

MA.4.GR.2.1

Overarching Standard: MA.4.GR.2 *Solve problems involving the perimeter and area of rectangles.*

Benchmark of Focus

Solve perimeter and area mathematical and real-world problems, **MA.4.GR.2.1** including problems with unknown sides, for rectangles with whole-number side lengths.

Benchmark Clarifications

Clarification 1: Instruction extends the development of algebraic thinking where the symbolic representation of the unknown uses a letter.

Clarification 2: Problems involving multiplication are limited to products of up to 3 digits by 2 digits. Problems involving division are limited to up to 4 digits divided by 1 digit.

Clarification 3: Responses include the appropriate units in word form.

Related Benchmark/Horizontal Alignment

- MA.4.NSO.2.2/2.3/2.4/2.5
- MA.4.AR.1.1

Vertical Alignment

Previous Benchmarks Next Benchmarks

MA.3.GR.2.3

MA.5.GR.2.1

Terms from the K-12 Glossary

- Perimeter

Purpose and Instructional Strategies

The purpose of this benchmark is for students to connect perimeter and area problems to algebraic concepts to find the measures of unknown side lengths. This new idea builds from solving area and perimeter problems with whole number side lengths when using models and formulas in Grade 3 (MA.3.GR.2.3) and will form the foundation for problems involving fractional and decimal side lengths in Grade 5 (MA.5.GR.2.1).

- During instruction, students should use a letter (variable) to represent the missing side length and have experiences solving for unknowns in perimeter situations with a given area and vice-versa.

- Instruction includes having students use the fact that opposite sides in rectangles and squares are equal when solving problems involving area and perimeter.

Common Misconceptions or Errors

- Students frequently confuse area and perimeter. Instruction should provide lots of opportunity for students to work with both measures on the same object and have them explain which measure is area and which is perimeter and why? Instruction should also focus on naming the units properly.

Strategies to Support Tiered Instruction

- Instruction provides many opportunities for students to work with both measures on the same object and explain which measure is area and which is perimeter and why. Instruction should also focus on naming the units properly
- Instruction includes finding both the area and perimeter in real world examples and having students explain how they solved for both.
 - For example, when provided with examples like the following, students use the measurements provided to create an equation to find area and perimeter and explain the difference. "A rectangular garden is being built at the school. The dimensions for the garden are 8 feet by 4 feet. Write and solve an equation to find the area of the garden and an equation to find the perimeter of the garden."
- The teacher provides students with images created using square tiles. Student count and labels the side lengths based on the tiles, then write equations to show how they would find the area and how they would find the perimeter.
 - For example: When provided with an image like the one shown below, students label each side length based on the number of tiles and write an equation for perimeter and then count the units around the outside of the figure to confirm their solution. Students multiply the length and width to find area and then count the number of squares that make up the figure to confirm their solution.

Student will label this side as 8 units.



Student will label this side as 4 units.

$$\text{Area} = 8 \times 4$$

$$\text{Perimeter} = 8 + 4 + 8 + 4$$

Questions to ask students:

- **See if students describe a real world situation in which they would need to find the area or perimeter.**
- **Draw a rectangle. Ask students to point and identify what you would be finding if you found the area.**

Sample answer that indicates understanding: *Area is how much space a shape covers. It's like an array of squares so I can multiply the number of squares in a row by the number of rows.*

Sample answer that indicates an incomplete understanding or a misconception: *(while pointing to the inside) area is the inside and perimeter is the outside.*

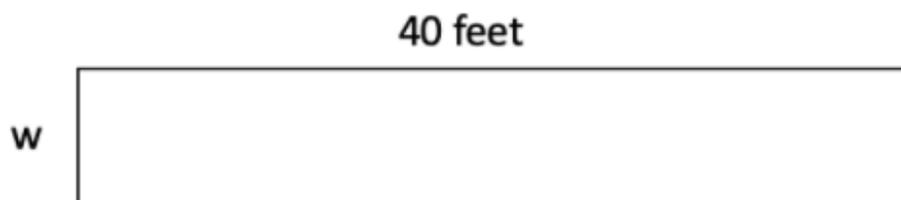
- **Ask students why the formula for area works.**

Sample answer that indicates understanding: *If I were to model this rectangle with tiles I would use ____ rows and each row would have ____ tiles. That is just like an array in multiplication!*

Instructional Tasks

Instructional Task 1

The perimeter of the patio below is 98 square feet.

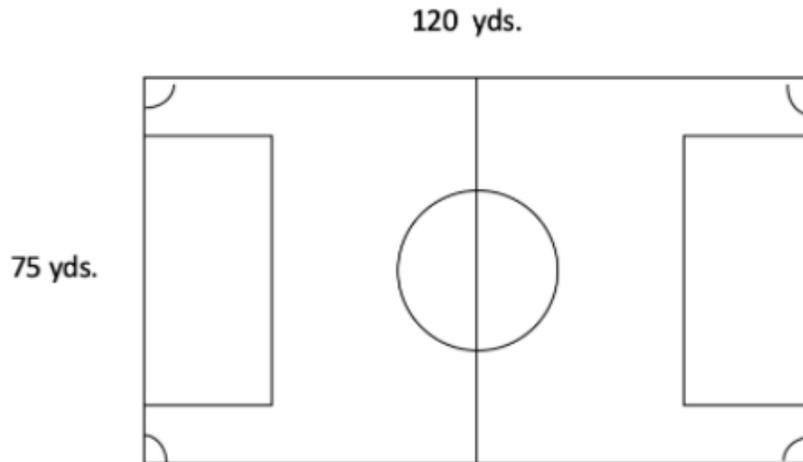


What is the area of the patio?

Instructional Items

Instructional Item 1

A soccer field with its dimensions is shown.



Which equation can be used to find the area of the soccer field?

- a. $75 \text{ yards} + 120 \text{ yards} = A \text{ yards}$
- b. $75 \text{ yards} + 75 \text{ yards} + 120 \text{ yards} + 120 \text{ yards} = A \text{ yards}$
- c. $75 \text{ yards} \times 120 \text{ yards} = A \text{ square yards}$
- d. $75 \text{ yards} \times 120 \text{ yards} \times 75 \text{ yards} \times 120 \text{ yards} = A \text{ square yards}$

Achievement Level Descriptors

Benchmark		Context	Assessment Limits
MA.4.GR.2.1 Solve perimeter and area mathematical and real-world problems, including problems with unknown sides, for rectangles with whole-number side lengths Clarification 1: Instruction extends the development of algebraic thinking where the symbolic representation of the unknown uses a letter. Clarification 2: Problems involving multiplication are limited to products of up to 3 digits by 2 digits. Problems involving division are limited to up to 4 digits divided by 1 digit. Clarification 3: Responses must include the appropriate units in word form.		Both	Items involving finding the area for two-dimensional figures must include side dimensions that are greater than 12 units. Items may require the students to find the perimeter, the area, or both.
ALD 2	ALD 3	ALD 4	ALD 5

solves perimeter and area mathematical problems, including problems with rectangles with unknown side of one or two digits given the equation.	solves perimeter and area mathematical problems, including problems with unknown sides, for rectangles with whole number side lengths.	solves perimeter and area mathematical and real-world problems, including problems with unknown sides, for rectangles with whole number side lengths.	identifies an error and writes an equation to solve perimeter and area mathematical or real-world problems, including problems with unknown sides, for rectangles with whole number side lengths.
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Additional Resources:

[CPALMS Resources](#)

[Video: Use area models to find the area of rectangles](#)

Resources/Tasks to Support Your Child at Home:

[Khan Academy Area and Perimeter Problems](#)