

MA 7B	Mathematics Embedded Credit
Cape Career & Technology Center	Last Update: April 2017
Topic: Basic Geometry	Focus: Right Triangles (Pythagorean Theorem, Trigonometry)

Show-Me Standards: MA2, MA4	MO Grade Level Expectations: G1A9, G1A11, G2A8, G4B10	NCTM Standards: 8D, 10A
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OBJECTIVE: Students will be able to use basic right triangle geometry to solve problems.

Introduction:

An understanding of basic geometry concepts is essential in most career fields. In a number of career fields, basic geometry is vital to success. Perimeter, area and volume are the foundations for calculating required materials for many jobs. The beginning to understanding starts with basic definitions. The following definitions are essential to one's understanding of basic geometry:

PERIMETER: simply, the distance around.

AREA: simply, the surface covered by distinct parameters.

VOLUME: simply, the calculation of the area combined with the height, or thickness.

Here are some other important basic right triangle geometry definitions for understanding problem solving with basic right triangle geometry.

PLANES: the area defined by two-dimensional, flat surfaces.

INTERSECT: to cross.

PARALLEL: nonintersecting lines and/or planes. (The distance between straight, parallel lines/planes is the same at all locations.

ACUTE ANGLES: an angle that is less than 90-degrees.

RIGHT ANGLES: angles that measure 90-degrees. A right angle is often shown with a small square drawn in the corner of the angle.

OBTUSE ANGLE: an angle that is greater than 90-degrees.

PERPENDICULAR: lines or planes that together form a right angle. (Also called 'square'.)

ACUTE TRIANGLE: all three angles of the triangle are less than 90-degrees.

RIGHT TRIANGLE: the triangle has one right angle (equaling 90-degrees).

OBTUSE TRIANGLE: one angle of the triangle equals more than 90-degrees.

OBLIQUE TRIANGLE: a triangle that does not have a right triangle.

EQUILATERAL TRIANGLE: all sides and all angles are equal.

ISOSCELES TRIANGLE: two sides and two angles are equal.

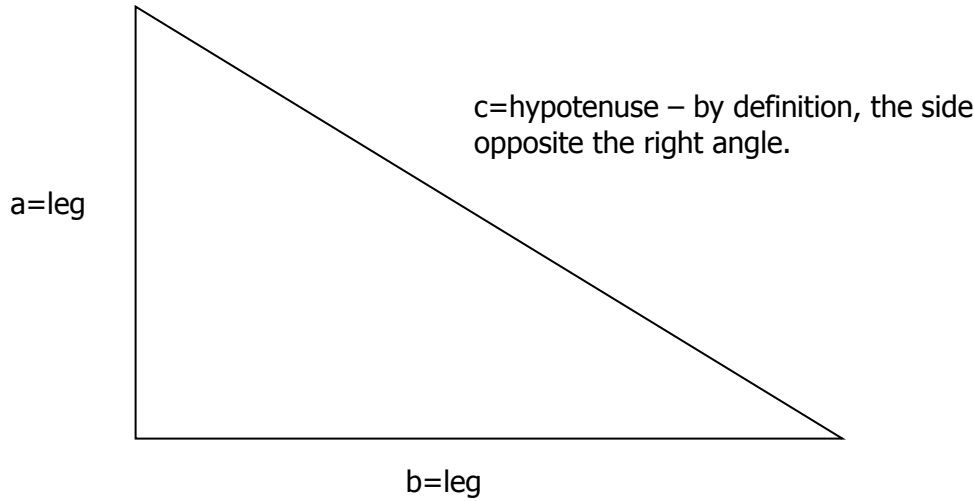
SCALENE TRIANGLE: no two sides and no two angles are equal.

Certain figures have specific rules that must be applied, and/or followed, when solving problems. This lesson will define rules related to Right Triangles.

Remember, the following characteristics of Triangles:

TRIANGLE:

A triangle is a three-sided figure. Each of the sides may be any length. The three inside angles of a triangle total 180-degrees when added together. A right triangle can be thought of as one-half of a rectangle. An 'oblique triangle' is a triangle that does not contain a right angle. There are two kinds of 'oblique triangles'. An 'obtuse triangle' has one angle that is greater than 90-degrees and an 'acute triangle' has all of its angles equal to less than 90-degrees. There are three types of triangles: Equilateral, Isosceles, and Scalene. An Equilateral Triangle has three equal sides, and three equal angles. An Isosceles Triangle has two equal sides, and two equal angles. A Scalene Triangle has no equal sides and no equal angles.



Pythagorean Theorem:

$$c^2 = a^2 + b^2, \text{ or}$$

$$a = \sqrt{c^2 - b^2}$$

$$b = \sqrt{c^2 - a^2}$$

$$c = \sqrt{a^2 + b^2}$$

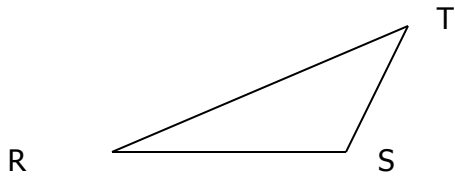
, where c is the hypotenuse.

OTHER IMPORTANT INFORMATION:

1. The sum of the angles of any triangle is 180-degrees.
2. The sum of the two acute angles of the right triangle is 90-degrees.
3. A triangle without a right angle (an 'oblique triangle') can be worked with by first creating two right triangles. Working from the known values, the two triangles can be solved and results combined to give the desired angles and sides of the oblique triangle.

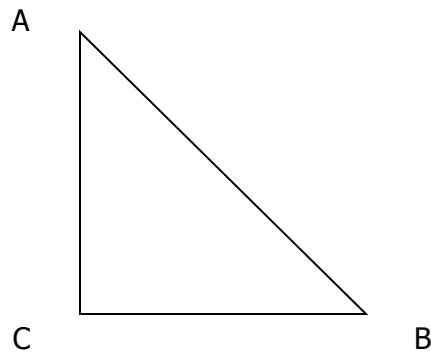
5. The length of one leg of a right triangle is 39m and the hypotenuse is 65m, what is the length of the other side of the triangle?

6. Find the measure of the remaining angle of the triangle.



Angle T = 27°
Angle R = 22°

7. Find the measure of Angle A given the right triangle.



Angle B = 38°