

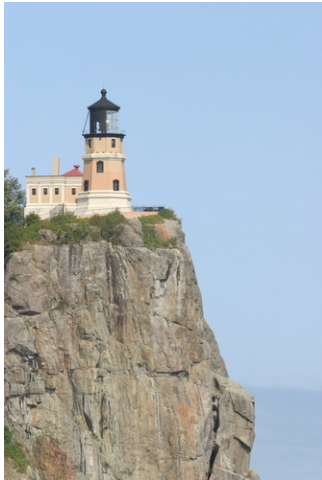
Unit 5 – Review – Applications of Trigonometry

1. Draw a right angle triangle with a base of 10 cm and a height of 7 cm. Determine the length of the hypotenuse and its angle of elevation.
2. Draw a right angle triangle with a hypotenuse of 16 km at an angle of elevation of 22 degrees. Determine the base and height of this triangle.
3. Determine the slope of a ramp that is inclined at an angle of 14 degrees.

- A hiker faced west, then turned 28° towards the south, and walked 4.5 km along a straight path. Determine how far west the hiker travelled and how far south the hiker travelled.
- A ramp is being designed to rise 7 ft over a horizontal distance of 25 ft. Determine the length of the ramp, and its angle of elevation.

- Determine the horizontal distance required for a ramp to rise 2 m at an angle of elevation of 12 degrees.
- Determine the necessary length of a guy wire that will be attached to a radio communication tower at a height of 18 m above the ground if it must make an angle of 54° with the ground at the point where it is anchored.
- Determine the necessary length of a guy wire that will be attached to a radio communication tower if it must make an angle of 42° with the ground where it is anchored 11 m away from the base of the tower.

9. The observation deck of Split Rock Lighthouse is located about 175 ft above the water level on Lake Superior. From the observation deck, a capsized sailboat is located at an angle of depression of 12° . How far is the sailboat horizontally from the lighthouse? Include a clear diagram with your solution.



10. While site-seeing at Multnomah Falls in Oregon State, two math students stood at opposite ends of the 45 ft long footbridge and measured angles of depression of 62° and 50° to a point at the edge of the river below them. Determine the height of the bridge above the river.



11. An air control tower is tracking two airplanes approaching an airport. The control tower measures an angle of 56° between the two planes when one of them is 270 km from the airport and the other is 410 km from the airport. How far are the planes from each other at this moment?

12. On the first hole of a golf course, an over-confident math teacher tries to hit his tee shot the entire distance of 255 yards from the tee to the green. Unfortunately, he slices his shot and watches it drift 36° to the right of his target. When he reaches his ball, he prepares for his second shot by measuring an angle of 81° between the tee and the green. How far must he hit his second shot in order to land on the green?

13. The second hole of the golf course, the math teacher manages to reduce his slice a little bit, but his tee shot still travels 29° to the right of his target. He forgets to check the distance from the tee to the green, but he measures a distance of 180 yards from the tee to his ball on the edge of the fairway. From this location, he measures an angle of 87° between the tee and the green. How far must he hit his second shot this time in order to land on the green?

14. The third hole of the golf course is longer, at 310 yards from the tee to the green. But the fairway is wide and flat so the math teacher decides to take out his Big Bertha driver and try for record-distance on his tee shot. He makes excellent contact with the ball, but his smile quickly turns to a frown as he watches his drive hook 42° to the left of his target. Despite this inaccuracy, his ball travelled 250 yards before coming to rest. How much distance remains between his ball and the green?

15. The fourth hole of the golf course is only 220 yards from tee to green, but there is a large pond directly in front of the green. The math teacher decides to play it safe this time, and he hits a careful approach shot safely onto the fairway to the right of the pond. He walks 170 yards to where his ball lies on the fairway, and then he measures an angle of 74° between the tee and the green. How far must his next shot travel to reach the green?

16. On the fifth hole of the golf course, the math teacher decides to stick with his strategy of sacrificing accuracy for distance. He hits a satisfying drive, and measures a distance of 290 yards from the tee to the location where his ball comes to rest on the fairway. Next, he strikes a brilliant approach shot to the centre of the green. He paces out this shot and determines that it travelled 205 yards. If the straight-line distance from the tee to the green was 340 yards, at what angle did he slice his first shot on this hole?

Answers:

1. The hypotenuse is 12.2 cm long at an angle of 35 degrees above horizontal.
2. The base is 14.8 km and the height is 6.0 km.
3. The slope is approximately 0.25.
4. The hiker travelled 4.0 km west and 2.1 km south.
5. The ramp is approximately 26 ft long at an angle of 15.6° above horizontal.
6. The ramp will require a horizontal distance of 9.4 m.
7. The guy wire must be 22.25 m long.
8. The guy wire must be 14.8 m long.
9. The sailboat is approximately 823 ft away, horizontally, from the lighthouse.
10. The bridge is 32.8 ft above the river, based on these measurements.
11. The planes are 342 km from each other at this moment.
12. His second shot must travel 152 yards.
13. His second shot must travel only 97 yards on this hole.
14. His ball lies 208 yards from the green.
15. His next shot must travel 194 yards.
16. He had sliced his first shot 37° off target on this hole.