

4.4 Homework

Find the exact values of $\sin \alpha$, $\cos \alpha$, $\tan \alpha$, $\csc \alpha$, $\sec \alpha$, and $\cot \alpha$, where α is an angle in standard position whose terminal side contains the given point.

1. $(9,12)$
2. $(-5,10)$
3. $(-4,-6)$
4. $(1,-7)$

Find the values of the other five trigonometric functions based on the quadrant of the angle and the value of the given function.

5. $\sin \alpha = 8/17$, α is in Quadrant I
6. $\tan \gamma = \sqrt{5}/2$, γ is in Quadrant III

7. $\cos \beta = -7/25$, β is in Quadrant II
8. $\sec \theta = 3$, θ is in Quadrant IV

Evaluate the following without a calculator. Some of these expressions are undefined.

9. $\sin(4\pi/3)$
10. $\cos(-11\pi/6)$
11. $\tan(-180^\circ)$
12. $\sec(-\pi/4)$
13. $\csc(225^\circ)$
14. $\cot(\pi/2)$
15. $\sin(135^\circ)$
16. $\cos(-4\pi/3)$
17. $\tan(-\pi/6)$

18. $\sec(150^\circ)$

19. $\csc(-5\pi/6)$

20. $\cot(330^\circ)$

21. $\sin(11\pi/4)$

22. $\cos(660^\circ)$

23. $\tan(-23\pi/6)$

24. $\sec(-315^\circ)$

25. $\csc(-7\pi/2)$

26. $\cot(495^\circ)$

27. $\sin(-4\pi/3)$

28. $\cos(-5\pi/4)$

29. $\tan(-2\pi/3)$

30. $\sec(-420^\circ)$

31. $\csc(7\pi/3)$

32. $\cot(0)$

33. $\sin\left(\frac{\pi}{3} + \frac{\pi}{6}\right)$

34. $\frac{1 - \cos(5\pi/6)}{\sin(5\pi/6)}$

35. $\sin(2\theta)$ if $\theta = \pi/6$

36. $\cos(\theta/2)$ if $\theta = 3\pi/2$

Find the exact value of each expression, in radians, without using a calculator.

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

38. $\cos^{-1}(\sqrt{2}/2)$

39. $\tan^{-1}(0)$

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

41. $\cos^{-1}(-1/2)$

42. $\tan^{-1}(-\sqrt{3})$

43. $\tan^{-1}(1)$

44. $\cos^{-1}(-1)$

Review

45. In degrees-minutes-seconds format, find the measure of the third angle of an isosceles triangle in which the equal angles each measure $9^{\circ}38'52''$.

46. Convert $13\pi/12$ radians to degrees.

47. Convert 140° to radians.

48. A sector of a circle with radius 8 meters has a central angle of $\pi/8$. Find the area of the sector to the nearest tenth of a square meter.

49. A 30-inch (diameter) lawnmower blade is rotating at 2000 revolutions per minute. Find the linear velocity of the tip of the blade in miles per hour.

50. A wheel is rotating at 45 miles per hour. If the radius of the wheel is 8 inches, find the angular velocity of the wheel in radians per second.

Solve the right triangles with the given measures.

51. $a = 4$, $c = 7$

52. $\alpha = 35.2^{\circ}$, $b = 6$