

11-9 Practice

Inverse Trigonometric Functions

Find each principal value (exact). Write angle measures in degrees and radians.

1. $\sin^{-1} 1$

2. $\cos^{-1}\left(-\frac{1}{2}\right)$

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

4. $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

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

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

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

8. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

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

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

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

12. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

13. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

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

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

15. $\cot^{-1}(-\sqrt{3})$

16. $\sec^{-1}(2)$

17. $\csc^{-1}(\sqrt{2})$

18. $\cot^{-1}\left(\frac{\sqrt{3}}{3}\right)$

19. $\sec^{-1}(-1)$

20. $\csc^{-1}(-2)$

Solve each equation. Round to the nearest tenth if necessary.

21. $\cos \theta = 0.05$

22. $\tan \theta = 3.22$

23. $\cos \theta = 0.25$

24. $\sin \theta = -0.57$

25. $\tan \theta = 5$

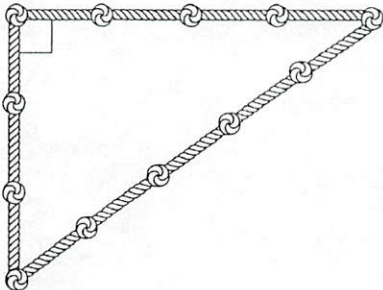
26. $\cos \theta = 0.11$

27. $\sin \theta = 0.9$

28. $\tan \theta = -11.35$

29. $\cos \theta = -0.36$

30. **SURVEYING** In ancient times, it was known that a triangle with side lengths of 3, 4, and 5 units was a right triangle. Surveyors used ropes with knots at each unit of length to make sure that an angle was a right angle. Such a rope was placed on the ground so that one leg of the triangle had three knots and the other had four. This guaranteed that the triangle formed was a right triangle, meaning that the surveyor had formed a right angle.



To the nearest degree, what are the angle measures in a triangle formed in this way?

Review

Use the unit circle to find the exact value of each trigonometric function.

31. $\sin 45^\circ$

32. $\cos 60^\circ$

33. $\tan 135^\circ$

34. $\sin 330^\circ$

35. $\cos 210^\circ$

36. $\tan 180^\circ$

37. $\sin \frac{\pi}{6}$

38. $\cos \frac{7\pi}{6}$

39. $\tan \frac{5\pi}{3}$

40. $\sin \frac{2\pi}{3}$

41. $\cos \frac{\pi}{4}$

42. $\tan \pi$

11-9 Practice**Inverse Trigonometric Functions**

Find each principal value (exact). Write angle measures in degrees and radians.

1. $\sin^{-1} 1$

$\frac{\pi}{2}, 90^\circ$

2. $\cos^{-1}\left(-\frac{1}{2}\right)$

$\frac{2\pi}{3}, 120^\circ$

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

$-\frac{\pi}{6}, -30^\circ$

4. $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

$\frac{3\pi}{4}, 135^\circ$

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

$-\frac{\pi}{3}, -60^\circ$

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

$\frac{\pi}{6}, 30^\circ$

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

$-\frac{\pi}{4}, -45^\circ$

8. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

$\frac{5\pi}{6}, 150^\circ$

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

$\frac{\pi}{3}, 60^\circ$

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

$-\frac{\pi}{6}, -30^\circ$

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

$\frac{\pi}{4}, 45^\circ$

12. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

$\frac{\pi}{6}, 30^\circ$

13. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

Same as 12 ☺

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

$-\frac{\pi}{3}, -60^\circ$

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

$-\frac{\pi}{4}, -45^\circ$

15. $\cot^{-1}(-\sqrt{3})$

$-30^\circ, -\frac{\pi}{6}$

16. $\sec^{-1}(2)$

$\cos^{-1}\left(\frac{1}{2}\right)$
 $\frac{\pi}{3}, 60^\circ$

17. $\csc^{-1}(\sqrt{2})$

$\sin^{-1}\left(\frac{1}{\sqrt{2}}\right) = \sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$
 $\frac{\pi}{4}, 45^\circ$

18. $\cot^{-1}\left(\frac{\sqrt{3}}{3}\right)$

$\frac{\pi}{3}, 60^\circ$

19. $\sec^{-1}(-1)$

$\cos^{-1}(-1)$
 $\pi, 180^\circ$

20. $\csc^{-1}(-2)$

$\sin^{-1}\left(-\frac{1}{2}\right)$
 $-\frac{\pi}{6}, -30^\circ$

Solve each equation. Round to the nearest tenth if necessary.

21. $\cos \theta = 0.05$

87°

22. $\tan \theta = 3.22$

72.7°

23. $\cos \theta = 0.25$

75.5°

24. $\sin \theta = -0.57$

-34.8°

25. $\tan \theta = 5$

78.7°

26. $\cos \theta = 0.11$

83.7°

27. $\sin \theta = 0.9$

64.2°

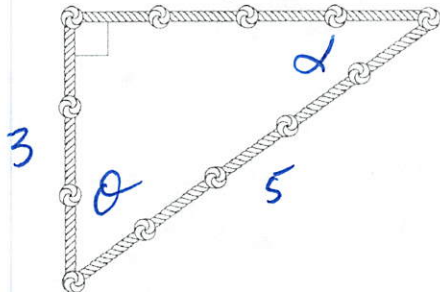
28. $\tan \theta = -11.35$

-85°

29. $\cos \theta = -0.36$

111.1°

30. **SURVEYING** In ancient times, it was known that a triangle with side lengths of 3, 4, and 5 units was a right triangle. Surveyors used ropes with knots at each unit of length to make sure that an angle was a right angle. Such a rope was placed on the ground so that one leg of the triangle had three knots and the other had four. This guaranteed that the triangle formed was a right triangle, meaning that the surveyor had formed a right angle.



$\tan \theta = \frac{4}{3}$

$\theta \approx 53.1^\circ$

$\alpha = 90 - 53.1^\circ$

$\alpha \approx 36.9^\circ$

To the nearest degree, what are the angle measures in a triangle formed in this way?

Review

Use the unit circle to find the exact value of each trigonometric function.

31. $\sin 45^\circ$

$\frac{\sqrt{2}}{2}$

32. $\cos 60^\circ$

$\frac{1}{2}$

33. $\tan 135^\circ$

-1

34. $\sin 330^\circ$

$-\frac{1}{2}$

35. $\cos 210^\circ$

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

36. $\tan 180^\circ$

0

37. $\sin \frac{\pi}{6}$

$\frac{1}{2}$

38. $\cos \frac{7\pi}{6}$

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

39. $\tan \frac{5\pi}{3}$

$-\sqrt{3}$

40. $\sin \frac{2\pi}{3}$

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

41. $\cos \frac{\pi}{4}$

$\frac{\sqrt{2}}{2}$

42. $\tan \pi$

0