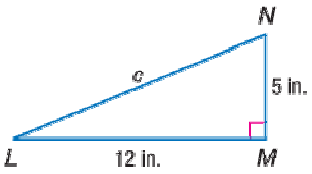
Lesson 11-3

Example 1

Find the length of the hypotenuse of triangle *LMN*.



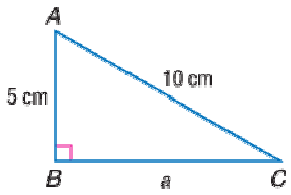
Solution

$c^2 = a^2 + b^2$ Use the Pythagorean Theorem.
$c^2 = 5^2 + 12^2$ Substitute 5 for a and 12 for b.
$c^2 = 25 + 144$
$c^2 = 169$
$\sqrt{c^2} = \sqrt{169}$ Take the square root of each side.
$c = \pm 13$ The length of the hypotenuse cannot be -13.

The length of the hypotenuse is 13 in.

Example 2

Find the length of $\overline{BC}$ to the nearest tenth.



Solution

$10^2 = 5^2 + n^2$ $c^2 = a^2 + b^2$
$100 = 25 + n^2$
$75 = n^2$ Subtract 25 from each side.
$\sqrt{75} = \sqrt{n^2}$ Take the square root of each side.
$\pm 8.6603 \approx n$ The length cannot be negative.

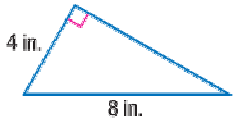
The length of $\overline{BC}$ is approximately 8.7 cm.

Example 3

ART The hypotenuse of a right triangle in a mosaic measures 8 in., and the shorter leg measures 4 in. What is the length of the longer leg of the triangle to the nearest tenth?

Solution

Draw a diagram of the problem. Use the Pythagorean Theorem to solve for the unknown length.



$c^2 = a^2 + b^2$

$8^2 = 4^2 + b^2$ Substitute 8 for c and 4 for a.

$64 = 16 + b^2$

$48 = b^2$ Subtract 16 from each side.

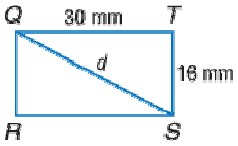
$\sqrt{48} = \sqrt{b^2}$

$\pm 6.928 \square b$ The height cannot be negative.

The length of the longer leg is approximately 6.9 in.

Example 4

What is the length of the diagonal of rectangle *QRST*?



Solution

Since the diagonal forms the hypotenuse of a right triangle, the Pythagorean Theorem can be used to solve the problem.

$d^2 = 16^2 + 30^2$

$d^2 = 256 + 900$

$\sqrt{d^2} = \sqrt{1156}$

$d = \pm 34$

The length of the diagonal of rectangle QRST is 34 mm.