ALBERT

Name _____ Date _____

Pythagorean Theorem Proof and Converse Worksheet

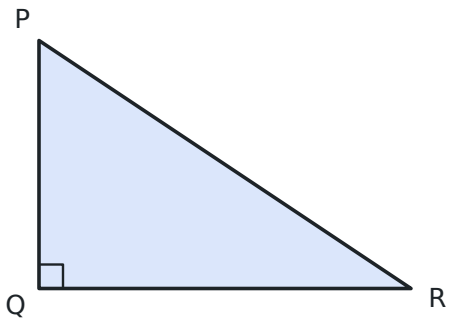
Grade 8 · Common Core 8.G.B.6

> Explain a proof of the Pythagorean Theorem and its converse.

Practice

Builds the skill step by step.

1. In a right triangle, which side is the hypotenuse?



   A. The side at the bottom of the drawing
   B. The side across from the right angle
   C. The shortest side
   D. Either side that forms the right angle

2. A right triangle has legs of 3 and 4 units. What is $a^2 + b^2$ for the two legs?

3. Is a triangle with sides of 6, 8 and 10 cm a right triangle? Answer Yes or No.

4. Is a triangle with sides of 4, 5 and 7 cm a right triangle? Answer Yes or No.

5. A right triangle has legs a and b and hypotenuse c. Which equation is the Pythagorean theorem?

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

   B. $a + b = c$

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

   D. $2a + 2b = 2c$

6. Squares are drawn on the two legs of a right triangle. Their areas are 9 and 16 square units. What is the area of the square drawn on the hypotenuse?

7. Squares drawn on the legs of a right triangle have areas of 36 and 64 square units. How long is the hypotenuse?

8. Is a triangle with sides of 5, 12 and 13 m a right triangle? Answer Yes or No.

9. A right triangle has sides of 9, 40 and 41 inches. How long is the hypotenuse?

10. The square on the hypotenuse of a right triangle has an area of 50 square units. The square on one leg has an area of 14 square units. What is the area of the square on the other leg?

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On Level

Grade-level practice.

1. Is a triangle with sides of 7, 24 and 25 feet a right triangle? Answer Yes or No.

2. Is a triangle with sides of 8, 15 and 16 feet a right triangle? Answer Yes or No.

3. Which set of lengths could be the sides of a right triangle?

   A. 10, 10, 15

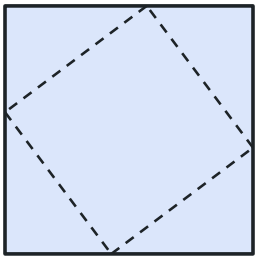
   B. 5, 6, 7

   C. 4, 6, 8

   D. 9, 12, 15

4. Explain how to decide whether a triangle with sides of 12, 16 and 20 cm is a right triangle, and give the answer.

5. A large square with sides of 7 units is split into four right triangles with legs of 3 and 4 units and a tilted square in the middle, as shown. What is the area of the tilted square?



6. A large square has an area of 81 square units. Inside it are four identical right triangles, each with an area of 10 square units, and a tilted square on the hypotenuses. What is the area of the tilted square?

7. A triangle has sides of 10, 24 and 26 cm. What is the measure of its largest angle?

8. Sam checks whether 5, 12 and 13 form a right triangle. He writes $5^2 + 13^2 = 194$, which is not $12^2 = 144$, and says no. What is his error?

   A. He should have added 5 + 12 + 13.

   B. He should have multiplied 5 × 12 × 13.

   C. He used the longest side as a leg; $5^2 + 12^2 = 169 = 13^2$, so it is a right triangle.

   D. There is no error.

9. Squares are drawn on the three sides of a triangle. Their areas are 20, 29 and 49 square units. Is the triangle a right triangle? Answer Yes or No.

10. Is a triangle with sides of 1.5, 2 and 2.5 m a right triangle? Answer Yes or No.

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Challenge

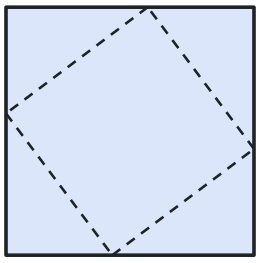
Multi-step and word problems that stretch it.

1. A right triangle has legs of 6 and 8 units and a hypotenuse of x units. What is x?

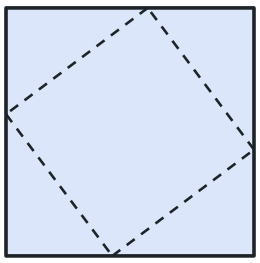
2. Is a triangle with sides of 20, 21 and 29 inches a right triangle? Answer Yes or No.

3. A carpenter marks 3 feet along one wall and 4 feet along the other wall from a corner. The distance between the marks is 4.8 feet. Is the corner a right angle? Answer Yes or No.

4. A large square with sides of 7 units is split into four identical right triangles and a tilted square, as shown. The tilted square has an area of 25 square units. What is the total area of the four triangles?



5. A large square with sides of a + b is made from four right triangles with legs a and b and a tilted square with sides c (the hypotenuses). Explain how the areas show that $a^2 + b^2 = c^2$.



6. A triangle has sides of 9, 12 and 15 cm. Which angle is the right angle?

   A. The triangle has no right angle.

   B. The angle across from the 15 cm side

   C. The angle across from the 9 cm side

   D. The angle across from the 12 cm side

7. A triangle has sides of 5 cm, 5 cm and x cm, where $x^2 = 50$. Is it a right triangle? Answer Yes or No.

8. The sides 9, k and 15 form a right triangle with 15 as the hypotenuse. What is k?

9. For which triangles is $a^2 + b^2 = c^2$ true, where c is the longest side?

   A. Equilateral triangles only

   B. All triangles

   C. Right triangles only

   D. Acute triangles only

10. The square on the hypotenuse of a right triangle has an area of 169 square units. One leg is 5 units long. What is the area of the square on the other leg?