

You may not use your calculator on this page.

Convert each radian measure to degree measure.

1. $\frac{\pi}{12} = \underline{\hspace{2cm}}$

2. $\frac{5\pi}{4} = \underline{\hspace{2cm}}$

3. $\frac{2\pi}{3} = \underline{\hspace{2cm}}$

4. $\frac{-5\pi}{6} = \underline{\hspace{2cm}}$

Convert each degree measure to radian measure (in terms of π).

5. $270^\circ =$

6. $75^\circ =$

7. $108^\circ =$

8. $-15^\circ =$

In each of the following problems you are given a point on the terminal side of angle θ . (Assume that θ is in standard position.) Find the exact value of all six trigonometric functions. Express your answers in simplest form.

9. $(5, -12)$

$\sin \theta =$

$\sec \theta =$

$\tan \theta =$

$\cos \theta =$

$\csc \theta =$

$\cot \theta =$

10. $(-2, -3)$

$\sin \theta =$

$\sec \theta =$

$\tan \theta =$

$\cos \theta =$

$\csc \theta =$

$\cot \theta =$

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Find two values of θ between 0° and 360° that are solutions of each of the following equations. Express your solutions in degrees.

11. $\sin \theta = -0.5$

12. $\tan \theta = 1$

Find two values of x in the interval $[0, 2\pi)$ that are solutions of each of the following equations. Express your solutions in radians in terms of π .

13. $\sec x = 2$

14. $\sin x = 0$

Find the exact value of each of the following. Express your answers in simplest form.

15. $\sin 270^\circ =$

16. $\sec -30^\circ =$

17. $\tan 120^\circ =$

18. $\cos 45^\circ =$

19. $\csc 60^\circ =$

20. $\cot 315^\circ =$

21. $\cos 300^\circ =$

22. $\sin -120^\circ =$

23. $\csc -135^\circ =$

24. $\sin \frac{5\pi}{4} =$

25. $\sec \frac{5\pi}{3} =$

26. $\tan \frac{\pi}{6} =$

27. $\cos \frac{-\pi}{4} =$

28. $\csc \frac{7\pi}{6} =$

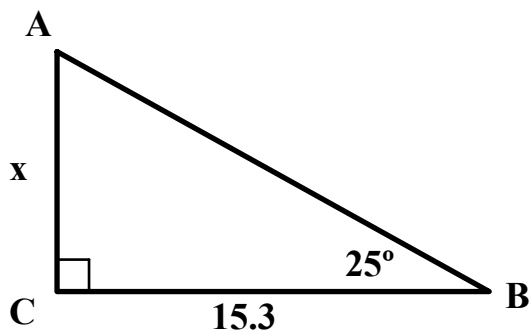
29. $\cot \frac{2\pi}{3} =$

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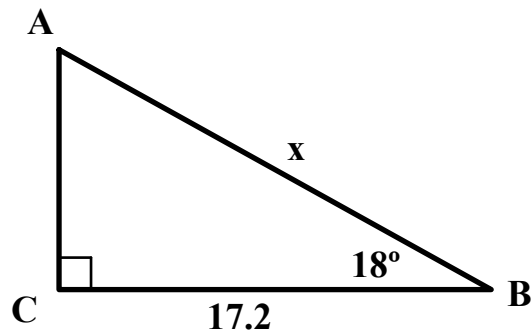
You will need to use your calculator on this page.

Find the value of x in each of the following diagrams. Show the equation you use and round your solution to 3 significant digits. The diagrams are not drawn to scale.

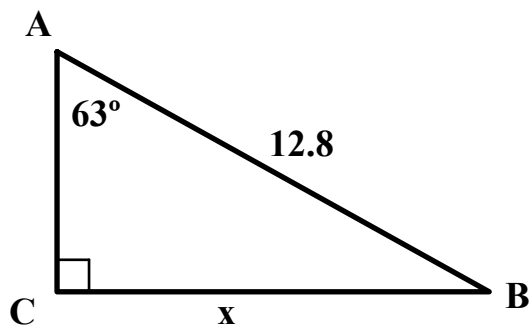
30. $x \approx$ _____



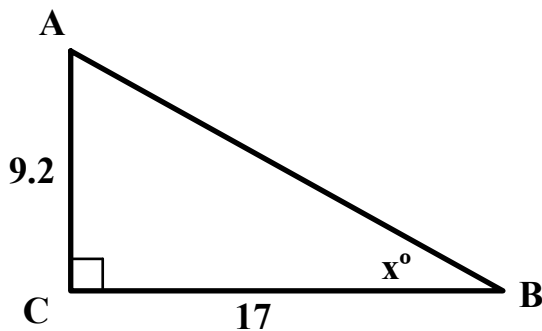
31. $x \approx$ _____



32. $x \approx$ _____



33. $x \approx$ _____



Find two values of θ between 0° and 360° that are solutions of each of the following equations. Express your solutions in degrees rounded to 3 significant digits.

34. $\cos \theta = -0.23$

35. $\csc \theta = 5.1$

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Find two values of x between 0 and 2π that are solutions of each of the following equations. Express your solutions in radians rounded to 3 significant digits.

36. $\tan x = 6.1$

37. $\sin x = -0.85$

Solve each of the following problems. Express solutions rounded to 3 significant figures.

38. The second hand of a kitchen clock is 4 inches long. How fast is the tip of the second hand moving? Express your answer in inches per second.

39. A bicycle has tires that are 28 inches in diameter. If the bike is moving at 8 miles per hour, then what is the angular speed of the tires? Express your answer in degrees per second.

40. A circular saw blade with a radius of 7 inches is turning at 1500 revolutions per minute. How fast are the teeth of the blade moving? Express your answer in feet per second.

41. The latitude of city A is $53^\circ 15' \text{ N}$, and the latitude of city B is $24^\circ 18' \text{ N}$. If city A is due north of city B, then what is the distance between them? Assume that the earth is a sphere with a radius of 4000 miles.