

8.1-8.2-8.3: Right Triangle Trigonometry, Law of Sines, and Law of Cosines

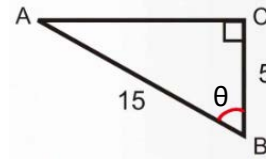
Set up and label a diagram. Show your equation(s) you need to use to solve the problem. Solve the equations and circle the answers. *Show all work for credit!!*

1. Write the six trig functions of the angle θ in the figure. Give an exact value with a rational denominator.

$\sin \theta$ _____ $\csc \theta$ _____

$\cos \theta$ _____ $\sec \theta$ _____

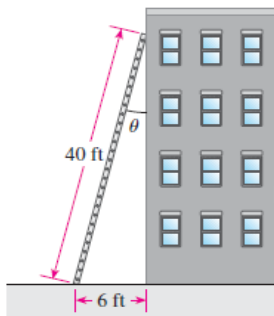
$\tan \theta$ _____ $\cot \theta$ _____



2.

A 40-ft ladder leans against a building. If the base of the ladder is 6 ft from the base of the building, what is the angle formed by the ladder and the building?

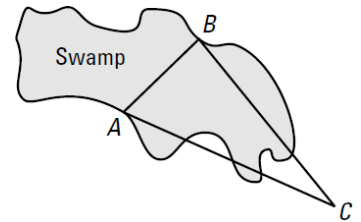
Round to the nearest degree. Off hand, would this ladder be safe to climb???



3. From the top of a 200-ft. lighthouse, the angle of depression to a ship in the ocean is 23° . How far is the ship from the base of the lighthouse? Round to the nearest foot.

4. To find the distance AB across a river, a distance $BC = 354\text{ m}$ is measured off on one side of the river. It is found that $\angle ABC = 112^\circ$ and $\angle BCA$ is 15.33° . Find AB. Round to nearest meter.

5. Some students in Geometry are assigned the task of measuring the distance between two trees separated by a swamp. The students determine that the angle formed by tree A , a dry point C , and tree B is 27° . They also know that $m\angle ABC$ is 85° . If AC is 150 ft, how far apart are the trees? Round to nearest foot.



6. To determine the distance RS across a deep canyon, Joanna measures a distance $TR = 582$ yd. She then finds that $\angle STR = 32.83^\circ$ and $\angle SRT = 120.33^\circ$. Find RS , round to the nearest yd. AND What is the area of RST ? Round to nearest square yard.

7. Two lookout towers, L and M , are 50 kilometers apart. The ranger in Tower L sees a fire at point C such that $m\angle CLM = 40^\circ$. The ranger in Tower M sees the same fire such that $m\angle CML = 65^\circ$. How far is the fire from Tower L ? Round to the nearest kilometer.

8. A ship is sailing due north. At a certain point the bearing of a lighthouse is 12.5 km away is $N 38.8^\circ E$. Later on, the captain notices that the bearing of the lighthouse has become $S 44.2^\circ E$. How far did the ship travel between the two observations of the lighthouse? Round to the nearest tenth kilometer.

9. The Vietnam Veteran's Memorial in Washington D.C. is in the shape of an unenclosed isosceles triangle (V-shaped) with equal sides of length 246.75 feet and the angle between these sides measuring 125.2° . Find the distance between the ends of the two equal sides. Round to the nearest foot.

10. A boy is flying two kites at the same time. He has 380 ft of line out to one kite and 420 ft to the other. He estimates the angle between the two lines to be 30° . Approximate the distance between the kites. Round to nearest foot.

11. Two radar stations 2.4 miles apart are tracking an airplane. The straight-line distance between Station A and the plane is 7.4 miles. The straight-line distance between Station B and the plane is 6.9 miles. What is the angle of elevation from Station A to the plane? Round to the nearest degree.

12-15 Complete the triangle using the Law of Sines or Cosines (suggestion draw a picture). Round to two decimal places.

12. $a = 75$, $b = 100$, $\angle A = 30^\circ$

13. $a = 20$, $b = 25$, $c = 22$

14. $a = 50$, $b = 100$, $\angle A = 50^\circ$

15. $a = 100$, $b = 80$, $\angle A = 135^\circ$

16. Find the area of the triangle whose sides have the given lengths:

$a = 5$, $b = 7$, $c = 8$

Use the following information to answer questions 17-19.

You are watching a fireworks display where you are standing 290 feet behind the launch pad. The launch tubes are aimed directly away from you at an angle of 65° with the ground. The angle for you to see the fireworks is 40° .

17. To the nearest foot, what is the horizontal distance from the launch pad to the point where the fireworks explode?

18. To the nearest foot, what is the height of the fireworks when they explode?

19. What is the measure of angle A?