

Middle School Math COURSE 3
Chapter 9, Lesson 3, More Examples

Extra Example 1
for use before Example 1

Solving Equations Using Square Roots

Solve the equation $x^2 + y^2 = 36$ when $y = 5$.

Solution

$$x^2 + y^2 = 36$$

Write the equation.

$$x^2 + 5^2 = 36$$

Substitute 5 for y .

$$x^2 + 25 = 36$$

Evaluate the power.

$$x^2 + 25 - 25 = 36 - 25$$

Subtract 25 from each side.

$$x^2 = 11$$

Simplify.

$$x = \sqrt{11}$$

Definition of square root

$$x \approx \pm 3.32$$

Evaluate square roots.

Extra Example 2
for use after Example 3

Identifying Right Triangles

A triangle has side lengths of 12 meters, 16 meters, and 20 meters. Assuming the triangle is a right triangle, tell which lengths are the leg lengths and which length is the length of the hypotenuse. Then prove whether or not it is a right triangle.

Solution

In a right triangle, the hypotenuse is always the longest side of the triangle. Therefore, assuming the triangle is a right triangle, the leg lengths are 12 meters and 16 meters, and the length of the hypotenuse is 20 meters.

To prove whether or not the triangle is a right triangle, use the converse of the Pythagorean theorem:

If $a^2 + b^2 = c^2$, then the triangle is a right triangle.

$$a^2 + b^2 \stackrel{?}{=} c^2$$

Write equation to be tested.

$$12^2 + 16^2 \stackrel{?}{=} 20^2$$

Substitute 12 for a , 16 for b , and 20 for c .

$$144 + 256 \stackrel{?}{=} 400$$

Evaluate powers.

$$400 = 400 \checkmark$$

Simplify.

ANSWER $12^2 + 16^2 = 20^2$. Therefore, the triangle is a right triangle with legs of lengths 12 meters and 16 meters, and a hypotenuse of length 20 meters.