

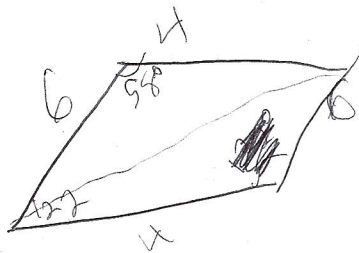
Law of Sines/Law of Cosines Review

2,5-7,9-13

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 = 354 m is measured off on one side of the river. It is found that $m\angle ABC = 112^\circ 10'$ and $m\angle BCA = 15^\circ 20'$. Find AB.

2. The sides of a parallelogram are 4.0 cm and 6.0 cm. One angle is 58° while another is 122° . Find the lengths of the diagonals of the parallelogram.



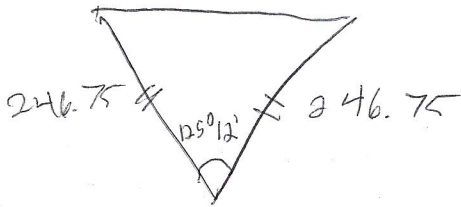
$$\begin{aligned} \sqrt{d_1^2} &= \sqrt{6^2 + 4^2 - 2(6)(4) \cos 122} \\ \sqrt{d_2^2} &= \sqrt{4^2 + 6^2 - 2(4)(6) \cos 58} \end{aligned}$$

$$d_1 = 8.8 \text{ cm} \quad d_2 = \cancel{5.4} 15.154 \text{ cm}$$

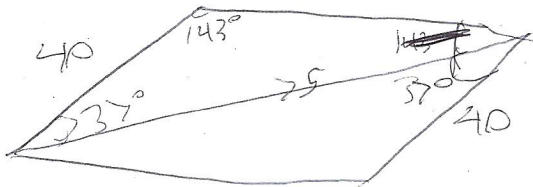
3. To determine the distance RS across a deep canyon, Joanna measures a distance TR = 582 yd. She then finds that $m\angle STR = 32^\circ 50'$ and $m\angle SRT = 102^\circ 20'$. Find RS.

4. A baseball diamond is a square, 90 ft on a side, with home plate and the three bases as vertices. The pitcher's rubber is located 60.5 ft from home plate on a direct line from home to 2nd. Find the distance from the pitcher's rubber to each of the bases.

5. 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.



6. A parallelogram has a side of length 40 and a diagonal of length of 75. If the angle between these two is 37° , find the length of the other side of the parallelogram.



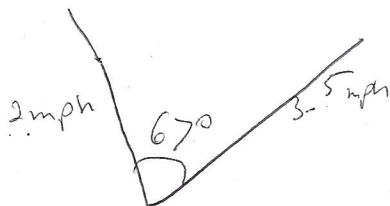
$$\begin{array}{r} 140 \\ 37 \\ \hline 143 \end{array}$$

$$75^2 =$$

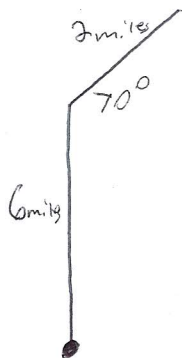
7. A ship is sailing due north. At a certain point the bearing of a lighthouse 12.5 km away is $N 38.8^\circ E$. Later on, as the ship has traveled further north, the captain notices that the bearing of the lighthouse has become $S 44.2^\circ E$. How far did the ship travel between the two observations of the lighthouse?
8. 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.
9. Two boats leave a dock together. Each travels in a straight line. The angle between their courses measures $54^\circ 10'$. One boat travels 36.2 km per hr, and the other travels 45.6 km per hr. How far apart will they be after 3 hours?

10. A property is described as follows: From a granite post, proceed 195 feet east along Hill Road, then turn and head along a bearing of $S 32^\circ E$ for 260 feet. Then head directly back to the granite post. What is the area, in square feet, of this property?

11. Two hikers are following a trail that separates into two forks. Each hiker takes a different fork. The forks diverge at an angle of 67° . If the first hiker walks at a speed of 3.5 mph and the second hiker walks at a speed of 2 mph, how far apart are the hikers after 2 hours?



12. Sam first walks 6 miles due north, then 2 miles at $N 70^\circ E$. How far is he from his starting point?



13.

A pilot travels to a city by going due north at 325 mph for 30 minutes, then turning and going N 40° W at 300 mph for 45 minutes. If he were to fly directly there instead, what bearing should he use?

14.

In the problem above, if he is to fly directly there at a speed of 350 mph, how long would the trip take?