



## Perimeter & Area Without Conversions



**Purpose** In this Ramp Up activity, students combine area and perimeter to solve problems about rectangles and squares. Some problems require students to justify conclusions. These problems mix area and perimeter so that students must constantly think about the measurement that they are calculating.

These problems do not include conversions.

**About the Problems:** Problem #7 is a Challenge!! Students have to multiply multiples of ten (ex.  $230 \times 230$ ). To keep this within the 4th grade student expectations, students should use the distributive property to multiply  $23 \times 23$ , and then multiply by 100. Multiplication by any multiple of 10 is essentially more a matter of place value than of multiplication. You may need to walk your students through that concept.

- |                                                         |                                              |                                                    |                                                           |
|---------------------------------------------------------|----------------------------------------------|----------------------------------------------------|-----------------------------------------------------------|
| <input checked="" type="checkbox"/> One-step problems   | <input type="checkbox"/> Equation            | <input type="checkbox"/> Subtraction               | <input checked="" type="checkbox"/> Small group           |
| <input checked="" type="checkbox"/> Two-step problems   | <input checked="" type="checkbox"/> Solution | <input checked="" type="checkbox"/> Multiplication | <input checked="" type="checkbox"/> Tutoring/Intervention |
| <input checked="" type="checkbox"/> Multi-step problems | <input type="checkbox"/> Estimation          | <input checked="" type="checkbox"/> Division       | <input checked="" type="checkbox"/> Centers               |
| <input type="checkbox"/> Strip diagram                  | <input checked="" type="checkbox"/> Addition | <input type="checkbox"/> Teacher-facilitated       | <input checked="" type="checkbox"/> Challenge!            |



### Setting Up For Instruction

- Make 1 copy of **All the Way Around** for each student.



### Guiding Students Through Problems That Involve Both Perimeter and Area (4.1B)

Most of the problems in *All the Way Around* involve both perimeter and area. When perimeter and area are mixed, students often get confused, which is exactly why they need to do problems that mix perimeter and area. The goal isn't to confuse them; it's to make students pay attention to the problems they are solving. Here are some suggestions to help students solve problems that mix perimeter and area.

1. Ensure that students draw a picture that contains all of the information from the problem. Even if a piece of information doesn't exactly belong in the picture, students should write the information near the diagram. This keeps all of the information together.
2. Have students read the question and determine what they need to find out: Are they finding perimeter or area?
3. Then students should decide what kind of information they need to solve the problem. For example, do they need to know the lengths of the sides?
4. Once they know what information they need, they must decide if they already have everything they need. If not, they need to decide what they need to find out and do the calculations to find it out.
5. Finally, they solve the problem.



### How-To Guide

1. Put students in groups of 3–4 and hand out **All the Way Around**.
2. Students should:
  - a. decide whether they are working with area or perimeter
  - b. draw a diagram and put the known measures on it
  - c. solve the problem
  - d. write their answers including units



### Thought Extenders

- What kind of figure should you draw?
- What measures do you know?
- What are the units?
- What does the problem ask you to find?
- How do you find perimeter?
- How do you find area?
- What does perimeter mean?
- What does area mean?
- Does the problem ask you to find perimeter or area? How do you know?
- Did you find the measure that the problem asks you to find?
- What is the unit in the solution?

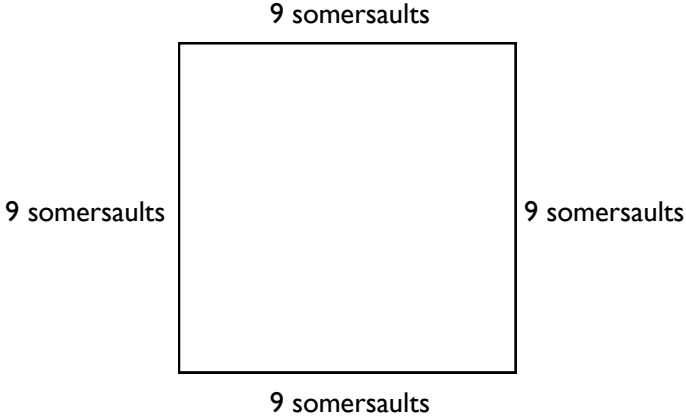


# ALL THE WAY AROUND ANSWER KEY (PG. 1 OF 4)

**Directions:** Read each problem and decide if you are working with perimeter, area, or both. Check the box to help you remember. Then draw a picture and solve the problem. Write your answers in complete sentences.

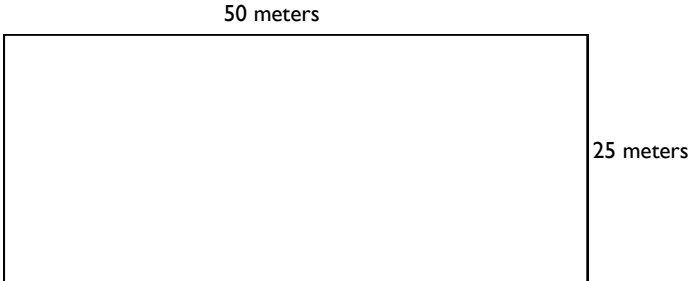
- 1 A gymnast does somersaults around the edge of a square mat. She does 9 somersaults per side. She travels 3 feet per somersault. How far does she travel?

Perimeter       Area

Picture	Solution
 <p>A square diagram representing a mat. Each side is labeled "9 somersaults".</p>	$9 \times 3 = 27 \text{ feet per side}$ $27 \times 4 = 108 \text{ feet}$ <p>She travels 108 feet.</p>

- 2 An Olympic size pool has a length of 50 meters (m) to accommodate long-course races. Its width is 25 meters. What is the area of the surface of the pool? If each lane is 5 meters wide, how many lanes can be put in the pool?

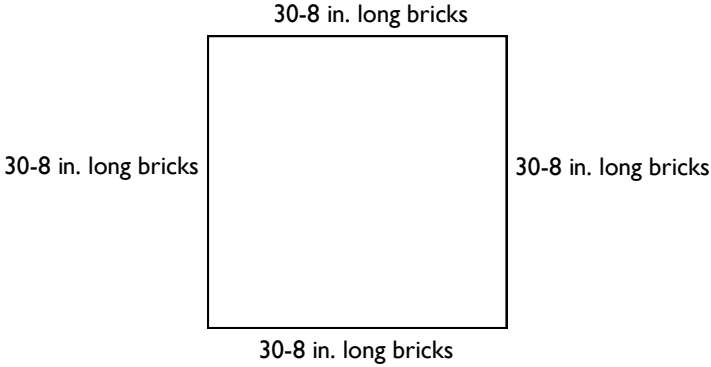
Perimeter       Area

Picture	Solution
 <p>A rectangular diagram representing a pool. The length is labeled "50 meters" and the width is labeled "25 meters".</p>	$50 \times 25 = 1,250$ $25 \div 5 = 5$ <p>The area of the surface of the pool is 1,250 square meters. There can be 5 lanes in the pool.</p>



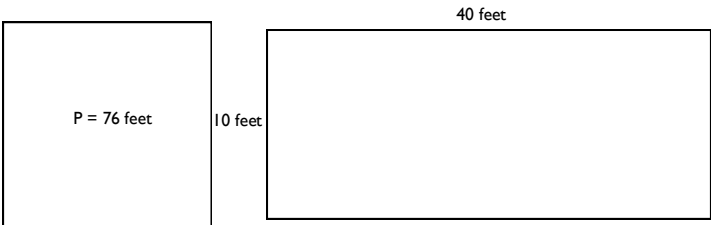
- 3 A brick garden is lined with bricks that are each 8 inches long. There are 30 bricks on each side. What is the perimeter of the garden?

Perimeter     Area

Picture	Solution
 <p>A square diagram representing a garden. Each of the four sides is labeled "30-8 in. long bricks".</p>	$8 \times 30 = 240$ <p>Each side is 240 inches. The perimeter of the garden is 960 inches.</p>

- 4 Joanna lives in an apartment that is shaped like a rectangle. Her apartment is 40 feet long and 10 feet wide. Joanna's friend Lonnie also lives in an apartment. His apartment is a square with a perimeter of 76 feet. Which apartment is larger and why?

Perimeter     Area

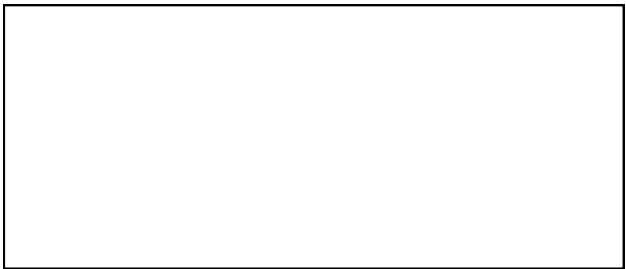
Picture	Solution
 <p>A diagram showing two rectangles. The left rectangle is a square with the label "P = 76 feet" inside. The right rectangle has a length of "40 feet" and a width of "10 feet".</p>	$40 \times 10 = 400 = \text{size of Joanna's apartment}$ $76 \div 4 = 19$ $19 \times 19 = 361 = \text{size of Lonnie's apartment}$ <p>Joanna's apartment is larger. She has 400 square feet and Lonnie has 361 square feet.</p>



# ALL THE WAY AROUND ANSWER KEY (PG. 3 OF 4)

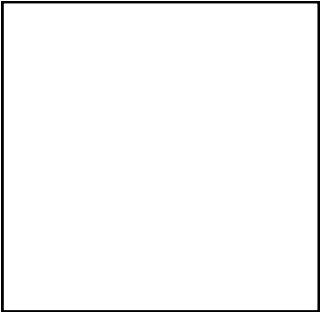
- 5 Lonnie made an area rug. The length of the rug is 3 meters and the width is 9 meters. He tells Carl that the border of the rug is 24 meters. Carl says that the border is 27 meters. Who is correct and why?

Perimeter     Area

Picture	Solution
 <p>A rectangle is shown with a horizontal top side labeled "9 m" and a vertical left side labeled "3 m".</p>	$(3 \times 2) + (9 \times 2) = 6 + 18 = 24$ <p>Lonnie is correct.</p>

- 6 Lonnie makes a new area rug. This rug is 4 meters long and 4 meters wide. He tells Carl that the new rug has a perimeter of 16 meters. Carl said "Lonnie, my silly friend. It's the area that is 16 meters." Who is right and why?

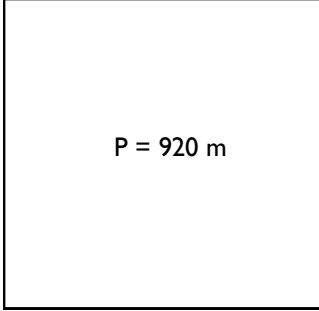
Perimeter     Area

Picture	Solution
 <p>A square is shown with a horizontal top side labeled "4 m" and a vertical left side labeled "4 m".</p>	$(4 \times 2) + (4 \times 2) = 8 + 8 = 16$ <p>The perimeter is 16 meters.</p> $4 \times 4 = 16$ <p>The area of the rug is 16 SQUARE meters. Carl is correct.</p>



- ★ 7 The Great Pyramid of Giza has a square base. Its perimeter is 920 meters. What is the area of its base?

Perimeter       Area

Picture	Solution
	$920 \div 4 = 230$ $230 \times 230 = 52,900 \text{ square meters}$ <p>The area of the base of the pyramid is 52,900 square meters.</p>

## Journaling:

Why is it important to list all of the measurement information given in a problem first?

Possible answers:

- *The measurements help you figure out what which numbers to use to find the answer.*
- *The measurements help you figure out if you need to do a conversion before solving the problem.*
- *Listing the measurements helps you know if you have everything needed to solve the problem or if you have to do a calculation first.*



**Directions:** Read each problem and decide if you are working with perimeter, area, or both. Check the box to help you remember. Then draw a picture and solve the problem. Write your answers in complete sentences.

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	Solution: _____



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Area

Picture	Solution
	Solution: _____





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Perimeter

Area

Picture	Solution
	Solution: _____



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