EUREKA MATH™ TIPS FOR PARENTS

KEY CONCEPT OVERVIEW

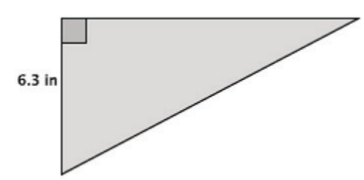
Building on students' new knowledge of square roots, this topic introduces another proof of the Pythagorean theorem (if a triangle is a right triangle, then $a^2 + b^2 = c^2$) and its converse (if $a^2 + b^2 = c^2$, then the triangle is a right triangle). Students learn to determine the approximate length of a side of a right triangle, even when the length is not a whole number. Students also practice explaining proofs in their own words, and they apply the converse of the Pythagorean theorem to make informal arguments about whether certain triangles are right triangles. To finish the topic, students focus on applications of the Pythagorean theorem. They calculate the distance between two points on a diagonal line in the coordinate plane and apply the theorem to a variety of other mathematical and real-world scenarios.

You can expect to see homework that asks your child to do the following:

- Use similar triangles to illustrate the Pythagorean theorem in particular situations.
- Use the Pythagorean theorem to find the unknown length of a side of a right triangle.
- Use the converse of the Pythagorean theorem to determine whether a triangle is a right triangle.
- Find the distance between two points on the coordinate plane.
- Use the Pythagorean theorem in a variety of mathematical and real-world scenarios.

SAMPLE PROBLEM *(From Lesson 18)*

The area of the right triangle shown is 26.46 in^2. What is the perimeter of the right triangle? Round your answer to the tenths place.



Let b inches represent the length of the base of the triangle.

Let h inches represent the height of the triangle, where $h = 6.3$.

$$A = \frac{bh}{2}$$

$$26.46 = \frac{6.3b}{2}$$

$$(2)26.46 = (2)\frac{6.3b}{2}$$

$$52.92 = 6.3b$$

$$\frac{52.92}{6.3} = \frac{6.3b}{6.3}$$

$$8.4 = b$$

Let c inches represent the length of the hypotenuse.

$$6.3^2 + 8.4^2 = c^2$$

$$39.69 + 70.56 = c^2$$

$$110.25 = c^2$$

$$\sqrt{110.25} = \sqrt{c^2}$$

$$\sqrt{110.25} = c$$

The number $\sqrt{110.25}$ is between 10 and 11. When comparing with tenths, the number is actually equal to 10.5 because $10.5^2 = 110.25$. Therefore, the length of the hypotenuse is 10.5 inches.

The perimeter of the triangle is
6.3 in. + 8.4 in. + 10.5 in. = 25.2 in.

Additional sample problems with detailed answer steps are found in the *Eureka Math Homework Helpers* books. Learn more at GreatMinds.org.

HOW YOU CAN HELP AT HOME

You can help at home in many ways. Here are some tips to help you get started.

- Draw a right triangle and label two of the sides with their lengths. Ask your child to use the Pythagorean theorem to approximate the unknown length of the third side to the nearest tenth or hundredth.
- Challenge your child to use the converse of the Pythagorean theorem to confirm right triangles in your surroundings. Instruct your child to mark two points on the legs of a right triangle (e.g., the sides that form the corner of a tennis court, as shown in the image at the right). Next, ask her to measure from the vertex of the right angle to each point she marked and then to measure diagonally from point to point. If the angle measures 90 degrees, your child can substitute the measurements she found for the variables in the Pythagorean theorem to yield a true statement, such as $6^2 + 8^2 = 10^2$ or, in other words, $100 = 100$. (Depending on the precision of your child's measurements and the accuracy of her measuring tool, it is likely that $a^2 + b^2$ will be only approximately equal to c^2.)