

# Assignment

## Write

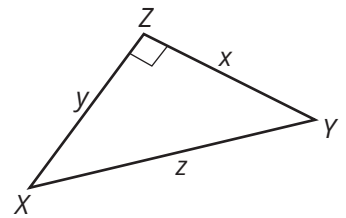
Describe the minimum side and angle measures you need to determine all the unknown measurements in a right triangle.

## Remember

The sine of an angle is equal to the cosine of its complement, the tangent of an angle is equal to the cotangent of its complement, and the secant of an angle is equal to the cosecant of its complement.

## Practice

1. Use  $\triangle XYZ$  to complete the table of ratios.



| Reference Angle | sin | cos | tan | csc | sec | cot |
|-----------------|-----|-----|-----|-----|-----|-----|
| $\angle X$      |     |     |     |     |     |     |
| $\angle Y$      |     |     |     |     |     |     |

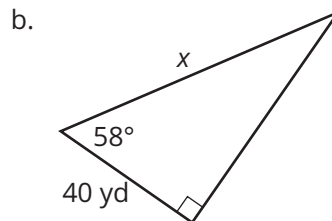
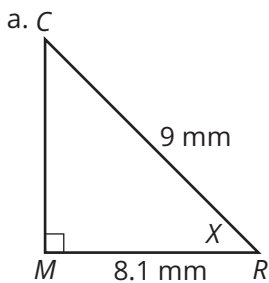
2. A pilot and co-pilot are performing a test run in a new airplane. The pilot is required to take off and fly in a straight path at an angle of elevation that is between  $33^\circ$  and  $35^\circ$  until the plane reaches an altitude of 10,000 feet. When the plane reaches 10,000 feet, the co-pilot will take over. Round each distance to the nearest tenth.
- Draw a figure to model this situation. Label the angle of elevation and the side opposite the angle of elevation. Label the side adjacent to the angle of elevation as  $x$  and the hypotenuse as  $y$ .
  - Determine the minimum and maximum horizontal distance between the point of takeoff and the point at which the co-pilot takes over.
  - What is the minimum distance that the pilot flies the plane? What is the maximum distance that the pilot flies the plane?

## Stretch

- A hot air balloon leaves the ground at 8 A.M. People on the ground watching the balloon are 250 meters from the take off point.
  - The people in the balloon wave when the angle of elevation of the balloon is  $25^\circ$ . How high up is the balloon? Round the distance to the nearest tenth.
  - The angle of elevation increases by  $6^\circ$ . How much further up is the balloon? Round the distance to the nearest tenth.
  - The balloon ascends another 24.9 meters. By how much did the angle of elevation increase?

## Review

- Use the cosine ratio, the secant ratio, or the inverse cosine to solve for  $x$ . Round the answer to the nearest tenth.



- Imani places a mirror 35 feet from the base of an Elm tree. When she stands at a distance of 4 feet from the mirror, she can see the top of the tree in the reflection. Imani is 5 feet 4 inches tall. Draw a diagram to represent the situation. Then, determine the height of the tree.
- Millie wants to know the distance between two points on a pond. She sets up triangles as shown in the figure. Determine the distance across the pond.
- Determine whether the triangles are similar. If so, write a similarity statement. Explain your reasoning.

