LESSON 9.6

NAME _____ DATE _____

Reteaching with Practice

For use with pages 567–572

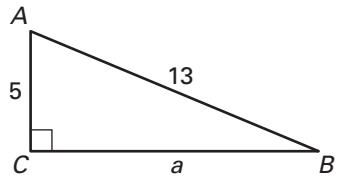
GOAL **Solve a right triangle**

VOCABULARY

To **solve a right triangle** means to determine the measures of all six parts (the right angle, the two acute angles, the hypotenuse, and the two legs).

EXAMPLE 1 Solving a Right Triangle

Solve the right triangle.



SOLUTION

Begin by using the Pythagorean Theorem to find the length of the missing side.

$(\text{hypotenuse})^2 = (\text{leg})^2 + (\text{leg})^2$ Pythagorean Theorem

$13^2 = a^2 + 5^2$ Substitute.

$169 = a^2 + 25$ Multiply.

$144 = a^2$ Subtract 25 from each side.

$12 = a$ Find the positive square root.

Then find the measure of $\angle B$.

$$\tan B = \frac{\text{opp.}}{\text{adj.}}$$

$$\tan B = \frac{5}{12}$$ Substitute.

$m\angle B \approx 22.6^\circ$ Use a calculator. (5 ÷ 12) 2nd TAN

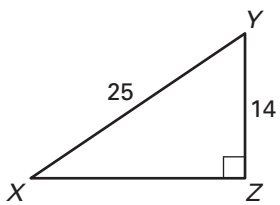
Finally, because $\angle A$ and $\angle B$ are complements, you can write $m\angle A = 90^\circ - m\angle B \approx 90^\circ - 22.6^\circ = 67.4^\circ$.

The side lengths of $\triangle ABC$ are 5, 12, and 13. $\triangle ABC$ has one right angle and two acute angles whose measures are about 22.6° and 67.4°.

Exercises for Example 1

Solve the right triangle.

1.



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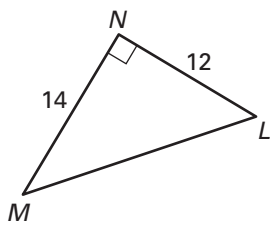

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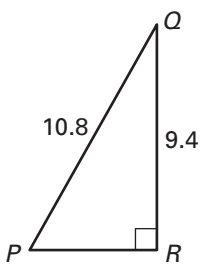

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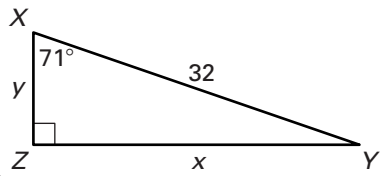
EXAMPLE 2 Solving a Right Triangle

Solve the right triangle.



SOLUTION

Use trigonometric ratios to find the values of x and y.

$$\sin X = \frac{\text{opp.}}{\text{hyp.}} \qquad \cos X = \frac{\text{adj.}}{\text{hyp.}}$$

$$\sin 71^\circ = \frac{x}{32} \qquad \cos 71^\circ = \frac{y}{32}$$

$$32 \sin 71^\circ = x \qquad 32 \cos 71^\circ = y$$

$$32(0.9455) = x \qquad 32(0.3256) = y$$

$$30.3 \approx x \qquad 10.4 \approx y$$

Because $\angle X$ and $\angle Y$ are complements, you can write

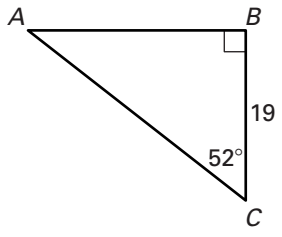
$m\angle Y = 90^\circ - m\angle x = 90^\circ - 71^\circ = 19^\circ$.

The side lengths of the triangle are about 10.4, 30.3, and 32. The triangle has one right angle and two acute angles whose measures are 71° and 19°.

Exercises for Example 2

Solve the right triangle.

4.



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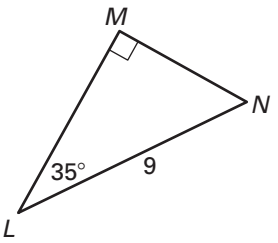

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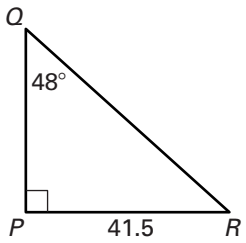

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