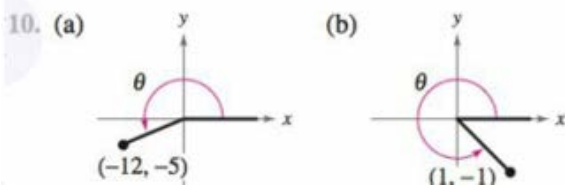


In Exercises 1–6, let θ be an angle in standard position with (x, y) a point on the terminal side of θ and $r = \sqrt{x^2 + y^2} \neq 0$.

1. $\sin \theta =$ _____
2. $\frac{r}{y} =$ _____
3. $\tan \theta =$ _____
4. $\sec \theta =$ _____
5. $\frac{x}{r} =$ _____
6. $\frac{x}{y} =$ _____
7. Because $r = \sqrt{x^2 + y^2}$ cannot be _____, the sine and cosine functions are _____ for any real value of θ .
8. The acute positive angle formed by the terminal side of an angle θ and the horizontal axis is called the _____ angle of θ and is denoted by θ' .

Evaluating Trigonometric Functions In Exercises 9–12, determine the exact values of the six trigonometric functions of each angle θ .



Evaluating Trigonometric Functions In Exercises 13–18, the point is on the terminal side of an angle in standard position. Determine the exact values of the six trigonometric functions of the angle.

16. $(-4, 10)$ 18. $(3\frac{1}{2}, -7\frac{3}{4})$

Determining a Quadrant In Exercises 19–22, state the quadrant in which θ lies.

19. $\sin \theta > 0$ and $\cos \theta > 0$ 20. $\sin \theta < 0$ and $\cos \theta < 0$
 21. $\sin \theta > 0$ and $\cos \theta < 0$ 22. $\sec \theta > 0$ and $\cot \theta < 0$

Evaluating Trigonometric Functions In Exercises 23–32, find the values of the six trigonometric functions of θ with the given constraint.

- | Function Value | Constraint |
|-----------------------------------|---------------------------------|
| 23. $\tan \theta = -\frac{15}{8}$ | $\sin \theta > 0$ |
| 25. $\sin \theta = \frac{3}{5}$ | θ lies in Quadrant II. |
| 31. $\cot \theta$ is undefined. | $\pi/2 \leq \theta \leq 3\pi/2$ |

An Angle Formed by a Line Through the Origin In Exercises 33–36, the terminal side of θ lies on the given line in the specified quadrant. Find the values of the six trigonometric functions of θ by finding a point on the line.

- | Line | Quadrant |
|------------------------|----------|
| 34. $y = \frac{1}{3}x$ | III |

Trigonometric Function of a Quadrant Angle In Exercises 37–44, evaluate the trigonometric function of the quadrant angle, if possible.

37. $\sin \pi$ 38. $\csc \frac{3\pi}{2}$
 41. $\sin \frac{\pi}{2}$ 42. $\cot \pi$

Finding a Reference Angle In Exercises 45–52, find the reference angle θ' and sketch θ and θ' in standard position.

45. $\theta = 160^\circ$ 46. $\theta = 309^\circ$
 47. $\theta = -125^\circ$ 51. $\theta = 4.8$

Using a Reference Angle In Exercises 53–68, evaluate the sine, cosine, and tangent of the angle without using a calculator.

53. 225° 58. 510° 59. $\frac{2\pi}{3}$ 100°
 61. $\frac{5\pi}{4}$ 62. $\frac{7\pi}{6}$ 63. $-\frac{\pi}{6}$

Using a Calculator In Exercises 75–90, use a calculator to evaluate the trigonometric function. Round your answer to four decimal places. (Be sure the calculator is in the correct mode.)

79. $\tan 304^\circ$ 80. $\cot 178^\circ$

Solving for θ In Exercises 91–96, find two solutions of each equation. Give your answers in degrees ($0^\circ \leq \theta < 360^\circ$) and in radians ($0 \leq \theta < 2\pi$). Do not use a calculator.

92. (a) $\cos \theta = \frac{\sqrt{2}}{2}$ (b) $\cos \theta = -\frac{\sqrt{2}}{2}$
 93. (a) $\csc \theta = \frac{2\sqrt{3}}{3}$ (b) $\cot \theta = -1$