

6.1-6.2 Law of Sines/Cosines Applications Worksheet

Set up and label a diagram. Then show the equation(s) you can use to solve the problem. Finally, solve it! Give your answers with lengths rounded to 4 significant digits, angles in degree/minute/second form rounded to whole numbers.

1. To find the distance AB across a river, a distance BC = 354m is measured off on one side of the river. It is found that $m\angle ABC = 112^\circ$ and $m\angle BCA = 15^\circ 20'$. Find AB. What is the area of triangle ABC?
2. The sides of a parallelogram are 4.0cm and 6.0cm. One angle is 58° while another is 122° . Find the lengths of the diagonals of the parallelogram.
3. From points P and Q, 180 meters apart on an east-west line, a tree is sighted on the opposite side of a deep ravine. From point P, a compass indicates that the bearing of the tree is 27° . From Q, the bearing of the tree is 43° . How far from P is the tree? (Note: pay attention to what order P and Q must be in)
4. To determine the distance RS across a deep canyon, Joanna measures a distance TR = 582 yd. She then finds that $m\angle STR = 32^\circ 50'$ and $m\angle SRT = 102^\circ 20'$. Find RS. What is the area of the triangle RST?
5. A baseball diamond is a square, 90ft on a side, with home plate and the three bases as vertices. The pitcher's rubber is located 60.5ft from home plate on a direct line from home to second base. Find the distance from the pitcher's rubber to each of the bases.

6. The Vietnam Veterans' Memorial in Washington, D.C. is in the shape of an unenclosed isosceles triangle (that is, V-shaped) with equal sides of length 246.75 feet and the angle between these sides measuring $125^{\circ}12'$. Find the distance between the ends of the two equal sides.
7. A parallelogram has a side of length 40 and a diagonal of length 75. If the angle between these two is 37° , find the length of the other side of the parallelogram.
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?
9. Two airplanes have elevations of 23,000 feet and 18,000 feet. Both are flying east toward an airport control tower. The plane with the higher elevation is closer to the airport than the second plane. From the control tower, the angle of elevation of the plane closest to the airport is 4° and the angle of elevation of the second plane is 2.5° . How many miles apart are the planes? (5280 feet = 1 mile)
10. The bearing of a lighthouse from a ship was found to be $N 37^{\circ} E$. After the ship sailed 2.5 miles due south, the new bearing was $N 25^{\circ} E$. Find the distance between the ship and the lighthouse at each location.