Trigonometric Functions

6.3 Applications of Right Triangle Trigonometry

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To *solve a triangle* means to find the measure of the three angles and three sides of the triangle.
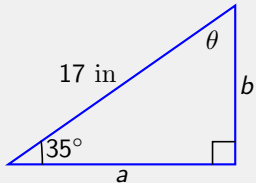
Definition: Significant Digits

The number of significant digits in a number is found by counting all of the digits from left to right starting with the first nonzero digit.

Significant digits are used to determine the precision of a measurement.

Solving a Right Triangle Given an Angle and a Side

Example
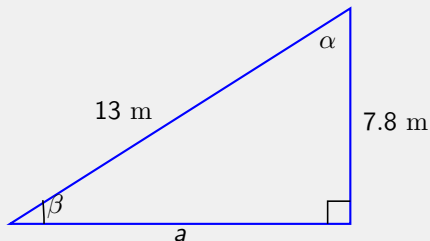
Solve the right triangle – find a, b, and θ.

Step 1: Determine accuracy:

Since the quantities, 17 in and 35°, are both expressed to two significant digits, we round all calculated values to two significant digits.
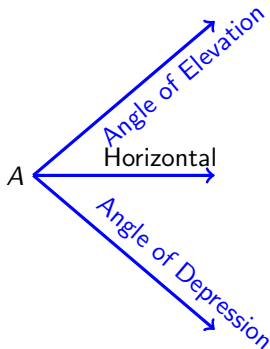
Solving a Right Triangle Given Two Sides

Example

Solve the right triangle – find a, α, and β.

Consider an observer (or point of reference) at A located on the horizontal and an object that is either above or below the horizontal.

Called **angle of inclination** if the angle is a physical one (e.g. skateboard ramp).

Example

Consider a mid-air refueling scenario that military aircraft often enact. Assume the elevation angle that the hose makes with the plane being refueled is $\theta = 36°$. If the hose is 150 feet long, what should be the altitude difference between the two planes? Round to the nearest foot.

Example

If the flagpole that a golfer aims at on a green measures 5 feet from the ground to the top of the flag and a golfer measures a $3°$ angle from top to bottom, how far (in horizontal distance) is the golfer from the flag? Round to the nearest foot.