# 6.3 Trigonometric Functions and Special Right Triangle
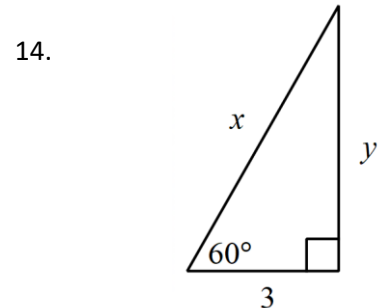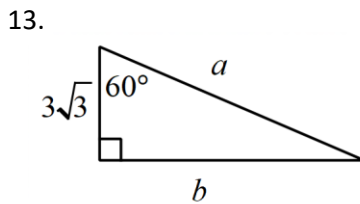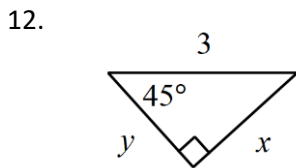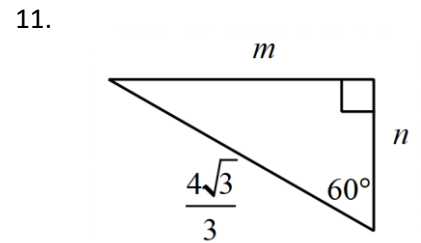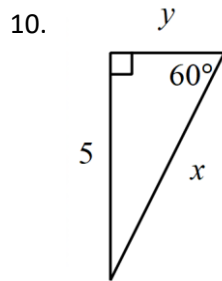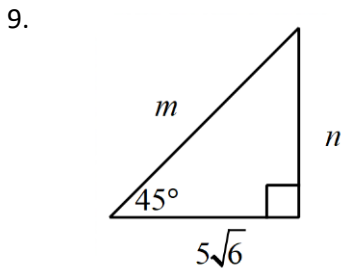
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Rationalize the denominator. Show your work. Leave answers exact and simplified.

1. $\dfrac{1}{\sqrt{3}}$

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

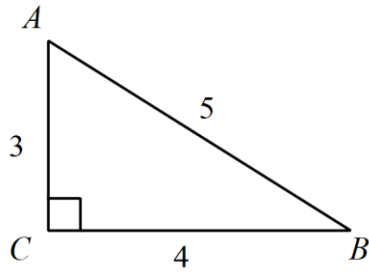3. $\dfrac{1}{2\sqrt{5}}$

4. $-\dfrac{5}{\sqrt{2}}$

5. $\dfrac{2\sqrt{3}}{3\sqrt{2}}$

6. $\dfrac{1}{\sqrt{2}}$

7. $\dfrac{2}{\sqrt{2}}$

8. $-\dfrac{3}{4\sqrt{3}}$

Find the missing sides using special right triangle rules ($30° - 60° - 90°$ or $45° - 45° - 90°$). Leave answer in simplest radical form.

9.



10.



11.



12.



13.



14.

Find the values of all six trigonometric functions of angle A.  Write the fractions in lowest terms.  Leave answer in exact form (radicals).

15.



sin A =            cos A =

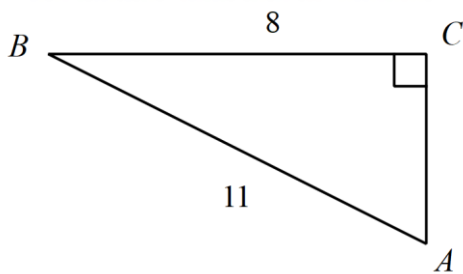tan A =            sec A =

csc A =            cot A =

16.



sin A =            cos A =

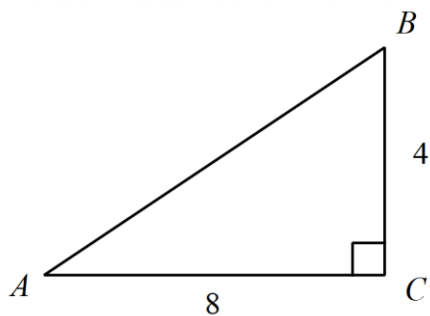tan A =            sec A =

csc A =            cot A =

For each given right triangle, find the exact values of sin A, cos A, tan A, sin B, cos B and tan B.

17.

Assume that $\theta$ is an acute angle in a right triangle satisfying the given conditions.  Evaluate the remaining trigonometric functions.  Leave answer in exact form (radicals).

18.    $\tan\theta = \frac{5}{9}$            $\cos\theta =$          $\sin\theta =$          $\csc\theta =$

                                                     $\sec\theta =$          $\cot\theta =$

19.  $\csc\theta = \frac{23}{9}$          $\cos\theta =$          $\sin\theta =$          $\tan\theta =$

                                                     $\sec\theta =$          $\cot\theta =$

Give the exact value without using a calculator.

20. $\sin\frac{\pi}{3} =$          21.  $\cot\frac{\pi}{6} =$          22.  $\sec 45° =$          23.   $\tan\frac{\pi}{4} =$

Use a calculator to find the function value to the nearest ten-thousandth.  Be sure to watch the mode on your calculator.

24. $\sin 74° =$

25. $\cos 19° =$

26. $\tan \frac{\pi}{12} =$

27. $\sec 49° =$

28. $\cot 0.89 =$

29. $\cot \frac{\pi}{8} =$

Find the acute angle $\theta$ that satisfies the given equation.  Give $\theta$ in both degrees and radians.  You should do these problems without a calculator.

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

31. $\cot \theta = \frac{\sqrt{3}}{3}$

32. $\sec \theta = 2$

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

Find the acute angle $\theta$ that satisfies the given equation using a calculator.  Make sure you calculator is in the correct mode.  Round answers to the nearest tenth of a degree.
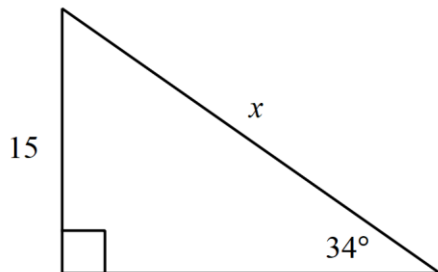
34. $\sin \theta \approx 0.4226$

35. $\tan^{-1}(11.4301)$

36. $\cos \theta \approx 0.9397$
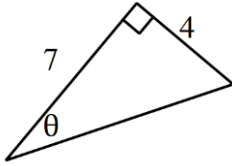
37. $\cos^{-1}(0.3746)$

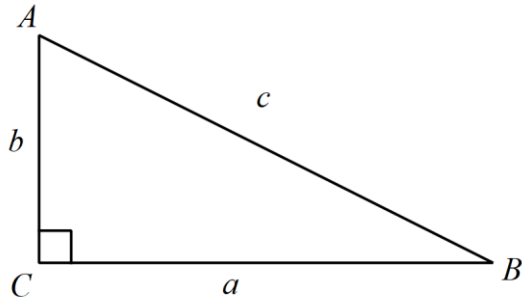Solve for x.  Round you answer to the nearest hundredth.

38.

Solve for $\theta$.  Round to the nearest tenth of a degree.

39.



Solve the right triangle for all missing sides and angles to the nearest tenth.

40.



$a = 12.3$
$A = 20°$

41.  From the distance of 43 feet from the base of a building, the angle of elevation to the top of the building is $63°$. Estimate the height of the building to the nearest foot.

42.  An aerial photograph from a U-2 spy plane is taken of a building suspected of housing nuclear warheads.  The photograph is made when the angle of elevation of the sun is 32 degrees.  By comparing the shadow cast by the building to objects of known size in the photograph, analysts determine that the shadow is 80 ft. long.  How tall is the building (to the nearest foot)?  Draw a diagram and use the proper trigonometric ratio to solve.