MATHCOUNTS®

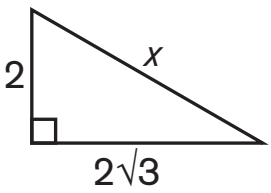
Special Right Triangles

Warm-Up!

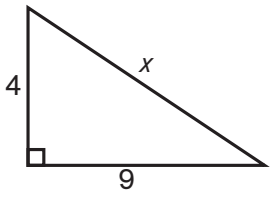
Try these problems before watching the lesson.

For each of the following problems, determine the value of x in each figure by using the Pythagorean Theorem. Express the value of x as an integer or in simplest radical form, whichever applies to your answer.

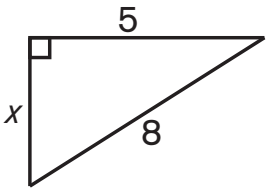
1.



2.



3.



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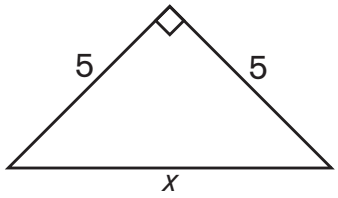
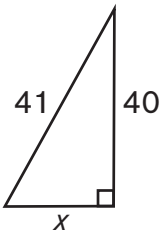


5.



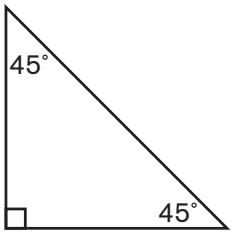
Note: An answer is in simplest radical form when the radicand has no square factors. For example, $\sqrt{12}$ in simplest radical form would be $2\sqrt{3}$.

The Problems

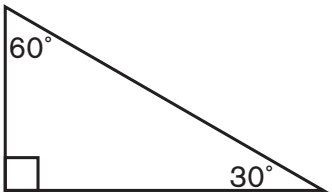
Take a look at the following problems and follow along as they are explained in the video.

Determine the relationship between the side lenghts of the special right triangles below.

6.



7.

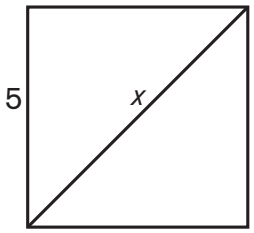


Piece It Together

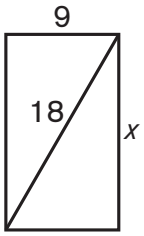
Use the skills you practiced in the warm-up and strategies from the video to solve the following problems.

For each of the following problems, determine the value of x in each figure by finding the special right triangles. Express the value of x as an integer or in simplest radical form, whichever applies to your answer.

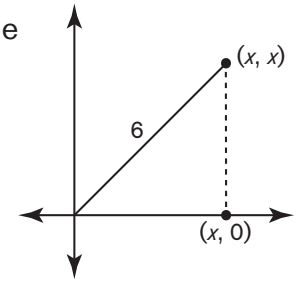
8. square



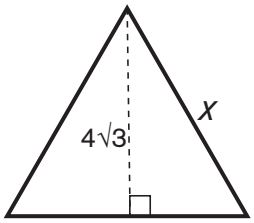
9. rectangle



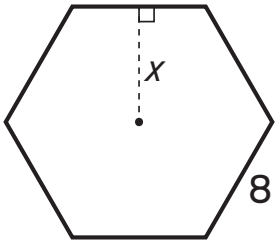
10. coordinate plane



11. equilateral triangle



12. regular hexagon



Optional Extension

To extend your understanding and have a little fun with math, try the following activities.

In the warm-up you practiced using the Pythagorean Theorem to solve for side lengths in right triangles. In the video, the Pythagorean Theorem was used to show the side length ratios in special right triangles. But how do we know the Pythagorean Theorem is true? There are 367 unique proofs of this theorem. For this extension, try to uncover one known proof. The figure below gives a hint. The figure shows a smaller square inscribed inside a larger square.