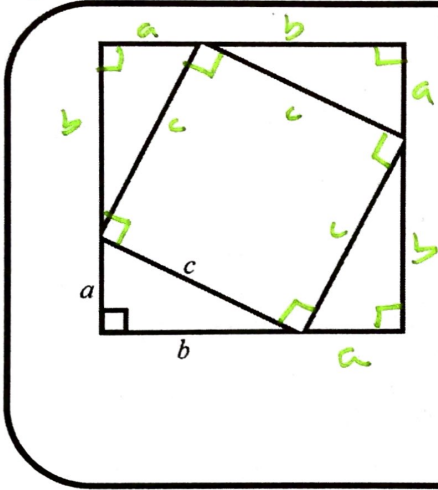


Pythagorean Theorem



Four congruent right triangles are used to form a square as shown.

- Label the lengths of the other triangles with a , b , c appropriately.
- Mark all right angles. There are eight of them.
- Find the area of the region using two different methods:

$$(a+b)(a+b) = 4\left(\frac{1}{2}ab\right) + c^2$$

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

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

$$a^2 + b^2 = c^2 \quad \text{😊}$$

Use the Pythagorean Theorem to find the value of x .

<p>1)</p> $5^2 + 12^2 = x^2$ $25 + 144 = x^2$ $169 = x^2$ $x = \pm\sqrt{169} \quad x = \pm 13$	<p>2)</p> $x^2 + 3^2 = 5^2$ $x^2 + 9 = 25$ $x^2 = 16$ $x = \pm\sqrt{16} \quad x = \pm 4$	<p>3)</p> $x^2 + 8^2 = 17^2$ $x^2 + 64 = 289$ $x^2 = 225$ $x = \pm\sqrt{225} \quad x = \pm 15$
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In geometry we often ignore neg solution

Core Concept

Common Pythagorean Triples and Some of Their Multiples

3, 4, 5	5, 12, 13	8, 15, 17	7, 24, 25
6, 8, 10	10, 24, 26	16, 30, 34	14, 48, 50
9, 12, 15	15, 36, 39	24, 45, 51	21, 72, 75
3x, 4x, 5x	5x, 12x, 13x	8x, 15x, 17x	7x, 24x, 25x

Find the value of x .

<p>4)</p> $x^2 + 3^2 = (\sqrt{17})^2$ $x^2 + 9 = 17$ $x^2 = 16$ $x = \pm\sqrt{16} \quad x = \pm 4$	<p>5)</p> $x^2 + (\sqrt{10})^2 = 4^2$ $x^2 + 10 = 16$ $x^2 = 6$ $x = \pm\sqrt{6}$	<p>6)</p> $10^2 + 10^2 = x^2$ $100 + 100 = x^2$ $x^2 = 200$ $x = \pm\sqrt{200} \quad x = \pm 10\sqrt{2}$
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