

2022 MCAS Sample Student Work and Scoring Guide

Grade 4 Mathematics

Question 8: Constructed-Response

Reporting Category: Measurement and Data

Standard: [4.MD.A.3](#) - Apply the area and perimeter formulas for rectangles in real-world and mathematical problems.

Item Description: Determine the area of a rectangle given the length and width, determine the width of a rectangle given the area and length, explain how it is possible for two rectangles with different areas to have the same perimeter, and solve a real-world problem involving rectangles with the same perimeter but with different areas.

Calculator: Not allowed

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Scoring Guide

Select a score point in the table below to view the sample student response.

Score*	Description
4A	The student response demonstrates an exemplary understanding of the Measurement and Data concepts involved in applying the area and perimeter formulas for rectangles in real-world and mathematical problems. The student determines the area of a rectangle given the length and width, determines the width given the area and length of a rectangle, explains how it is possible for two rectangles with different areas to have the same perimeter, and solves a real-world problem involving rectangles with the same perimeter but with different areas.
4B	
3	The student response demonstrates a good understanding of the Measurement and Data concepts involved in applying the area and perimeter formulas for rectangles in real-world and mathematical problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points.
2	The student response demonstrates a fair understanding of the Measurement and Data concepts involved in applying the area and perimeter formulas for rectangles in real-world and mathematical problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Measurement and Data concepts involved in applying the area and perimeter formulas for rectangles in real-world and mathematical problems.
0	The student response contains insufficient evidence of an understanding of the Measurement and Data concepts involved in applying the area and perimeter formulas for rectangles in real-world and mathematical problems. As a result, the response does not merit any points.

*Letters are used to distinguish between sample student responses that earned the same score (e.g., 4A and 4B).

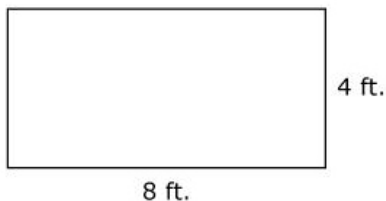
Score Point 4A

This question has four parts.

There is a garden, a patio, and a flower bed in the backyard of a house. The garden, the patio, and the flower bed are each in the shape of a rectangle.

Part A

The garden has a length of 4 feet and a width of 8 feet, as shown in this diagram.



What is the area, in square feet, of the garden?

Enter your answer in the box.

square feet

Part B

The patio has a length of 5 feet and an area of 35 square feet.

What is the width, in feet, of the patio? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The width of the patio is 7 feet. I know this because the formula of area is length x width, but we already have the area, so instead we divide. Eventually, I did $35 \div 5$ and I got 7 feet as my answer.

Part C

The owner of the house thinks the garden and the patio have the same perimeter.

Is the owner correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

The owner is correct because if you do $4 + 4 + 8 + 8$ you'll get 24, if you also do $7 + 7 + 5 + 5$ you'll also get 24, so basically the owner is correct.

Part D

The area of the flower bed is **less than** the area of the garden. The perimeter of the flower bed is **equal** to the perimeter of the patio.

What could be the length **and** the width of the flower bed? Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

The length of the flower bed could be 2 and the width of the flower bed would be 10. I think it's correct because when you do $2 + 2 + 10 + 10$ you'll get 24. When you multiply them you'll get 20 which is less than the area of the garden.

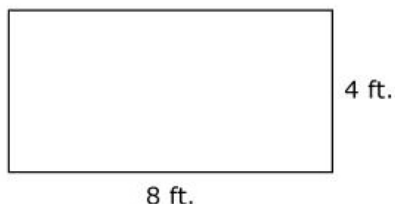
Score Point 4B

This question has four parts.

There is a garden, a patio, and a flower bed in the backyard of a house. The garden, the patio, and the flower bed are each in the shape of a rectangle.

Part A

The garden has a length of 4 feet and a width of 8 feet, as shown in this diagram.



What is the area, in square feet, of the garden?

Enter your answer in the box.

32 square feet

Part B

The patio has a length of 5 feet and an area of 35 square feet.

What is the width, in feet, of the patio? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$35 \div 5 = 7 \text{ ft}$$

Part C

The owner of the house thinks the garden and the patio have the same perimeter.

Is the owner correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

The owner is correct because
 $8 + 4 + 8 + 4 = 24 \text{ ft}$ and
 $7 + 5 + 7 + 5 = 24 \text{ ft}$

Part D

The area of the flower bed is **less than** the area of the garden. The perimeter of the flower bed is **equal** to the perimeter of the patio.

What could be the length **and** the width of the flower bed? Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

The length of the flower bed is 11 ft and the width of the flower bed is 1 ft. This is correct because
 $11 + 1 + 11 + 1 = 24$ and
 $11 \times 1 = 11$ which is less than 32.

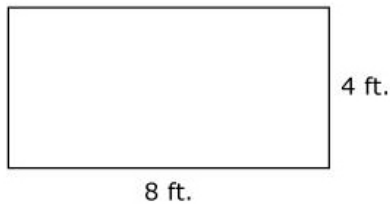
Score Point 3

This question has four parts.

There is a garden, a patio, and a flower bed in the backyard of a house. The garden, the patio, and the flower bed are each in the shape of a rectangle.

Part A

The garden has a length of 4 feet and a width of 8 feet, as shown in this diagram.



What is the area, in square feet, of the garden?

Enter your answer in the box.

square feet

Part B

The patio has a length of 5 feet and an area of 35 square feet.

What is the width, in feet, of the patio? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

I got my answer because I divided 35 by 5 and I got 7 as my answer.

Part C

The owner of the house thinks the garden and the patio have the same perimeter.

Is the owner correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

The owner is correct because
 $7 + 7 + 5 + 5 = 24$ and
 $8 + 8 + 4 + 4 = 24$.

Part D

The area of the flower bed is **less than** the area of the garden. The perimeter of the flower bed is **equal** to the perimeter of the patio.

What could be the length **and** the width of the flower bed? Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

I think that the length is 6 and the width is 6. I know that my answer is correct because I added $6 + 6 + 6 + 6$ and I got 24

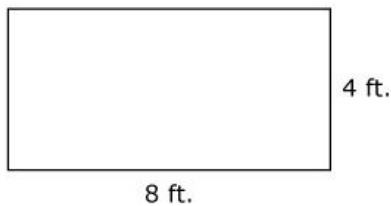
Score Point 2

This question has four parts.

There is a garden, a patio, and a flower bed in the backyard of a house. The garden, the patio, and the flower bed are each in the shape of a rectangle.

Part A

The garden has a length of 4 feet and a width of 8 feet, as shown in this diagram.



What is the area, in square feet, of the garden?

Enter your answer in the box.

32 square feet

Part B

The patio has a length of 5 feet and an area of 35 square feet.

What is the width, in feet, of the patio? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

7 because $5 \times 7 = 35$

Part C

The owner of the house thinks the garden and the patio have the same perimeter.

Is the owner correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

no

Part D

The area of the flower bed is **less than** the area of the garden. The perimeter of the flower bed is **equal** to the perimeter of the patio.

What could be the length **and** the width of the flower bed? Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

10

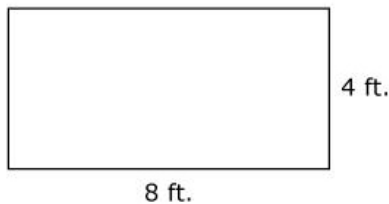
Score Point 1

This question has four parts.

There is a garden, a patio, and a flower bed in the backyard of a house. The garden, the patio, and the flower bed are each in the shape of a rectangle.

Part A

The garden has a length of 4 feet and a width of 8 feet, as shown in this diagram.



What is the area, in square feet, of the garden?

Enter your answer in the box.

square feet

Part B

The patio has a length of 5 feet and an area of 35 square feet.

What is the width, in feet, of the patio? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The patio's length is 5 feet and an area of 35 square feet so if I know $5 \times 7 = 35$ so the width is 7

Part C

The owner of the house thinks the garden and the patio have the same perimeter.

Is the owner correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

No the garden and the patio does not have the same perimeter because the square feet is 24sq but the width is 7 and I add them I would get 31 for the perimeter.

Part D

The area of the flower bed is **less than** the area of the garden. The perimeter of the flower bed is **equal** to the perimeter of the patio.

What could be the length **and** the width of the flower bed? Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

The area of the flower bed is less of garden because it only has 31 perimeter for the garden.

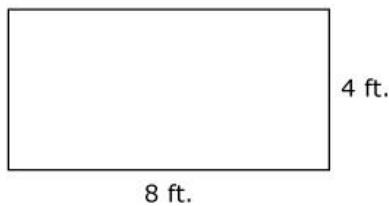
Score Point 0

This question has four parts.

There is a garden, a patio, and a flower bed in the backyard of a house. The garden, the patio, and the flower bed are each in the shape of a rectangle.

Part A

The garden has a length of 4 feet and a width of 8 feet, as shown in this diagram.



What is the area, in square feet, of the garden?

Enter your answer in the box.

square feet

Part B

The patio has a length of 5 feet and an area of 35 square feet.

What is the width, in feet, of the patio? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$35 \div 5 = 7$ The width of the patio is 7 feet long I know this because $35 \div 5 = 7$.

Part C

The owner of the house thinks the garden and the patio have the same perimeter.

Is the owner correct? Explain your reasoning.

Enter your answer and your explanation in the space provided.

The owner is incorrect because the patio has a 5 feet and the garden doesnt have 5 feet on any sides so the owner is incorrect.

Part D

The area of the flower bed is **less than** the area of the garden. The perimeter of the flower bed is **equal** to the perimeter of the patio.

What could be the length **and** the width of the flower bed? Explain how you know your answer is correct.

Enter your answer and your explanation in the space provided.

I think the width of the garden is 30 ft and lentgh is 5 ft.