

Do the following problems as indicated.

1. Find the exact values of the six trigonometric functions of angle θ in standard position.

- a. $(-8, -15)$ is on the terminal side of θ . c. $\tan \theta = 7$, θ in quadrant III
 b. Equation of terminal side of θ is $6x + 7y = 0$, $x \leq 0$.

2. Evaluate each expression. Give exact values.

- a. $4 \csc 270^\circ - 3 \cos 180^\circ$ d. $\cos^2 30^\circ + \sec^2 45^\circ$
 b. $2 \sin^2 90^\circ + 5 \tan^2 360^\circ$ e. $5 \cot 60^\circ - 3 \csc 30^\circ \cos 45^\circ$
 c. $3 \tan 330^\circ - 2 \sin 240^\circ + 5 \sec 135^\circ$ f. $8 \sin 300^\circ \cos 300^\circ$

3. Find a value for θ .

- a. $\sin(4\theta + 2^\circ) \csc(3\theta + 5^\circ) = 1$ c. $\sec(5\theta + 2^\circ) = \csc(2\theta + 4^\circ)$
 b. $\tan(3\theta - 4^\circ) = \frac{1}{\cot(5\theta - 8^\circ)}$ d. $\cot(3\theta + 4^\circ) = \tan(5\theta - 10^\circ)$

4. Decide whether each statement is possible or impossible.

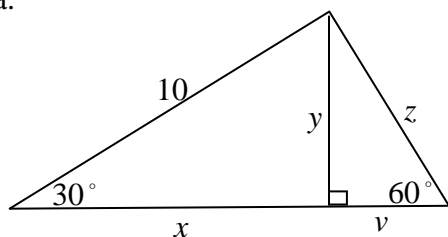
- a. $\sec \theta = -0.8975$ b. $\tan \theta = 100$ c. $\sin \theta + 1 = .0023$

5. Use identities to find each function value.

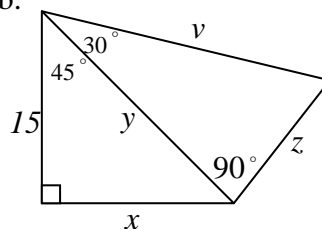
- a. $\csc \theta$, if $\cot \theta = -\frac{1}{2}$ with θ in quadrant II c. $\sin \theta$ if $\cos \theta = -\frac{1}{4}$, θ is in QIII
 b. $\tan \theta$ if $\sin \theta = -.49783$, θ in QIV (use a calculator)

6. Find exact values of x, y, z, v in each figure.

a.



b.



7. Use a calculator to find a decimal approximation for each value, accurate to four decimal places.

- a. $\sin 250^\circ 25'$ c. $\cos(-110.987^\circ)$ e. $\tan(-67^\circ 18')$
 b. $\csc 4190^\circ$ d. $\sec(-516^\circ 33')$ f. $\cot 279^\circ 18' 38''$

8. Find a value of θ in $[0^\circ, 90^\circ]$ that satisfies each statement.

- a. $\tan \theta = 5.6$ c. $\sec \theta = 4.567$ e. $\sin \theta = .0981$
 b. $\cos \theta = .9106$ d. $\cot \theta = 19$ f. $\csc \theta = 16$

9. Solve each right triangle. In each case, $C = 90^\circ$.

- a. $B = 70.65^\circ$, $b = 125$ in b. $A = 53^\circ$, $c = 340$ cm c. $b = 219$ m, $c = 647$ m

10. A guy wire 77.4 meters long is attached to the top of an antenna mast that is 71.3 meters high. Find the angle that the wire makes with the ground.
11. Convert decimal degrees to degrees, minutes, seconds, and convert degrees, minutes, seconds to decimal degrees. Round to the nearest second or the nearest thousandth of a degree, as appropriate.
- a. 36.736° b. $56^\circ 40' 45''$ c. 112.085° d. $212^\circ 49' 25''$
12. Find the angle of smallest possible measure co-terminal with given angle.
- a. 435° b. 789° c. 1293°
13. A pulley is rotating 280 times per minute. Through how many degrees does a point on the edge of the pulley move in two seconds?
14. The propeller of a speedboat rotates 840 times per minute. Through how many degrees will a point on the edge of the propeller rotate in 5 seconds?
15. The angle of depression from the top of a building to a point on the ground is $36^\circ 35'$. How far is the point on the ground from the top of the building if the building is 256 meters high?
16. Two lighthouses are located on a north-south line. From lighthouse A, the bearing of a ship 3742 meters away is $129^\circ 43'$. From lighthouse B, the bearing of the ship is $39^\circ 43'$. Find the distance between the lighthouses.
17. Radio direction finders are set up at two points A and B , which are 2.5 miles apart on an east-west line. From A , it is found that the bearing of a signal from a radio transmitter is $N 36^\circ 20' E$, while from B , the bearing of the same signal is $N 53^\circ 40' W$. Find the distance of the transmitter from B .
18. The angle of elevation from Lone Pine to the top of Mt. Whitney is $10^\circ 50'$. Van Dong Le, traveling 7 km from Long Pine along a straight, level road toward Mt. Whitney, finds the angle of elevation to be $22^\circ 40'$. Find the height of the top of Mt. Whitney above the level of the road.
19. Find h as indicated in the figure.

