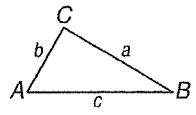
NAME Key DATE _____ PERIOD ____

8-2 Study Guide and Intervention *(continued)*

The Pythagorean Theorem and Its Converse

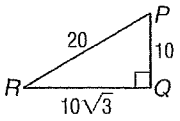
Converse of the Pythagorean Theorem If the sum of the squares of the measures of the two shorter sides of a triangle equals the square of the measure of the longest side, then the triangle is a right triangle.



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
yes, yes

2. 20, 30, 40
no, no

3. 18, 24, 30
yes, yes

4. 6, 8, 9
no, no

5. $\frac{3}{7}, \frac{4}{7}, \frac{5}{7}$
yes, no

6. 10, 15, 20
no, no

7. $\sqrt{5}, \sqrt{12}, \sqrt{13}$
no, no

8. $2, \sqrt{8}, \sqrt{12}$
yes, no

9. 9, 40, 41
yes, yes

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
30, 40, 50
6, 8, 10

11. 5, 12, 13
10, 24, 26
50, 120, 130

12. 7, 24, 25
14, 48, 50
70, 240, 250

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Radical Homework

Directions: Simplify each radical. Remember, no decimals and NO RADICALS in the denominator! Circle your final answers!

1. $\frac{\sqrt{15}}{\sqrt{20}} = \frac{\sqrt{3}\cdot\sqrt{5}}{2\sqrt{5}} = \boxed{\frac{\sqrt{3}}{2}}$

2. $\frac{\sqrt{10}}{\sqrt{32}} = \frac{\sqrt{2}\cdot\sqrt{5}}{4\sqrt{2}} = \boxed{\frac{\sqrt{5}}{4}}$

$\sqrt{20}$

$\sqrt{4}\ \sqrt{5}$

2

$\sqrt{32} = 4\sqrt{2}$

$\sqrt{2}\ \sqrt{16}$

4

3. $\frac{2\sqrt{6}}{4\sqrt{8}} = \frac{2\sqrt{3}\sqrt{2}}{4\cdot 2\sqrt{2}} = \boxed{\frac{\sqrt{3}}{4}}$

4. $\frac{3\sqrt{16}}{2\sqrt{25}} = \frac{3\cdot 4}{2\cdot 5} = \frac{12}{10} = \boxed{\frac{6}{5}}$

$\sqrt{8} = 2\sqrt{2}$

$\sqrt{4}\ \sqrt{2}$

Directions: Solve for each variable. Make sure your answer is in simplified radical form without any radicals in the denominator.

5. $\frac{15}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}}$ $\quad x = \frac{15\sqrt{3}}{3} = \boxed{5\sqrt{3}}$

6. $\frac{24}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$ $\quad x = \frac{24\sqrt{2}}{2} = \boxed{12\sqrt{2}}$

7. $\frac{17}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$ $\quad \boxed{x = \frac{17\sqrt{2}}{2}}$

8. $\frac{8}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}}$ $\quad \boxed{x = \frac{8\sqrt{3}}{3}}$

9. $\frac{50}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$ $\quad x = \frac{50\sqrt{2}}{2} = \boxed{25\sqrt{2}}$

10. $\frac{21}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}}$ $\quad x = \frac{21\sqrt{3}}{3} = \boxed{7\sqrt{3}}$