Objective

The student will be able to:

use the Pythagorean Theorem

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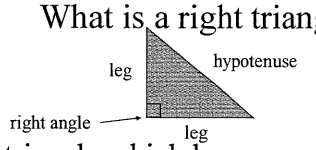
What is a right triangle?



It is a triangle which has an angle that is **90** degrees.

The two sides that make up the right angle are called **legs**.

The side opposite the right angle is the **hypotenuse**.

The Pythagorean Theorem

In a right triangle, if a and b are the measures of the legs and c is the hypotenuse, then

$\mathbf{a^2 + b^2 = c^2}$.

Note: The hypotenuse, c, is always the longest side.

Find the length of the hypotenuse if

1. a = 12 and b = 16.

$12^2 + 16^2 = c^2$

$144 + 256 = c^2$

$400 = c^2$

Take the square root of both sides.

$\sqrt{400} = \sqrt{c^2}$

20 = c

Find the length of the hypotenuse if

2. a = 5 and b = 7.

$5^2 + 7^2 = c^2$

$25 + 49 = c^2$

$74 = c^2$

Take the square root of both sides.

$\sqrt{74} = \sqrt{c^2}$

8.60 = c

Find the length of the hypotenuse given a = 6 and b = 12

1. 180
2. 324
3. ✓ 13.42
4. 18

Find the length of the leg, to the nearest hundredth, if

3. a = 4 and c = 10.

$4^2 + b^2 = 10^2$

$16 + b^2 = 100$

Solve for b.

$16 - \mathbf{16} + b^2 = 100 - \mathbf{16}$

$b^2 = 84$

$\sqrt{b^2} = \sqrt{84}$

b = 9.17

Find the length of the leg, to the nearest hundredth, if

4. c = 10 and b = 7.

$a^2 + 7^2 = 10^2$

$a^2 + 49 = 100$

Solve for a.

$a^2 = 100 - 49$

$a^2 = 51$

$\sqrt{a^2} = \sqrt{51}$

a = 7.14

Find the length of the missing side given a = 4 and c = 5

1. 1
2. ✓ 3
3. 6.4
4. 9

5. The measures of three sides of a triangle are given below. Determine whether each triangle is a right triangle.

$\sqrt{73}$, 3, and 8

Which side is the biggest?

The square root of 73 (= 8.5)! This must be the hypotenuse (c).

Plug your information into the Pythagorean Theorem. It doesn't matter which number is a or b.

Sides: $\sqrt{73}$, 3, and 8

$3^2 + 8^2 = (\sqrt{73})^2$

$9 + 64 = 73$

$73 = 73$

Since this is true, the triangle is a right triangle!! If it was not true, it would not be a right triangle.

Determine whether the triangle is a right triangle given the sides 6, 9, and $\sqrt{45}$

1. ✓ Yes
2. No
3. Purple