Dear Family,

The next unit in your child's mathematics class this year is ***Looking for Pythagoras: The Pythagorean Theorem***. Students' work in this unit develops a fundamentally important relationship connecting geometry and algebra: the Pythagorean Theorem.

UNIT GOALS

In this unit, students explore the Pythagorean Theorem, square roots, and strategies for estimating square roots. In addition, irrational numbers are introduced.

The presentation of ideas in the unit reflects the historical development of the concept of irrational numbers. Early Greek mathematicians recognized the need for such numbers as they searched for a ratio of integers to represent the length of the sides of a square with certain areas, such as 2 square units.

HELPING WITH HOMEWORK

You can help with your child's homework and encourage sound mathematical habits as your child studies this unit by asking questions such as:

- Is this a situation where it is appropriate to use the Pythagorean Theorem?
- Do I need to find the distance between two points?
- How are square roots and areas of squares related?
- How can I estimate the square root of a number?
- How can I know the length of something without directly measuring it?

In your child's notebook, you can find worked-out examples from problems done in class, notes on the mathematics of the unit, and descriptions of the vocabulary words.

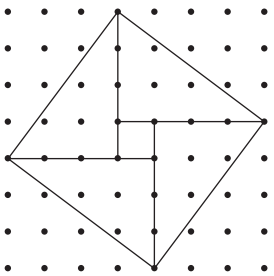
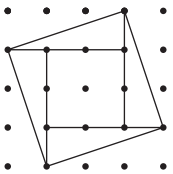
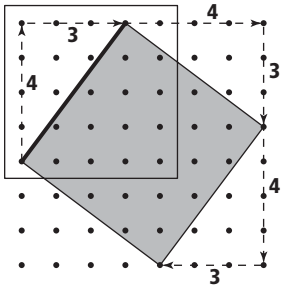
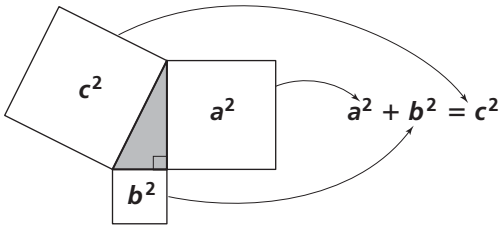
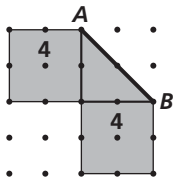
HAVING CONVERSATIONS ABOUT THE MATHEMATICS IN *LOOKING FOR PYTHAGORAS*

You can help your child with his or her work for this unit in several ways:

- Ask your child to explain the ideas presented in the text about finding distances.
- Discuss with your child how the Pythagorean Theorem is applied by people in some careers, such as carpenters, architects, and pilots.
- Look over your child's homework and make sure that all the questions are answered and that explanations are clear.
- Have your child pick a question that was interesting to him or her and explain it to you.

A few important mathematical ideas that your child will learn in *Looking for Pythagoras* are given on the back. As always, if you have any questions or concerns about this unit or your child's progress in class, please feel free to call.

Sincerely,

Important Concepts	Examples
Finding Area Students find areas of squares drawn on grids. One method is to subdivide the square and add the areas of the component shapes. Another method is to enclose the square in a rectangle and subtract the area outside the figure from the area of the rectangle.	Area of tilted square = Area of 4 triangles + 1 small square = 4 $[\frac{1}{2}(3 \times 4)] + 1$ = 25 square units 
Square Roots If the area of a square is known, its side length is the number whose square is the area. Some of these lengths are not whole numbers, so we use the $\sqrt{\ }$ symbol.	The area of the tilted square is 10 square units, so the side of the tilted square is $\sqrt{10}$ units. 
Estimating Square Roots Students develop benchmarks for estimating square roots.	$\sqrt{5}$ is between 2 and 3 because $2^2 < 5 < 3^2$. It is closer to 2. Try $2.25 \div 2.25^2 = 5.06$. So $\sqrt{5}$ is between 2 and 2.25, but closer to 2.25. Try 2.24 ($2.24^2 = 5.0176$), even closer. Continue until the desired accuracy is obtained.
Finding Distances To find various lengths of line segments, students begin by drawing a square that is associated with the length.	The line segment shown is the side of a square with an area of 25 square units, so the segment has length $\sqrt{25}$, or 5. 
Pythagorean Theorem In a right triangle, the sum of the squares of the lengths of the two legs is equal to the square of the length of the longest side, called the hypotenuse. Symbolically, this is $a^2 + b^2 = c^2$, where a and b are the lengths of the legs and c is the length of the hypotenuse.	
Length of Line Segment On a grid, the length of a horizontal or vertical line segment can be found by counting the distance. If a segment is not vertical or horizontal, it is possible to treat it as the hypotenuse of a right triangle. The Pythagorean Theorem is used to find the length of the hypotenuse.	The length of line segment AB can be the hypotenuse of a right triangle, c. $2^2 + 2^2 = c^2$, so $4 + 4 = 8 = c^2$. $\sqrt{8} = c$ 
Irrational Numbers A number that cannot be written as a fraction with an integer numerator or denominator is irrational. Decimal representations of irrational numbers never end and never show a repeating pattern for a fixed number of digits.	The numbers $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, and π are examples of irrational numbers. $\sqrt{2}$ is 1.41421356237…. The decimal part goes forever without any pattern of fixed length that repeats.

On the **CMP Parent Web Site,** you can learn more about the mathematical goals of each unit, see an illustrated vocabulary list, and examine solutions of selected ACE problems. **http://PHSchool.com/cmp2parents**