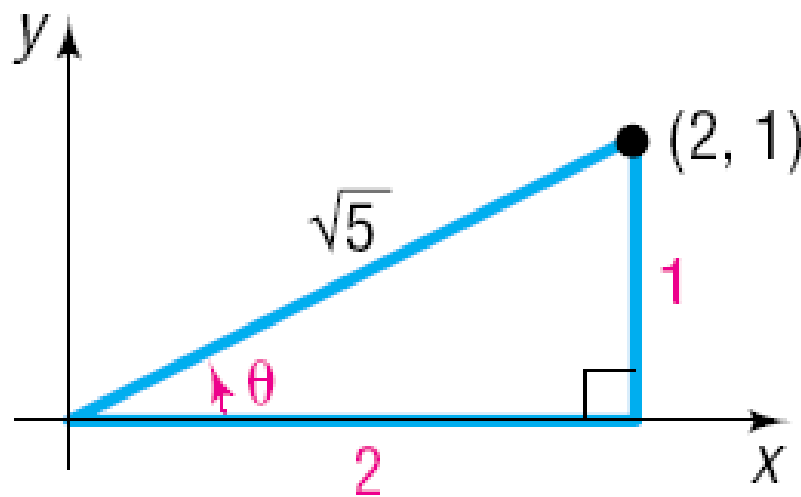
✓ CHECK:

```
sin-1(sin(5π/4))  
-.7853981634  
-π/4  
-.7853981634
```

EXAMPLE

Finding the Exact Value of Expressions Involving Inverse Trigonometric Functions

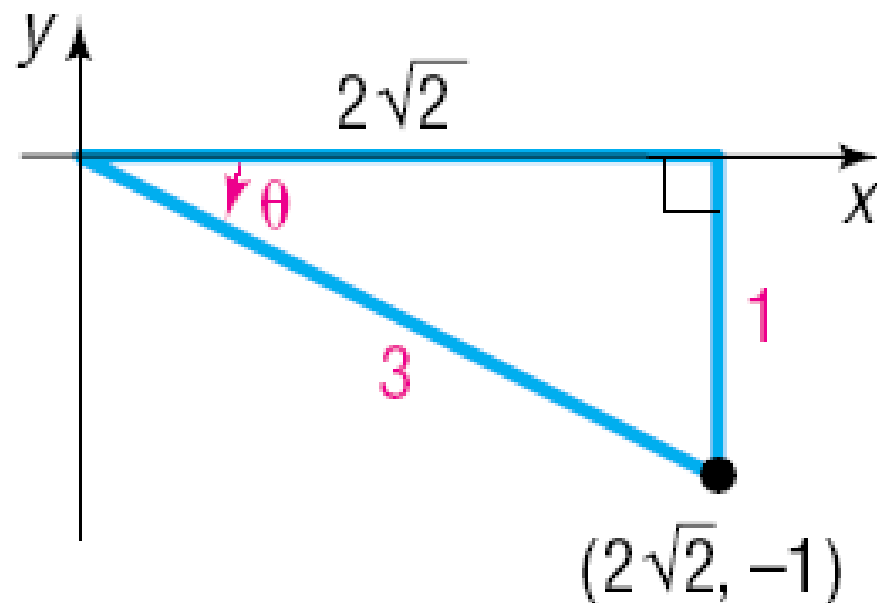
Find the exact value of: $\sin\left(\tan^{-1}\frac{1}{2}\right)$



EXAMPLE

Finding the Exact Value of Expressions Involving Inverse Trigonometric Functions

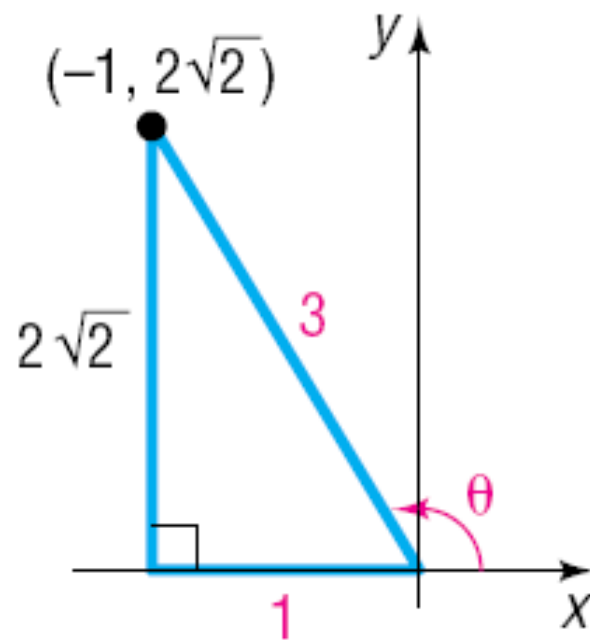
Find the exact value of: $\cos\left[\sin^{-1}\left(-\frac{1}{3}\right)\right]$



EXAMPLE

Finding the Exact Value of Expressions Involving Inverse Trigonometric Functions

Find the exact value of: $\tan\left[\cos^{-1}\left(-\frac{1}{3}\right)\right]$

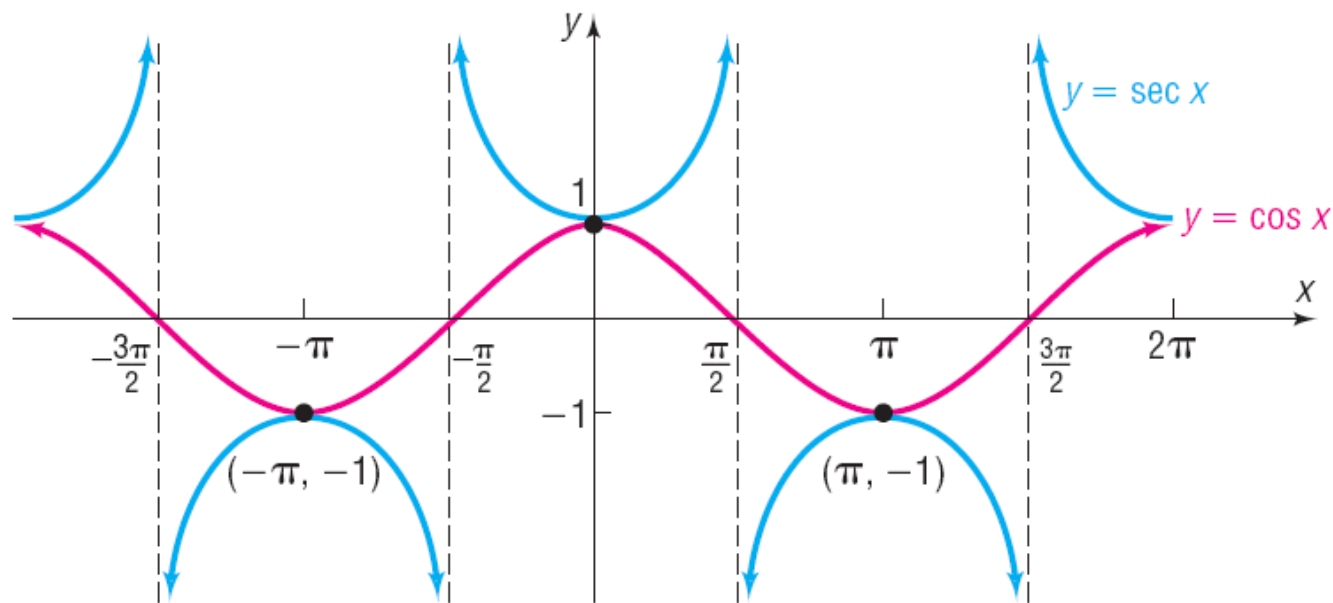


OBJECTIVE 2

- 2 Know the Definition of the Inverse Secant, Cosecant, and Cotangent Functions

$$y = \sec^{-1} x \text{ means } x = \sec y$$

where $|x| \geq 1$ and $0 \leq y \leq \pi$, $y \neq \frac{\pi}{2}$ *

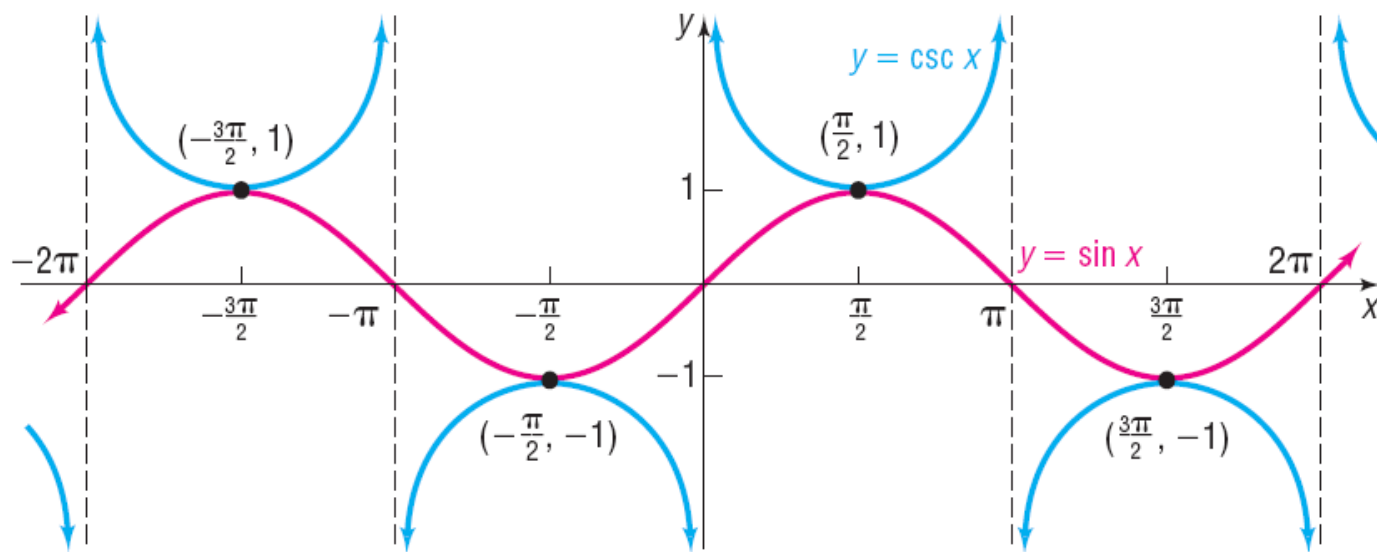


$$y = \sec x, -\infty < x < \infty, x \text{ not equal}$$

to odd multiples of $\frac{\pi}{2}$, $|y| \geq 1$

$$y = \csc^{-1} x \text{ means } x = \csc y$$

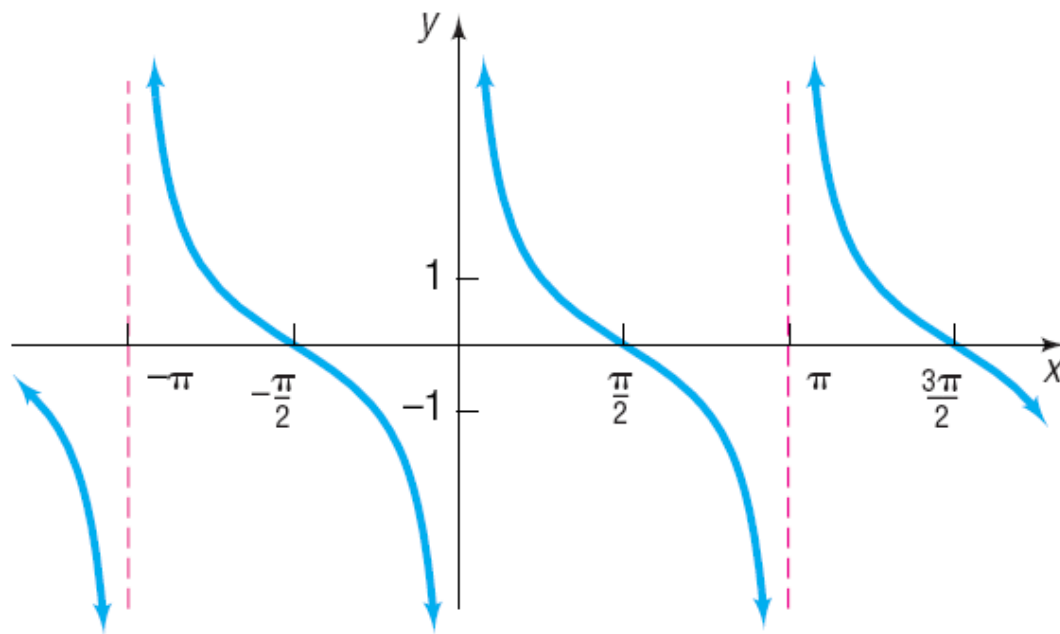
where $|x| \geq 1$ and $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$, $y \neq 0^\dagger$



$y = \csc x$, $-\infty < x < \infty$, x not equal to integer

multiples of π , $|y| \geq 1$

$y = \cot^{-1} x$ means $x = \cot y$
where $-\infty < x < \infty$ and $0 < y < \pi$



$y = \cot x$, $-\infty < x < \infty$, x not equal to integer
multiples of π , $-\infty < y < \infty$

EXAMPLE

Finding the Exact Value of an Inverse Cosecant Function

Find the exact value of: $\csc^{-1} 2$

$$-\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}, \theta \neq 0$$

whose sine equals $\frac{1}{2}$

OBJECTIVE 3

- 3 Use a Calculator to Evaluate $\sec^{-1} x$, $\csc^{-1} x$, and $\cot^{-1} x$

EXAMPLE

Approximating the Value of Inverse Trigonometric Functions

Use a calculator to approximate each expression in radians rounded to two decimal places.

(a) $\sec^{-1} 3$ (b) $\csc^{-1}(-4)$ (c) $\cot^{-1} \frac{1}{2}$ (d) $\cot^{-1}(-2)$

$$\sec^{-1} 3 = \theta = \cos^{-1} \frac{1}{3} \approx 1.23$$

$$\csc^{-1}(-4) = \theta = \sin^{-1}\left(-\frac{1}{4}\right) \approx -0.25$$

$$\cot^{-1} \frac{1}{2} = \theta = \cos^{-1}\left(\frac{1}{\sqrt{5}}\right) \approx 1.11$$

$$\cot^{-1}(-2) = \theta = \cos^{-1}\left(-\frac{2}{\sqrt{5}}\right) \approx 2.68$$

