

# The Not-So-Secret Formulas

## Purpose

Students will discover and use the formulas for finding the areas of rectangles and squares and use appropriate units when describing the area.

## Materials

*For the teacher:* transparency of Black Line Master (BLM) *Centimeter Graph Paper*, chalk, chalkboard

*For each student:* copy of BLM *Using the Not-So-Secret Formulas*

## Activity

### A. Introduction

1. Place the BLM *Centimeter Graph Paper* transparency on the overhead projector.
2. Tell students that they will be detectives today and will find secret formulas to help measure the area of rectangles and squares. Tell them that the formulas are not really secret, because people use them all the time. Give examples of circumstances where finding the area of a rectangle or square is used in everyday life.
3. Explain to the students that each square on the BLM transparency measures exactly one centimeter on each side and are called “square centimeters” because of their measure.
4. Draw a rectangle on the transparency so that the rectangle fits exactly over a group of square centimeters.
5. Ask students how the area of the rectangle might be found. Reword the question, if necessary, to: “How many square centimeters big is the rectangle?”
6. Explain that the area of the rectangle might be found by counting the number of square centimeters inside the rectangle. Discuss the impracticality of measuring area in this manner using real-life examples.
7. Tell students that using the not-so-secret formula is an easier way to find the number of square centimeters, square inches, square feet, etc., in a rectangle or square.

### B. Student Activity

1. Draw a table on the chalkboard with the column headings: *Length of Rectangle*, *Width of Rectangle*, and *Area of Rectangle*.

(continued)



### INCORPORATING TECHNOLOGY

Using a drawing program, set the format so that a grid appears on the screen and that objects snap to the grid. Have students draw different sizes of rectangles and find the areas. Have them print out their drawings and represent answers by using the formulas.



### MEETING INDIVIDUAL NEEDS

For students who want a greater challenge, have them find the greatest area with a given perimeter. Set up story problems such as finding the greatest amount of pasture that could be fenced in with 32 yards of fence.

**Standards Links**  
4.2.4, 4.3.1, 4.3.2

## Activity (continued)

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2. Tell students that the table will give them clues to the not-so-secret formulas. Tell students to raise their hands when they have an idea of what either of the formulas might be.
3. Have students volunteer the length and width of the first rectangle that you drew. Write the correct answers in the first row. Fill in the area that you found by counting the number of square centimeters.
4. Continue to draw different sizes of rectangles. Fill in the table with student assistance.
5. Ask a student to tell you the not-so-secret formula for finding area of rectangles. Check what the student tells you with the information in the table. Write the following correct formula on the board:  $\text{Area} = l \times w$ . Review how to do calculations using a formula.
6. Draw a new table on the chalkboard for the formula for finding the area of a square. The column headings should be: *Length of One Side* and *Area of Square*.
7. Clean the transparency and repeat the process in steps 5 and 6, drawing different sizes of squares. Write the following formula on the board:  $\text{Area} = s \times s$ .
8. Discuss the importance of measuring both sides of a rectangle in the same unit. Tell students the correct unit of area as “square inches,” “square feet,” etc.
9. Have students complete the BLM *Using the Not-So-Secret Formulas*.

## Questions for Review

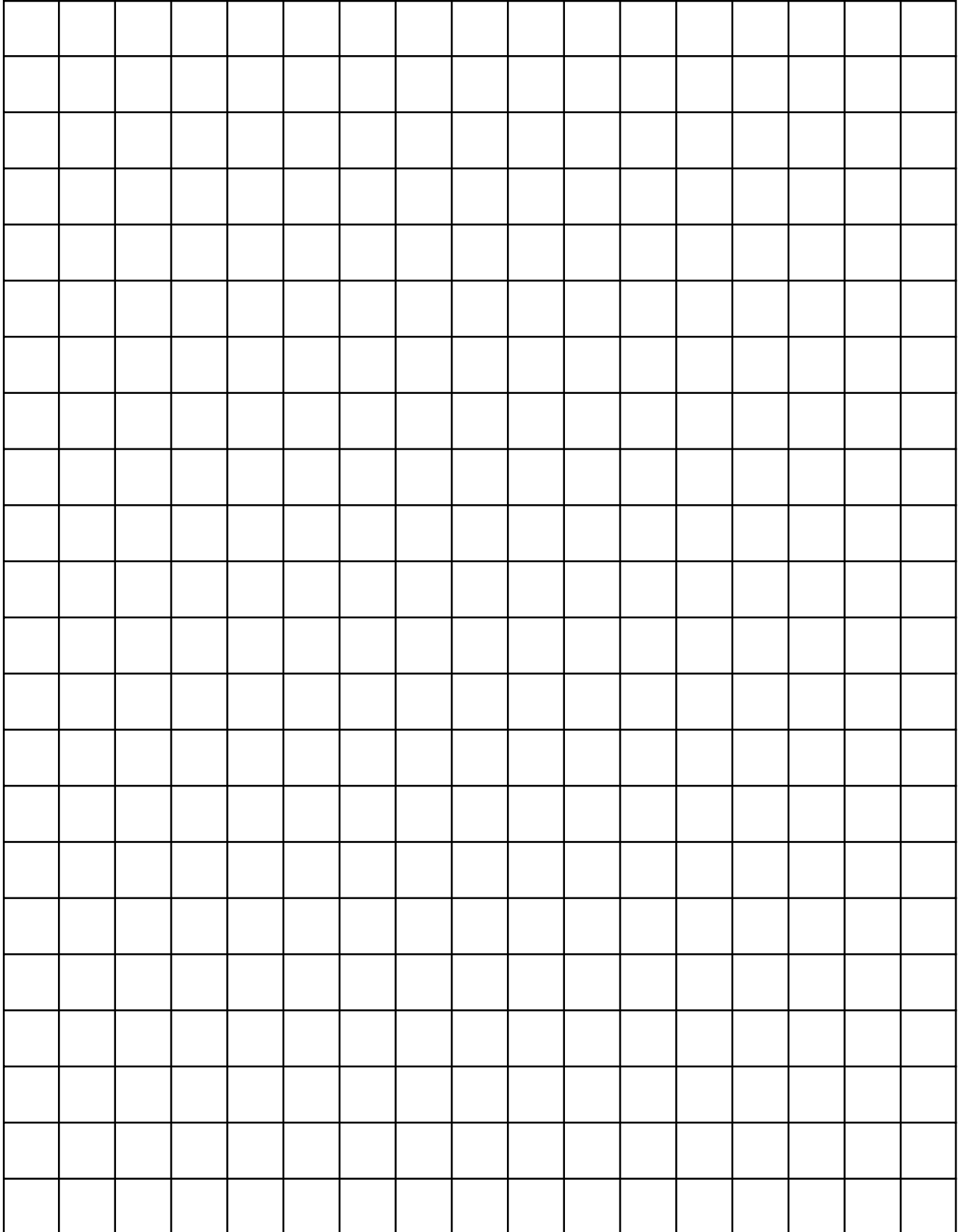
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### Basic Concepts and Processes

During the activity, discuss the following questions with students to gauge their understanding of the indicators:

-  What is the area of a rectangle that has a length of five inches and a width of three inches?
  -  How did you get your answers?
  -  What is the formula for finding the area of a square?
  -  Why is it not necessary to know both the length and the width of a square in order to find the area?
  -  If a square has a side that measures five feet, why is it incorrect to say that the area measures 25 square inches?
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# Centimeter Graph Paper



# Centimeter Graph Paper

## Teacher Directions

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Copy the BLM onto an overhead transparency.

## Answer Key

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Not applicable


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

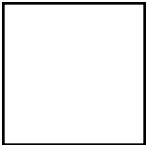


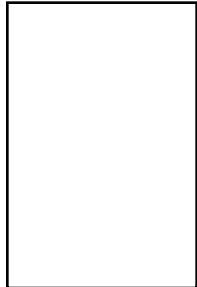
## Using the Not-So-Secret Formulas

Use the formulas to find the areas of the shapes below. Fill in the correct unit for the area.

1.  **Area:**  square \_\_\_\_\_

2.  **Area:**  square \_\_\_\_\_

3.  **Area:**  square \_\_\_\_\_

4.  **Area:**  square \_\_\_\_\_

5. Joe is baking a cake for his mother's birthday. He buys a can of chocolate frosting. The label on the can says that there is enough frosting in it to cover 117 square inches. The cake Joe is baking is square with sides that are nine inches. Will Joe have enough frosting to cover the top of the cake?

Using the formula, write the number sentence that determines the area of the top of Joe's cake and solve it. Express your answer in the correct unit of measure.

Does Joe have enough frosting?

# Using the Not-So-Secret Formulas

## Teacher Directions

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Have students apply the formulas for finding area of rectangles and squares to complete the BLM.

## Answer Key

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1. Area = 63 square inches
2. Area = 20 square yards
3. Area = 9 square centimeters
4. Area = 96 square feet
5. 9 inches  $\times$  9 inches = 81 square inches; Yes, Joe has enough frosting for his mother's cake.