

2021 MCAS Sample Student Work and Scoring Guide

Grade 7 Mathematics

Question 15: Constructed-Response

Reporting Category: Geometry

Standard: [7.G.B.6](#) - Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Item Description: Solve real-world problems involving area and volume for right prisms of varying dimensions.

Calculator: 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 Geometry concepts involved in solving real-world problems involving area and volume of two- and three-dimensional objects composed of quadrilaterals, polygons, cubes, and right prisms. Given a set of parameters, the student finds the dimensions of a right rectangular prism.
4B	
3	The student response demonstrates a good understanding of the Geometry concepts involved in solving real-world problems involving area and volume of two- and three-dimensional objects composed of quadrilaterals, polygons, cubes, and right prisms. 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 Geometry concepts involved in solving real-world problems involving area and volume of two- and three-dimensional objects composed of quadrilaterals, polygons, cubes, and right prisms. 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 Geometry concepts involved in solving real-world problems involving area and volume of two- and three-dimensional objects composed of quadrilaterals, polygons, cubes, and right prisms.
0	The student response contains insufficient evidence of an understanding of the Geometry concepts involved in solving real-world problems involving area and volume of two- and three-dimensional objects composed of quadrilaterals, polygons, cubes, and right prisms. 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 three parts.

A playground has two sandboxes. Each sandbox is in the shape of a right prism.

Part A

The first sandbox has a square base with a side length of 8 feet. What is the area, in square feet, of the base of the first sandbox? Show or explain how you got your answer.

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

Square has all even sides

$$8 \text{ ft} \times 8 \text{ ft} = 64 \text{ ft}^2$$

Part B

The groundskeeper filled the first sandbox with sand to a height of 6 inches. What is the volume, in cubic feet, of the sand that was used to fill the first sandbox to a height of 6 inches? Show or explain how you got your answer.

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

$$V = Bh$$

$$\text{Volume} = 64 \text{ ft}^2 \times 6 \text{ in}$$

$$\text{Volume} = 64 \text{ ft}^2 \times .5 \text{ ft}$$

$$\text{Volume} = 32 \text{ ft}^3$$

Part C

After filling the first sandbox to a height of 6 inches, the groundskeeper had 24 cubic feet of sand left over. She used all the leftover sand to fill the second sandbox.

- The second sandbox has a base in the shape of a rectangle.
- The base of the second sandbox has a perimeter that is less than 35 feet.
- The groundskeeper filled the second sandbox to a height of 6 inches.

What could be the length and width, in feet, of the second sandbox? Show or explain how you got your answers.

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

The length could be 6 ft and the width could be 8 ft, if you use these to find the volume you get 24 ft^3 of sand needed and if you use these measurements to find the perimeter you get 28 feet which is less than 35 feet.

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Score Point 4B

This question has three parts.

A playground has two sandboxes. Each sandbox is in the shape of a right prism.

Part A

The first sandbox has a square base with a side length of 8 feet. What is the area, in square feet, of the base of the first sandbox? Show or explain how you got your answer.

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

If the area of the base is a square then all the sides are the same so if one of the sides are 8 they are all 8. The area of a square is length times width so in this situation that is $8 \times 8 = 64$ square feet.

Part B

The groundskeeper filled the first sandbox with sand to a height of 6 inches. What is the volume, in cubic feet, of the sand that was used to fill the first sandbox to a height of 6 inches? Show or explain how you got your answer.

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

The area for a prism is length times width times height or area of the base times the height. We know the area of the base is 64 square feet so we can multiply it by the height of .5 feet to get a volume of 32 cubic feet.

Part C

After filling the first sandbox to a height of 6 inches, the groundskeeper had 24 cubic feet of sand left over. She used all the leftover sand to fill the second sandbox.

- The second sandbox has a base in the shape of a rectangle.
- The base of the second sandbox has a perimeter that is less than 35 feet.
- The groundskeeper filled the second sandbox to a height of 6 inches.

What could be the length and width, in feet, of the second sandbox? Show or explain how you got your answers.

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

If we divide 24 cubic feet by .5 which equals the area of the base we get 48. So the length and width are 4 and 12 because they make an area that is 48 and have a perimeter of less than 35.

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Score Point 3

This question has three parts.

A playground has two sandboxes. Each sandbox is in the shape of a right prism.

Part A

The first sandbox has a square base with a side length of 8 feet. What is the area, in square feet, of the base of the first sandbox? Show or explain how you got your answer.

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

The area of the square base of the sandbox is 64 square feet. I know this because if one of the sides of a square is 8 feet, then all of the sides of the square are 8 feet because all of the sides are equal. Then, to find the area of a square, you just multiply the length by the width, which in this case is $8 \times 8 = 64$.

Part B

The groundskeeper filled the first sandbox with sand to a height of 6 inches. What is the volume, in cubic feet, of the sand that was used to fill the first sandbox to a height of 6 inches? Show or explain how you got your answer.

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

The volume of the sand in the first sandbox is 384 cubic feet. I know this because to find the area of a right prism can be expressed as the area of the base times the height (Bh). In this case, the area of the base is 64 and the height is 6. $64 \times 6 = 384$, so the volume is 384 cubic feet.

Part C

After filling the first sandbox to a height of 6 inches, the groundskeeper had 24 cubic feet of sand left over. She used all the leftover sand to fill the second sandbox.

- The second sandbox has a base in the shape of a rectangle.
- The base of the second sandbox has a perimeter that is less than 35 feet.
- The groundskeeper filled the second sandbox to a height of 6 inches.

What could be the length and width, in feet, of the second sandbox? Show or explain how you got your answers.

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

The length of the second sandbox could be 8 and the width could be 6. These two numbers fit all of the requirement. First, these side lengths would constitute a rectangle because they are not equal. Secondly, the perimeter would be $(2 \times 6) + (2 \times 8) = 28$, which is less than 35. Finally, since the height is 0.5 feet (6 inches), the volume of the sand in this sandbox would be $6 \times 8 \times 0.5 = 24$, which is the correct volume of 24 cubic feet.

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Score Point 2

This question has three parts.

A playground has two sandboxes. Each sandbox is in the shape of a right prism.

Part A

The first sandbox has a square base with a side length of 8 feet. What is the area, in square feet, of the base of the first sandbox? Show or explain how you got your answer.

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

I mulitplyed so the area of the square base is 64.

Part B

The groundskeeper filled the first sandbox with sand to a height of 6 inches. What is the volume, in cubic **feet**, of the sand that was used to fill the first sandbox to a height of 6 inches? Show or explain how you got your answer.

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

the volume is 48.

Part C

After filling the first sandbox to a height of 6 inches, the groundskeeper had 24 cubic feet of sand left over. She used all the leftover sand to fill the second sandbox.

- The second sandbox has a base in the shape of a rectangle.
- The base of the second sandbox has a perimeter that is less than 35 feet.
- The groundskeeper filled the second sandbox to a height of 6 inches.

What could be the length and width, in feet, of the second sandbox? Show or explain how you got your answers.

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

the length for the second sandbox is 6 and the width for the secind sandbox is 8.

Score Point 1

This question has three parts.

A playground has two sandboxes. Each sandbox is in the shape of a right prism.

Part A

The first sandbox has a square base with a side length of 8 feet. What is the area, in square feet, of the base of the first sandbox? Show or explain how you got your answer.

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

$$8 \times 8 = 64 \text{ ft squared}$$

The area of the base in the first sand box is 64 feet squared

Part B

The groundskeeper filled the first sandbox with sand to a height of 6 inches. What is the volume, in cubic feet, of the sand that was used to fill the first sandbox to a height of 6 inches? Show or explain how you got your answer.

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

$$6 \times 8 = 48 \text{ cubic feet}$$

The sand box has a volume of 48 cubic feet.

Part C

After filling the first sandbox to a height of 6 inches, the groundskeeper had 24 cubic feet of sand left over. She used all the leftover sand to fill the second sandbox.

- The second sandbox has a base in the shape of a rectangle.
- The base of the second sandbox has a perimeter that is less than 35 feet.
- The groundskeeper filled the second sandbox to a height of 6 inches.

What could be the length and width, in feet, of the second sandbox? Show or explain how you got your answers.

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

$$24 \div 6 = 4 \text{ foot width}$$

$$34 - 8 = 26$$

$$26 \div 2 = 13 \text{ foot length}$$

The second sand box has a width of 4 feet and a length of 13 feet.

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Score Point 0

This question has three parts.

A playground has two sandboxes. Each sandbox is in the shape of a right prism.

Part A

The first sandbox has a square base with a side length of 8 feet. What is the area, in square feet, of the base of the first sandbox? Show or explain how you got your answer.

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

32

I mutiplied 4 times 8 becuase its a square sandbox so
It had 4 sides.

Part B

The groundskeeper filled the first sandbox with sand to a height of 6 inches. What is the volume, in cubic feet, of the sand that was used to fill the first sandbox to a height of 6 inches? Show or explain how you got your answer.

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

192

I mutiplied 32 times 6 because the sandbox was 32
feet and a height of 6 inches

Part C

After filling the first sandbox to a height of 6 inches, the groundskeeper had 24 cubic feet of sand left over. She used all the leftover sand to fill the second sandbox.

- The second sandbox has a base in the shape of a rectangle.
- The base of the second sandbox has a perimeter that is less than 35 feet.
- The groundskeeper filled the second sandbox to a height of 6 inches.

What could be the length and width, in feet, of the second sandbox? Show or explain how you got your answers.

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

The width could be 210 and the lenth could be 114

I mutiplied 35 times 6 to find the width of the sandbox
then I mutiplied 24 times 6 to find the length of the
sandbox.