

Name: \_\_\_\_\_ Date: \_\_\_\_\_

# The Path to Success

## Pythagorean Theorem

Freda owns a very successful garden designing business. Her most popular design involves a rectangular garden with a path along one of the diagonals. In order to purchase the correct number of stones to form the path, she needs to know the length of the diagonal of the rectangle to the nearest hundredth of a foot. Can you help her find the length of the diagonals of the rectangular gardens described below? (Hint: Use the **FIX** key to round the answer to the nearest hundredth.)



<b>Garden 1:</b>	Dimensions	Length of Diagonal
	12 ft by 15 ft	

<b>Garden 2:</b>	Dimensions	Length of Diagonal
	10 ft by 10 ft	

<b>Garden 3:</b>	Dimensions	Length of Diagonal
	18 ft by 20 ft	

<b>Garden 4:</b>	Dimensions	Length of Diagonal
	16 ft by 24 ft	

<b>Garden 5:</b>	Dimensions	Length of Diagonal
	15 ft by 20 ft	

<b>Garden 6:</b>	Dimensions	Length of Diagonal
	12.5 ft by 18.5 ft	



### Thinking Cap



Design a rectangular garden of your own that has a path along a diagonal that is 10 feet long. Explain what you did to find the dimensions of the garden.

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## Pythagorean Theorem

**Topic:** Pythagorean Theorem

**Objective:** To use the calculator to solve problems involving the Pythagorean Theorem.

**NCTM Standards:** Communication, Problem Solving, Geometry

### Using the Activity

Students use the calculator and the Pythagorean Theorem in this activity to help them find the length of a diagonal of a rectangle.

- The  $x^2$  key can be used to square the lengths of the sides of the rectangle.
- The  $\sqrt{\square}$  key can be used to find the square root of the sum of the squares of the lengths of the sides.
- The **FIX** key can be used to round the answer to the nearest hundredth.

**Example** To find the length of the diagonal of Garden 1, first enter **FIX** 2. The calculator will round the answer to two decimal places. Then enter  $12 \ x^2 \ + \ 15 \ x^2 \ = \ 369.00 \ \sqrt{\square}$  19.21. The length of the diagonal is 19.21 ft.

**Assessment** Students should be encouraged to press the  $x^2$  key after the answer is found. If the answer is correct, the square should be the same as the sum of the squares of the sides.

### Answers

*Garden 1: See example above.*

*Garden 2:  $10 \ x^2 \ + \ 10 \ x^2 \ = \ 200.00 \ \sqrt{\square}$  14.14; The length of the diagonal is 14.14 ft.*

*Garden 3:  $18 \ x^2 \ + \ 20 \ x^2 \ = \ 724.00 \ \sqrt{\square}$  26.91; The length of the diagonal is 26.91 ft.*

*Garden 4:  $16 \ x^2 \ + \ 24 \ x^2 \ = \ 832.00 \ \sqrt{\square}$  28.84; The length of the diagonal is 28.84 ft.*

*Garden 5:  $15 \ x^2 \ + \ 20 \ x^2 \ = \ 625.00 \ \sqrt{\square}$  25.00; The length of the diagonal is 25.00 ft.*

*Garden 6:  $12.5 \ x^2 \ + \ 18.5 \ x^2 \ = \ 498.50 \ \sqrt{\square}$  22.33; The length of the diagonal is 22.33 ft.*

### Thinking Cap Answers

The sum of the squares of the sides of the rectangle must be 100. Since  $6^2 + 8^2 = 10^2 = 100$ , the dimensions are 6 ft and 8 ft.