

NAME: _____

P.I. A.A.44: Find the measure of a side of a right triangle, given an acute angle and the length of another side

1. Draw a right triangle. Find the measure of one acute angle and one side. Use a trigonometric ratio to find the measure of another side. Show your work.
2. Write a problem that involves using the tangent ratio and uses any problem solving strategy. Include the solution.
3. Describe how you would choose whether to use sine, cosine, or tangent to find the length of the side of a right triangle given the measure of one angle and the length of one leg or the hypotenuse.
4. A right triangle has angles 15° , 75° , and 90° . The longer leg is 60 units, the shorter leg is x units, and the hypotenuse is y units. Write a paragraph describing how to find x and y .
5. What is an angle of elevation?
6. Describe how to use an angle of elevation or an angle of depression to find how high an extension ladder on a hook and ladder truck would reach on a building.
7. Suppose you are on a cliff and can measure the angles of depression to two ships that are due west. If you know the height of the cliff, how can you determine how far apart the ships are?

- Answers may vary. Sample: A right triangle has an acute angle of 25° and hypotenuse 10 m. The opposite side of the triangle is 4.23 m to the nearest hundredth. Check students drawings.
-

- Answers may vary. Sample: Suppose that an angle of elevation from a boat to a lighthouse is 30° . The boat is 125 feet from the lighthouse. How tall is the lighthouse? about 72 feet tall
-

- Check students' work. They should indicate that if they know the measure of an angle and the length of the hypotenuse, they should use sine or cosine, and if they know the measure of an angle and the length of a leg, they should first use the tangent to find the length of the other leg and then use sine or cosine (or the Pythagorean Theorem) to find the length of the hypotenuse.
-

- Answers may vary. Sample: solve the equation $\tan 15^\circ = \frac{x}{60}$ to find x . Then use the Pythagorean Theorem to find y .
-

- It is an angle from the horizontal up to a line of sight.
-

- Check students' work. They should describe using an angle of elevation and needing to know the angle the ladder makes with the horizontal and the length of the ladder. Students should also indicate the need to add the calculated height to the height the ladder sits off the ground.
-

- Use the tangent function to find the distance each ship is from the cliff and then subtract the distances.
-