

1. If $\tan \theta = \frac{1}{2}$, $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$, then $\sin \theta =$ ____.

If $\tan \theta = \frac{1}{2}$, $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$, then $\sin \theta =$.

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

2. If (x, y) is a point on the unit circle in quadrant I and if $x = \frac{1}{2}$, what is y ?

$y =$ (Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

3. Complete the sentence below.

For any angle θ in standard position, let $P = (x, y)$ be the point on the terminal side of θ that is also on the circle $x^2 + y^2 = r^2$. Then, $\sin \theta =$ _____ and $\cos \theta =$ _____.

For any angle θ in standard position, let $P = (x, y)$ be the point on the terminal side of θ that is also on the circle $x^2 + y^2 = r^2$. Then, $\sin \theta =$ (1) _____ and $\cos \theta =$ (2) _____

- | | |
|---|---|
| (1) ☐ $\frac{x}{r}$ | (2) ☐ $\frac{x}{r}$ |
| ☐ $\frac{y}{x}$ | ☐ $\frac{y}{r}$ |
| ☐ $\frac{x}{y}$ | ☐ $\frac{x}{y}$ |
| ☐ $\frac{y}{r}$ | ☐ $\frac{y}{x}$ |

4. Find the values of $\sin t$, $\cos t$, $\tan t$, $\csc t$, $\sec t$, and $\cot t$ if $P = \left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ is the point on the unit circle that corresponds to the real number t .

$\sin t =$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

$\cos t =$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

$\tan t =$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

$\csc t =$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

$\sec t =$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

$\cot t =$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

5. Rewrite $\cot \theta \cdot \sec \theta$ in terms of sine and cosine.

$\cot \theta \cdot \sec \theta =$ (Simplify your answer.)

6. Which of the following equations is not an identity?

Choose the correct answer below.

- ☐ $\csc \theta = \frac{1}{\sin \theta}$
- ☐ $\tan(-\theta) = -\tan \theta$
- ☐ $\cot^2 \theta + 1 = \csc^2 \theta$
- ☐ $\tan \theta = \frac{\cos \theta}{\sin \theta}$

7. If $\sec \theta = 3$, $\sin \theta > 0$, find the exact value of each of the following for $0 \leq \theta < 2\pi$.

- (a) $\sin(2\theta)$ (b) $\cos(2\theta)$ (c) $\sin \frac{\theta}{2}$ (d) $\cos \frac{\theta}{2}$

(a) $\sin(2\theta) =$

(Type an exact answer, using radicals as needed.)

(b) $\cos(2\theta) =$

(Type an exact answer, using radicals as needed.)

(c) $\sin \frac{\theta}{2} =$

(Type an exact answer, using radicals as needed.)

(d) $\cos \frac{\theta}{2} =$

(Type an exact answer, using radicals as needed.)

8. Use a half-angle formula to find the exact value of $\sec \frac{13\pi}{8}$.

$\sec \frac{13\pi}{8} =$

(Type an exact answer, using radicals as needed.)

9. Find the exact value of the following expression.

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

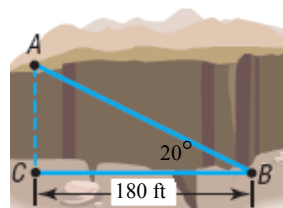
Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

☐ A. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) =$

(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)

☐ B. The function is not defined.

10. Find the distance from A to C across the gorge illustrated in the figure.



The distance from A to C is feet.

(Do not round until the final answer. Then round to two decimal places as needed.)

11. Find the amplitude, period, and phase shift of the function. Graph the function. Be sure to label key points. Show at least two periods.

$$y = 6 \sin(2x - \pi)$$

What is the amplitude?

(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)

What is the period?

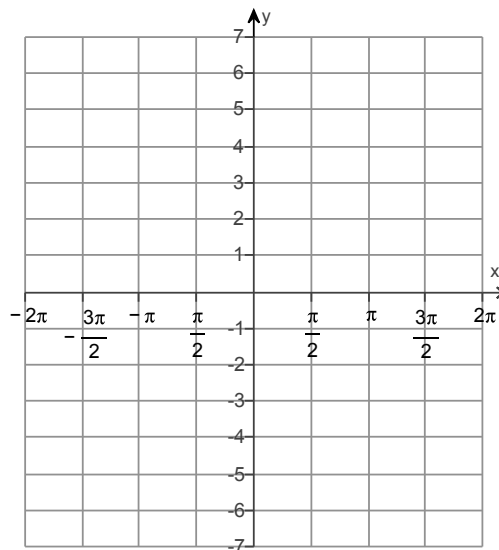
(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)

What is the phase shift?

(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)

Use the graphing tool to graph the function.

(For any answer boxes shown with the grapher, type an exact answer. Type the word pi to insert the symbol π as needed.)



12. Find the inverse function f^{-1} of the function f . Find the range of f and the domain and range of f^{-1} .

$$f(x) = 5 \sin(5x - 6); \quad \frac{6}{5} - \frac{\pi}{10} \leq x \leq \frac{6}{5} + \frac{\pi}{10}$$

Find the inverse, f^{-1} , of f .

$$f^{-1}(x) = \text{}$$

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

The range of $f(x)$ is .

(Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

The domain of $f^{-1}(x)$ is .

(Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

The range of $f^{-1}(x)$ is .

(Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

13. Find the exact solution of the equation.

$$20 \sin^{-1} x = 5\pi$$

The solution set is .

(Simplify your answer, including any radicals. Type an exact answer, using radicals as needed.)

14. Solve the equation on the interval $0 \leq \theta < 2\pi$.

$$2 \sin \theta + 4 = 5$$

What are the solutions in the interval $0 \leq \theta < 2\pi$? Select the correct choice and fill in any answer boxes in your choice below.

- ☐ A. The solution set is $\{\text{[]}\}$.
(Simplify your answer. Type an exact answer, using π as needed. Type your answer in radians. Use integers or fractions for any
- ☐ B. There is no solution.

15. Solve the equation on the interval $0 \leq \theta < 2\pi$.

$$4 \cos \theta - 2 = 0$$

What are the solutions to $4 \cos \theta - 2 = 0$ in the interval $0 \leq \theta < 2\pi$? Select the correct choice and fill in any answer boxes in your choice below.

- ☐ A. The solution set is $\{\text{[]}\}$.
(Simplify your answer. Type an exact answer, using π as needed. Type your answer in radians. Use integers or fractions for any
- ☐ B. There is no solution.

16. Use the information given about the angle θ , $\cot \theta = -5$, $\sec \theta < 0$, $0 \leq \theta < 2\pi$, to find the exact values of the following.

(a) $\sin(2\theta)$, (b) $\cos(2\theta)$, (c) $\sin \frac{\theta}{2}$, and (d) $\cos \frac{\theta}{2}$

(a) $\sin(2\theta) = \text{[]}$ (Type an exact answer, using radicals as needed.)

(b) $\cos(2\theta) = \text{[]}$ (Type an exact answer, using radicals as needed.)

(c) $\sin \frac{\theta}{2} = \text{[]}$ (Type an exact answer, using radicals as needed.)

(d) $\cos \frac{\theta}{2} = \text{[]}$ (Type an exact answer, using radicals as needed.)

17. Solve the equation on the interval $0 \leq \theta < 2\pi$.

$$\cos(2\theta) + 4 \sin^2 \theta = 2$$

What is the solution in the interval $0 \leq \theta < 2\pi$? Select the correct choice and fill in any answer boxes in your choice below.

- ☐ A. $\theta = \{\text{[]}\}$
(Simplify your answer. Type an exact answer, using π as needed. Type your answer in radians. Use integers or fractions for any
- ☐ B. There is no solution.

18. Solve the equation on the interval $0 \leq \theta < 2\pi$.

$$\cos(2\theta) = -3 \cos \theta - 2$$

Select the correct choice below and fill in any answer boxes in your choice.

- ☐ A. $\theta = \{\text{[]}\}$ radians
(Simplify your answer. Type an exact answer, using π as needed. Type your answer in radians. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- ☐ B. There is no solution on this interval.

1. $\frac{\sqrt{5}}{5}$

2. $\frac{\sqrt{3}}{2}$

3. (1) $\frac{y}{r}$
(2) $\frac{x}{r}$.

4. $\frac{1}{2}$
 $-\frac{\sqrt{3}}{2}$
 $-\frac{\sqrt{3}}{3}$
 2
 $-\frac{2\sqrt{3}}{3}$
 $-\sqrt{3}$

5. $\frac{1}{\sin \theta}$

6. $\tan \theta = \frac{\cos \theta}{\sin \theta}$

7. $\frac{4\sqrt{2}}{9}$
 $-\frac{7}{9}$
 $\frac{\sqrt{3}}{3}$
 $\frac{\sqrt{6}}{3}$

8. $\frac{2}{\sqrt{2-\sqrt{2}}}$

9. A. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) = \boxed{\frac{\pi}{4}}$

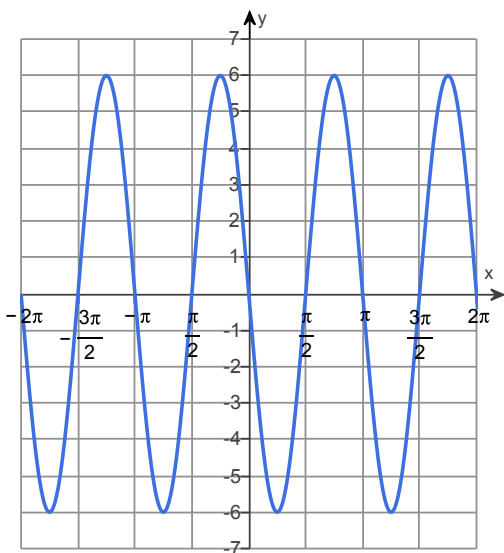
(Simplify your answer. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)

10. 65.51

11. 6

π

$\frac{\pi}{2}$



12. $\frac{1}{5} \sin^{-1}\left(\frac{x}{5}\right) + \frac{6}{5}$

$[-5, 5]$

$[-5, 5]$

$\left[\frac{6}{5} - \frac{\pi}{10}, \frac{6}{5} + \frac{\pi}{10}\right]$

13. $\frac{\sqrt{2}}{2}$

14. A. The solution set is $\boxed{\left\{\frac{\pi}{6}, \frac{5\pi}{6}\right\}}$.

(Simplify your answer. Type an exact answer, using π as needed. Type your answer in radians. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

15. A. The solution set is $\left\{ \frac{\pi}{3}, \frac{5\pi}{3} \right\}$.

(Simplify your answer. Type an exact answer, using π as needed. Type your answer in radians. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

16. $-\frac{5}{13}$

$\frac{12}{13}$

$\frac{1}{2} \sqrt{\frac{26 + 5\sqrt{26}}{13}}$

$\frac{1}{2} \sqrt{\frac{26 - 5\sqrt{26}}{13}}$

17. A. $\theta = \left\{ \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4} \right\}$

(Simplify your answer. Type an exact answer, using π as needed. Type your answer in radians. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

18. A. $\theta = \left\{ \frac{2\pi}{3}, \frac{4\pi}{3}, \pi \right\}$ radians

(Simplify your answer. Type an exact answer, using π as needed. Type your answer in radians. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
