

# Law of Sines and Cosines Word Problems

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1. During a figure skating routine, Jackie and Peter skate apart with an angle of  $15^\circ$  between them. Jackie skates for 5 meters and Peter skates for 7 meters. How far apart are the skaters?
2. A bridge is supported by triangular braces. If the sides of each brace have lengths 63 feet, 46 feet, and 40 feet, find the measure of the angle opposite the 46 foot side.
3. Two observers are standing on shore  $\frac{1}{2}$  mile apart at points A and B and measure the angle to a sailboat at a point C at the same time. Angle A is  $63^\circ$  and angle B is  $56^\circ$ . Find the distance from each observer to the sailboat.
4. A vertical flagpole is attached to the top edge of a building. A man stands 400 feet from the base of the building. From his viewpoint, the angle of elevation to the bottom of the flagpole is  $60^\circ$ ; to the top is  $62.5^\circ$ . Determine the height of the flagpole.

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5. On a map, Orlando is 178 mm due south of Niagara Falls, Denver is 273 mm from Orlando, and Denver is 235 mm from Niagara Falls. Find the angle at Niagara Falls.
6. Nicole shines a light from a window of a lighthouse on a cliff 250 feet above the water level. Nick, 10 feet above the water level in a ship off shore, finds that the angle of elevation of the light is  $3^\circ$ . Find the length of the line of sight (light beam) from the ship to Nicole. Round to the nearest tenth.
7. Fire towers A and B are located 10 miles apart. Rangers at fire tower A spot a fire at  $42^\circ$ , and rangers at fire tower B spot the same fire at  $64^\circ$ . How far from tower A is the fire to the nearest tenth of a mile?