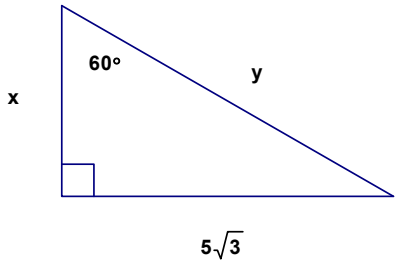
7.1

In this lesson, we'll solve problems involving triangles. We'll start by working with right triangles, but we will also solve problems involving oblique and acute triangles (triangles which do not contain a right angle).

Note that a calculator will be needed for most of the problems we will do in class. Test problems will involve angles for which no calculator is needed (e.g., $30°, 45°, 60°, 120°$, etc.). So you will still need those unit circle values.

Example 1: Use properties of special triangles to find *x* and *y*.



Example 2: Suppose *x* represents an acute angle in a right triangle. Use a calculator to find *x* and round to the nearest hundredth of a degree.

$$\tan(x) = \frac{12}{7}$$

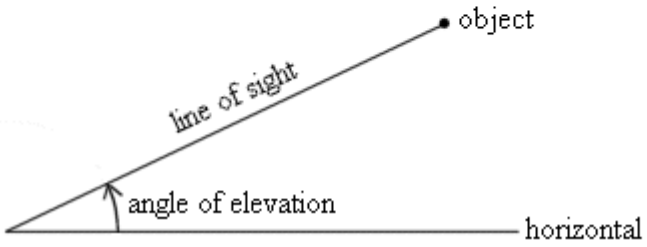
Example 3: In ΔABC with right angle *C*, $\angle A = 46°$ and $AC = 12$. Find *BC*. Round the answer to the nearest hundredth.

Example 4: An isosceles triangle has sides measuring 9 inches, 14 inches, and 14 inches. What are the measures of its angles?

Example 5: A 46 foot ladder is leaned against the side of a building. If the ladder forms a 41° angle with the ground, how high up the side of the building does the ladder reach?

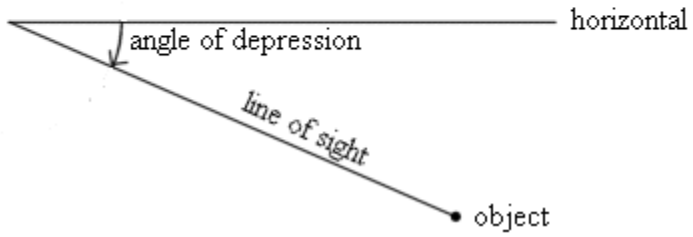
Angle of Elevation; Angle of Depression:

An angle of elevation is an angle that is formed by a horizontal ray and another ray above the horizontal. For example, in viewing an object at a point above the horizontal, the angle between the line of sight and the horizontal is the angle of elevation as shown in the figure below.



Example 6: The angle of elevation to the top of a building from a point on the ground 125 feet away from the building is **8°** . How tall is the building?

An angle of depression is an angle that is formed by a horizontal ray and another ray below the horizontal. For example, in viewing an object at a point below the horizontal, the angle between the line of sight and the horizontal is the angle of depression as shown in the figure below.



Example 7: The sonar of a navy cruiser detects a submarine that is 4000 feet from the cruiser. The angle between the water line and the submarine is 34 °. How deep is the submarine?