SM3 Application Problems Using Trigonometry
2023-2024

SCORE:

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Name _____ Date _____ Period _____

Solve. Draw a diagram and show all your work. Round all answers to the nearest <u>tenth</u> if necessary.

1. From a boat on the lake, the angle of elevation to the top of a cliff is 12°. If the base of the cliff is 1,366 feet from the boat, how high is the cliff?

2. When sitting atop a tree and looking down at his pal Joey, the angle of depression of Mack's line of sight is 38°. If Joey is known to be standing 39 feet from the base of the tree, how tall is the tree?

3. Two, fire-lookout stations are 15 miles apart, with station B directly west of station A. Both stations spot a fire. The bearing of the fire from station A is S28°W and the bearing of the fire from station B is S49°E. How far, to the nearest tenth of a mile, is the fire from each lookout station?

4. A wire to a tower makes a 65° angle with level ground. At a point 39 feet farther from the tower but on the same side as the base of the wire, the angle of elevation to the top of the tower is 36°. Find the length of the wire.

5. Two observers are 450 feet apart on opposite sides of a flagpole. The angles of elevation from the observers to the top of the flagpole are $23°$ and $25°$. Find the height of the flagpole to the nearest foot.

6. Points A and B are on opposite sides of a lake. Point C is 109.8 meters from A. The measure of $\angle BAC = 72°$ and the measure of $\angle ACB = 40°$. Find the distance between points A and B.

7. The dimensions of a triangular flag are 15 inches by 24 inches by 29 inches. To the nearest tenth, what is the measure of the angle formed by the two shorter sides?

8. An airplane leaves an airport and flies due west150 miles and then 230 miles in the direction S 39.67° W. How far is the airport from the plane's final destination?

9. Two observers are 2.4 miles apart on opposite sides of a hot-air balloon. The angle of elevation from observer A is 30° and the angle of elevationfrom observer B is 35°. Find the altitude (height) of the balloon to the nearest tenth of a mile.

10. A building has a ramp to its front door to accommodate persons with disabilities. If the distance from the building to the end of the ramp is 18 feet and the height of the ramp from the ground to the front doors is 7 feet, how long is the ramp?

11. On a sunny day, a building and its shadow for the sides of a right triangle. If the hypotenuse is 34 m long and the shadow is 24 m, how tall is the building?

12. A surveyor needs to determine the distance between two points that lie on opposite banks of a river. Two points, A and C, along one bank are 250 yards apart. The point B is on the opposite bank. Angle A is 64° and angle C is 51°. Find the distance between A and B to the nearest tenth of a yard.

13. Two ships leave a harbor at the same time. One ship travels on a bearing of N14°E at 12 mph. The other ship travels on a bearing of S74°W at 9 mph. To the nearest tenth of a mile, how far apart will the ships be after three hours?