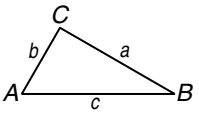
NAME _____ DATE _____ PERIOD _____

7-2 Study Guide and Intervention *(continued)*

The Pythagorean Theorem and Its Converse

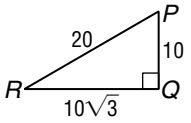
Converse of the Pythagorean Theorem If the sum of the squares of the measures of the two shorter sides of a triangle equals the square of the measure of the longest side, then the triangle is a right triangle.



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

If the three whole numbers a, b, and c satisfy the equation $a^2 + b^2 = c^2$, then the numbers a, b, and c form a **Pythagorean triple**.

Example **Determine whether $\triangle PQR$ is a right triangle.**



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

$10^2 + (10\sqrt{3})^2 \stackrel{?}{=} 20^2$ $a = 10$, $b = 10\sqrt{3}$, $c = 20$

$100 + 300 \stackrel{?}{=} 400$ Simplify.

$400 = 400$✓ Add.

The sum of the squares of the two shorter sides equals the square of the longest side, so the triangle is a right triangle.

Exercises

Determine whether each set of measures can be the measures of the sides of a right triangle. Then state whether they form a Pythagorean triple.

1. 30, 40, 50

2. 20, 30, 40

3. 18, 24, 30

4. 6, 8, 9

5. $\frac{3}{7}, \frac{4}{7}, \frac{5}{7}$

6. 10, 15, 20

7. $\sqrt{5}, \sqrt{12}, \sqrt{13}$

8. $2, \sqrt{8}, \sqrt{12}$

9. 9, 40, 41

A *family* of Pythagorean triples consists of multiples of known triples. For each Pythagorean triple, find two triples in the same family.

10. 3, 4, 5

11. 5, 12, 13

12. 7, 24, 25