



8-1 Additional Practice

Solving Trigonometric Equations Using Inverses

- How would you restrict the domain of the sine function to define the inverse sine function?
- Evaluate the inverse trigonometric function at the given value.
 - $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$
 - $\tan^{-1}\left(\frac{\sqrt{3}}{3}\right)$
- What are all of the angles in radians that have a sine value of 0.85?
- What is the value for θ in radians when $0.15 \cos \theta + 1 = 1.30 \cos \theta$ for values between 0 and 2π ?
- What is the value for θ in radians when $4 \tan \theta - 5 = \tan \theta$ for values between 0 and π ?
- The total monthly sales of a retail store is modeled by the function $S = 29 \sin(0.18x - 4.8) + 56$, where S is the sales in thousands, x is the month, and $x = 1$ corresponds to January. Use this function to determine the month in which the total sales was approximately \$54,000.
- Can you find the radian measures of the angles θ whose cosine is -1.75 ? Explain.
- A simple harmonic motion of a hanging spring is defined by $d = 3 \cos\left(\frac{\pi}{2}t\right) + 9$, where d is the displacement of the end of the spring in inches, and t is the time in seconds.
 - Solve the equation for t .
 - Find the first time at which the spring is displaced 6 in.
- Solve the equation $8 \sin^2 \theta - 2 = 0$. Write your answer in radians.



8-1 Additional Practice

Solving Trigonometric Equations Using Inverses

1. How would you restrict the domain of the sine function to define the inverse sine function?

$$-\frac{\pi}{2} \leq t \leq \frac{\pi}{2}$$

2. Evaluate the inverse trigonometric function at the given value.

a. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{3}$

b. $\tan^{-1}\left(\frac{\sqrt{3}}{3}\right) = \frac{\pi}{6}$

3. What are all of the angles in radians that have a sine value of 0.85?

$$1.02 + 2k\pi \text{ or } 2.12 + 2k\pi$$

4. What is the value for θ in radians when $0.15 \cos \theta + 1 = 1.30 \cos \theta$ for values between 0 and 2π ?

$$0.52, 5.76$$

5. What is the value for θ in radians when $4 \tan \theta - 5 = \tan \theta$ for values between 0 and π ?

$$1.03$$

6. The total monthly sales of a retail store is modeled by the function $S = 29 \sin(0.18x - 4.8) + 56$, where S is the sales in thousands, x is the month, and $x = 1$ corresponds to January. Use this function to determine the month in which the total sales was approximately \$54,000.

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7. Can you find the radian measures of the angles θ whose cosine is -1.75 ? Explain.

No; $\cos \theta$ cannot be less than -1 .

8. A simple harmonic motion of a hanging spring is defined by $d = 3 \cos\left(\frac{\pi}{2}t\right) + 9$, where d is the displacement of the end of the spring in inches, and t is the time in seconds.

- a. Solve the equation for t .

$$t = \frac{2 \cos^{-1}\left(\frac{d-9}{3}\right)}{\pi}$$

- b. Find the first time at which the spring is displaced 6 in.

$$2 \text{ s}$$

9. Solve the equation $8 \sin^2 \theta - 2 = 0$. Write your answer in radians.

$$\theta = \frac{5\pi}{6} + 2\pi k, \text{ and } \frac{\pi}{6} + 2\pi k$$