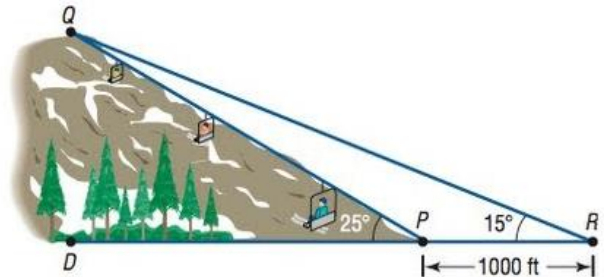


Precalculus Unit 9: 9.1-9.2
Law of Sines/Law of Cosines Applications
(20 points)

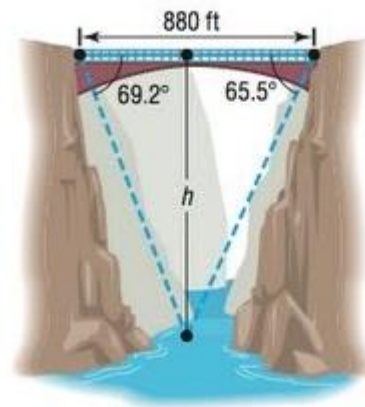
For each of the following problems, find the indicated values. If a diagram is not provided, draw one. Everyone in your group must be on the same problem at the same time – no working ahead.

1. Consult the figure. To find the length of the span of a proposed ski lift from P to Q, a surveyor measures the angle DPQ to be 25° and then walks off a distance of 1000 feet to R and measures the angle PRQ to be 15° . What is the distance from P to Q, the length of the lift? (2 points)

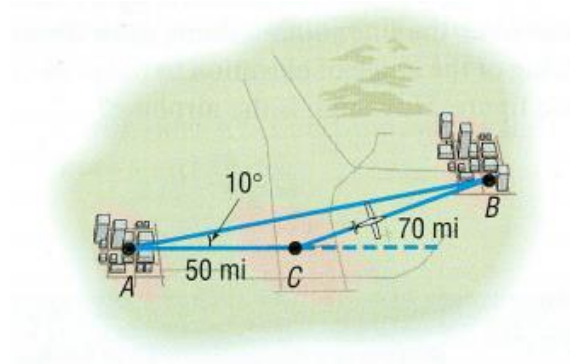


What is the length of QD, the height of the mountain?

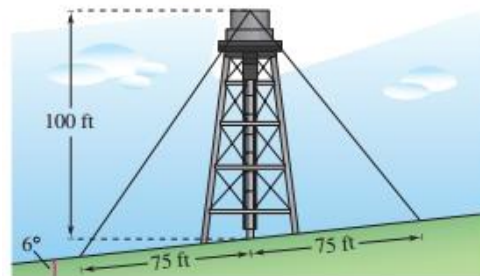
2. The highest bridge in the world is the bridge over the Royal Gorge of the Arkansas River in Colorado. Sightings to the same point at water level directly under the bridge are taken from each side of the 880 ft long bridge, as indicated in the figure. How high is the bridge? (2 points)



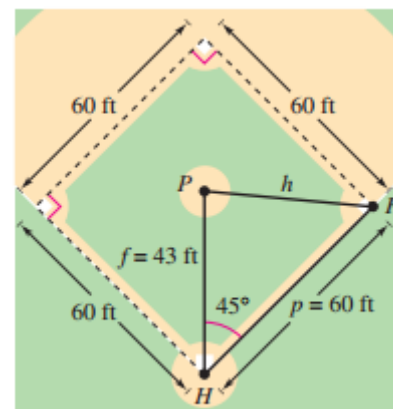
3. In attempting to fly from city A to city B, an aircraft followed a course that was 10° in error, as indicated in the figure. After flying a distance of 50 miles, the pilot corrected the course by turning at point C and flying 70 miles farther. If the constant speed of the aircraft was 250 miles per hour, how much time was lost due to the error? (2 points)



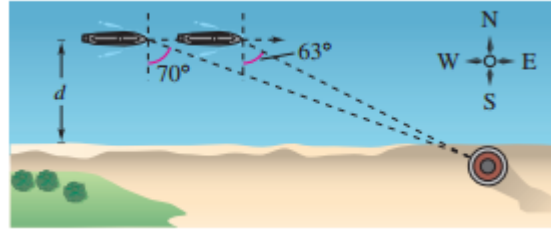
4. A 100 foot vertical tower is to be erected on the side of a hill that makes a 6° angle with the horizontal (see figure). Find the length of each of the two guy wires that will be anchored 75 feet uphill and downhill from the base of the tower. (2 points)



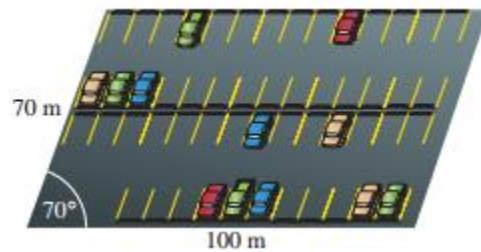
5. The pitcher's mound on a softball field is 43 feet from home plate and the distance between the bases is 60 feet as shown in the figure. (The pitcher's mound is NOT halfway between home plate and second base). How far is the pitcher's mound from first base? (1 point)



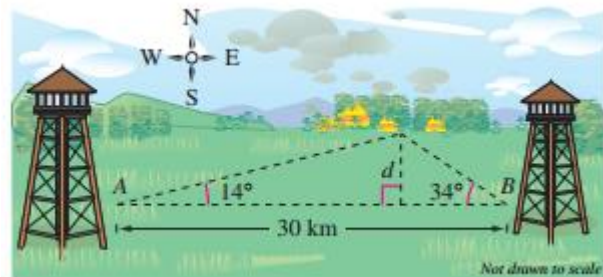
6. A boat is sailing due east parallel to the shoreline at a speed of 10 miles per hour. At a given time the bearing to the lighthouse is S 70° E, and 15 minutes later the bearing is S 63° E (see figure). The lighthouse is located at the shoreline. Find the distance from the boat to the shoreline. (2 points)



7. A parking lot has the shape of a parallelogram (see figure). The lengths of two adjacent sides are 70 meters and 100 meters. The angle between the two sides is 70° . What is the area of the parking lot? (1 point)



8. Two fire towers are 30 km apart, where tower A is due west of tower B. A fire is spotted from the towers, and the bearings from A and B are E 14° N and W 34° N, respectively. Find the distance d of the fire from the line segment AB. (2 points)



9. While hiking on a level path toward Colorado's front range, Mr. Tapp determines that the angle of elevation to the top of Long's Peak is 30° . Moving 1000 feet closer to the mountain, Mr. Tapp determines the angle of elevation to be 35° . How much higher is the top of the mountain than Mr. Tapp's elevation? (2 points)

10. Create an application problem that utilizes the law of sines or the law of cosines other than the ones that have been given previously and solve it. Put some thought into this, it could become a test question! (2 points)

11. Find the area of the following quadrilateral. (2 points)

