PRECALCULUS PROBLEM SESSION #13

The Law of Sines

1. Explain why the law of sines cannot be used to find the first angle when solving a triangle given three sides.
2. Explain why we cannot solve a triangle given SAS with the law of sines.
3. Solve each triangle. Round lengths to the nearest tenth and angle measures to the nearest degree.
   a. $A = 56°, C = 24°, c = 22$ b. $B = 80°, C = 10°, a = 8$
4. Two sides and an angle (SSA) of a triangle are given. Determine whether the given measurements produce one triangle, two triangles, or no triangle at all. Solve each triangle that results. Round to the nearest tenth and the nearest degree for all sides and angles.
   a. $a = 30, b = 20, A = 50°$ b. $a = 30, b = 40, A = 20°$
5. A surveyor needs to determine the distance between two points that lie on opposite banks of a river. The figure shows that 300 yards are measured along one bank. The angles from each end of this line segment to a point on the opposite bank are 62° and 53°. Find the distance between *A* and *B* to the nearest tenth of a yard. (Figure 1)
6. A pier forms an 85°angle with a straight shore. At a distance of 100 feet from the pier, the line of sight to the top forms a 37° angle. Find the length of the pier to the nearest tenth of a foot. (Figure 2)
7. A leaning wall is inclined 6° from the vertical. At a distance of 40 feet from the wall, the angle of elevation to the top is 22°. Find the height of the wall to the nearest tenth of a foot. (figure 3)

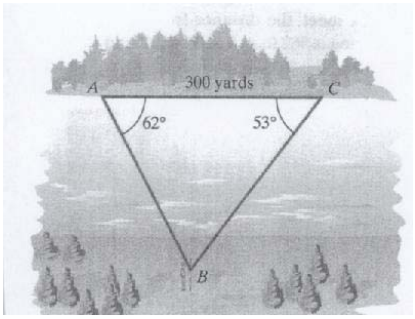


Figure 1

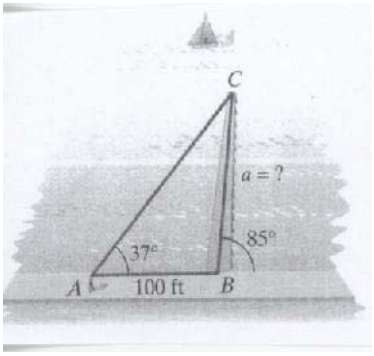


Figure 2

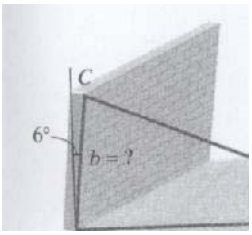


Figure 3

8. The law of sines is sometimes expressed as $\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin\gamma}$. Explain whether any restrictions should be placed on variables in the denominators.

The Law of Cosines

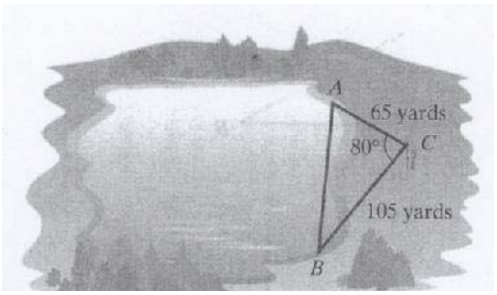
1. To solve a right triangle means to find the measures of the unknown sides and angles, when some measures of the triangle are known. Summarize the combinations of sides and angles of a right triangle that must be known to yield a solution.
2. Solve each triangle. Round lengths to the nearest tenth and angle measures to the nearest degree.
   a. $a = 10, b = 3, C = 15°$ b. $a = 4, b = 6, c = 9$ c. $\alpha = 50°$, $a = 8$, $c = 10$
3. Explain why the following triangles are impossible:
   a. $\alpha = 46.5°$, $a = 7.9$ mm, $b = 13.1$ mm b. $\alpha = 123°$, $a = 101$ m, $b = 150$ m

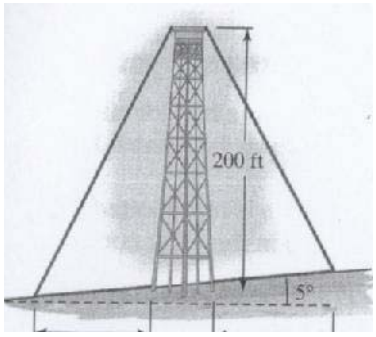
Selected problems were taken from Blitzer's PreCalculus

4. To find the distance across a protected cove at a lake, a surveyor makes the measurements shown in the figure. Use these measurements to find the distance from A to B to the nearest yard.

5. The figure shows a 200-foot tower on the side of a hill that forms a 5° angle with the horizontal. Find the length of each of the two guy wires that are anchored 150 feet uphill and downhill from the tower's base and extend to the top of the tower. Round to the nearest tenth of a foot.

6. A Little League baseball diamond has four bases forming a square whose sides measure 60 feet each. The pitcher's mound is 46 feet from home plate on a line joining home plate and second base. Find the distance from the pitcher's mound to third base. Round to the nearest tenth of a foot.





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