

2023 MCAS Sample Student Work and Scoring Guide

Grade 7 Mathematics

Question 4: Constructed-Response

Reporting Category: Ratios and Proportional Relationships

Standard: [7.RP.A.1](#) - Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

Item Description: Determine unit rates associated with ratios of fractions and use them to solve real-world problems.

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 Ratios and Proportional Relationships concepts involved in computing unit rates associated with ratios of fractions. The student determines and compares unit rates in a real-world context.
4B	
3	The student response demonstrates a good understanding of the Ratios and Proportional Relationships concepts involved in computing unit rates associated with ratios of fractions. 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 Ratios and Proportional Relationships concepts involved in computing unit rates associated with ratios of fractions. 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 Ratios and Proportional Relationships concepts involved in computing unit rates associated with ratios of fractions.
0	The student response contains insufficient evidence of an understanding of the Ratios and Proportional Relationships concepts involved in computing unit rates associated with ratios of fractions. 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.

Hank has been hired to paint all the rooms in a hotel.

- All of the rooms in the hotel are the same size.
- Hank will paint 3 hotel rooms every $7\frac{1}{2}$ hours.
- Hank will paint at the same rate until the job is complete.

Part A

How many hours will it take Hank to paint 6 hotel rooms?
Show or explain how you got your answer.

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

$$\frac{15}{2} \times 2 = 15$$

It will take 15 hours to paint 6 hotel rooms

Part B

How many hours will it take Hank to paint 1 hotel room?
Show or explain how you got your answer.

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

$$\frac{15}{2} \div 3$$

$$\frac{15}{2} \times \frac{1}{3} = \frac{5}{2}$$

$$\frac{5}{2} = 2.5$$

It takes 2.5 hours for Hank to paint a hotel room.

Part C

Write an equation that can be used to find h , the number of hours it will take Hank to paint r hotel rooms.

Enter your equation in the space provided.

$$h = 2.5r$$

Part D

It will take Hank 1,200 hours to paint all the hotel rooms.
What is the total number of rooms in the hotel? Show or explain how you got your answer.

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

$$1200 \div \frac{5}{2}$$

$$1200 \times \frac{2}{5} = 480$$

There are 480 rooms in a hotel.

Score Point 4B

This question has four parts.

Hank has been hired to paint all the rooms in a hotel.

- All of the rooms in the hotel are the same size.
- Hank will paint 3 hotel rooms every $7\frac{1}{2}$ hours.
- Hank will paint at the same rate until the job is complete.

Part A

How many hours will it take Hank to paint 6 hotel rooms?
Show or explain how you got your answer.

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

7.5 hours per 3 rooms.
to get to 6 rooms, multiply by 2.
 $7.5 \cdot 2 = 15$
it will take Hank 15 hours to paint 6 rooms.

Part B

How many hours will it take Hank to paint 1 hotel room?
Show or explain how you got your answer.

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

7.5 hours per 3 rooms.
to get to 1 room, divide by 3.
 $7.5 / 3 = 2.5$
it will take Hank 2.5 hours to paint 1 room.

Part C

Write an equation that can be used to find h , the number of hours it will take Hank to paint r hotel rooms.

Enter your equation in the space provided.

$$h = 2.5r$$

Part D

It will take Hank 1,200 hours to paint all the hotel rooms.
What is the total number of rooms in the hotel? Show or explain how you got your answer.

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

$1200 = 2.5r$
 $\frac{1200}{2.5} = r$
 $\frac{12000}{25} = r$
 $480 = r$
there are 480 rooms in the hotel.

Score Point 3

This question has four parts.

Hank has been hired to paint all the rooms in a hotel.

- All of the rooms in the hotel are the same size.
- Hank will paint 3 hotel rooms every $7\frac{1}{2}$ hours.
- Hank will paint at the same rate until the job is complete.

Part A

How many hours will it take Hank to paint 6 hotel rooms?
Show or explain how you got your answer.

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

It will take Hank 15 hours to paint 6 rooms.

$$3 \cdot 2 = 6 \text{ rooms}$$

$$7\frac{1}{2} \cdot 2 = 15 \text{ hours}$$

Part B

How many hours will it take Hank to paint 1 hotel room?
Show or explain how you got your answer.

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

It will take Hank $2\frac{1}{2}$ hours to paint 1 hotel room.

$$7\frac{1}{2} = \frac{15}{2}$$

$$\frac{15}{2} \div 3 = \frac{5}{2} = 2\frac{1}{2} \text{ hours}$$

Part C

Write an equation that can be used to find h , the number of hours it will take Hank to paint r hotel rooms.

Enter your equation in the space provided.

$$h \cdot r$$

Part D

It will take Hank 1,200 hours to paint all the hotel rooms.
What is the total number of rooms in the hotel? Show or explain how you got your answer.

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

There are 480 hotel rooms in total.

$$1200 \times 2 = 2400 \text{ hours}$$

$$2400 \div 5 = 480$$

$$\frac{5}{2} \cdot 480 = \frac{2400}{2} = 1200$$

Score Point 2

This question has four parts.

Hank has been hired to paint all the rooms in a hotel.

- All of the rooms in the hotel are the same size.
- Hank will paint 3 hotel rooms every $7\frac{1}{2}$ hours.
- Hank will paint at the same rate until the job is complete.

Part A

How many hours will it take Hank to paint 6 hotel rooms?

Show or explain how you got your answer.

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

$$3 \text{ hotel rooms} = 7\frac{1}{2}$$

$$7\frac{1}{2} \times 2 = 15$$

6 hotels rooms will take 15 hours.

Part B

How many hours will it take Hank to paint 1 hotel room?

Show or explain how you got your answer.

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

$$3 = 7\frac{1}{2}$$

$$1 = \text{one third of } 7\frac{1}{2}$$

$$\text{one third of } 7\frac{1}{2} \text{ is } 2\frac{1}{2}$$

it would take hank 2 and a half hours to paint one room.

Part C

Write an equation that can be used to find h , the number of hours it will take Hank to paint r hotel rooms.

Enter your equation in the space provided.

$$r = 7\frac{1}{2} h$$

Part D

It will take Hank 1,200 hours to paint all the hotel rooms.

What is the total number of rooms in the hotel? Show or explain how you got your answer.

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

$$3 = 7\frac{1}{2}$$

$$x = 1200$$

$$1200 \div 3 = 400$$

there are 400 rooms

Score Point 1

This question has four parts.

Hank has been hired to paint all the rooms in a hotel.

- All of the rooms in the hotel are the same size.
- Hank will paint 3 hotel rooms every $7\frac{1}{2}$ hours.
- Hank will paint at the same rate until the job is complete.

Part A

How many hours will it take Hank to paint 6 hotel rooms?
Show or explain how you got your answer.

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

It will take Hank 45 hours to paint 6 hotel rooms. I did $6 \times 7\frac{1}{2}$ and got 45.

Part B

How many hours will it take Hank to paint 1 hotel room?
Show or explain how you got your answer.

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

It will take Hank $2\frac{1}{2}$ hours to paint 1 hotel room. I did $7\frac{1}{2} \div 3$ and got $2\frac{1}{2}$.

Part C

Write an equation that can be used to find h , the number of hours it will take Hank to paint r hotel rooms.

Enter your equation in the space provided.

$$2\frac{1}{2}h = r$$

Part D

It will take Hank 1,200 hours to paint all the hotel rooms.
What is the total number of rooms in the hotel? Show or explain how you got your answer.

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

There are 160 rooms in the hotel. I did $1200 \div 7\frac{1}{2}$ and got 160.

Score Point 0

This question has four parts.

Hank has been hired to paint all the rooms in a hotel.

- All of the rooms in the hotel are the same size.
- Hank will paint 3 hotel rooms every $7\frac{1}{2}$ hours.
- Hank will paint at the same rate until the job is complete.

Part A

How many hours will it take Hank to paint 6 hotel rooms?
Show or explain how you got your answer.

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

Painting 6 rooms will take Hank $42\frac{1}{2}$ hours

$$42\frac{1}{2} = 3 \times 7\frac{1}{2}$$

Part B

How many hours will it take Hank to paint 1 hotel room?
Show or explain how you got your answer.

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

It will take Hank $7\frac{1}{2}$ hours to paint 1 room

$$1 \times 7\frac{1}{2} = 7\frac{1}{2}$$

Part C

Write an equation that can be used to find h , the number of hours it will take Hank to paint r hotel rooms.

Enter your equation in the space provided.

$$6h \times r$$

Part D

It will take Hank 1,200 hours to paint all the hotel rooms.
What is the total number of rooms in the hotel? Show or explain how you got your answer.

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

$$1,200 \div 6 = 200$$