

2022 MCAS Sample Student Work and Scoring Guide

Grade 10 Mathematics

Question 6: Constructed-Response

Reporting Category: Number and Quantity

Standards: [AI.N-Q.A.2](#) - Define appropriate quantities for the purpose of descriptive modeling.

[MI.N-Q.A.2](#) - Define appropriate quantities for the purpose of descriptive modeling.

Item Description: Interpret the units in a graph that represents a real-world situation and estimate solutions of associated problems.

Calculator: Not allowed

[View item in MCAS Digital Item Library](#)

Scoring Guide

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

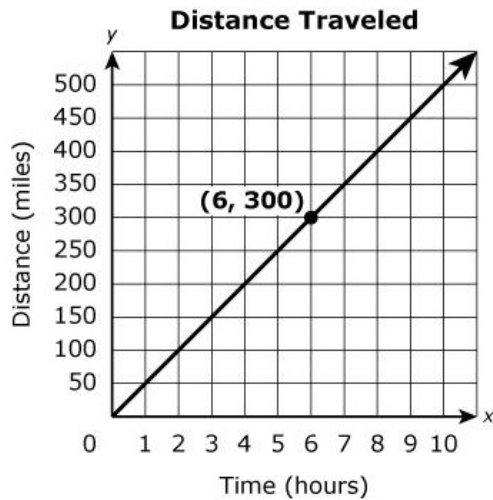
Score*	Description
4A	The student response demonstrates an exemplary understanding of the Number and Quantity concepts involved in defining appropriate quantities for the purpose of descriptive modeling. The student uses units to solve a real-world problem based on information displayed on a graph.
4B	
3	The student response demonstrates a good understanding of the Number and Quantity concepts involved in defining appropriate quantities for the purpose of descriptive modeling. 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 Number and Quantity concepts involved in defining appropriate quantities for the purpose of descriptive modeling. 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 Number and Quantity concepts involved in defining appropriate quantities for the purpose of descriptive modeling.
0	The student response contains insufficient evidence of an understanding of the Number and Quantity concepts involved in defining appropriate quantities for the purpose of descriptive modeling. 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.

This graph models the linear relationship between the distance a car traveled and time.



Part A

What does the point $(6, 300)$ represent in this situation?

Enter your answer in the space provided.

The point $(6, 300)$ represents the distance the car traveled over 6 hours, that being 300 miles.

Part B

Based on the graph, what was the average speed of the car? Show or explain how you got your answer.

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

The average speed of the car was 50mph. I got this answer by dividing 300 miles by 6 hours to get how fast the car was traveling in miles per hour, that being 50mph.

Part C

A second car traveled a distance of 209 miles in 5 hours and 6 minutes. **Estimate** the average speed of the second car. Show or explain how you got your answer.

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

The second car is traveling at about 40mph. I estimated this answer by rounding 209 down to 200 and 5 hours and 6 minutes down to just 5 hours. I then found the speed of the car by dividing 200 miles by 5 hours to get the speed of 40mph.

Part D

A third car traveled at an average speed of 61 miles per hour for 8 hours and 28 minutes. **Estimate** the total distance the third car traveled. Show or explain how you got your answer.

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

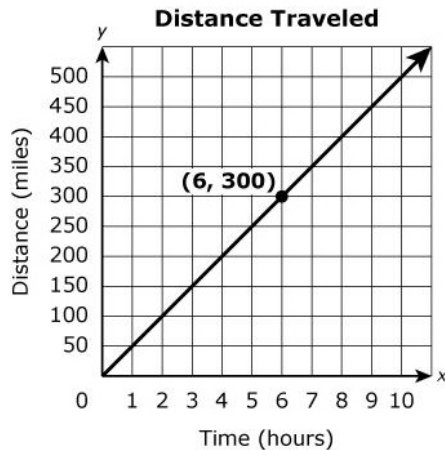
I estimated the distance covered by the car to be around 510 miles. To get this answer I first rounded 61 mph to 60 mph and 8 hours and 28 minutes to 8.5 hours. I then multiplied 60 miles by 8.5 hours to get that the car would travel around 510 miles.

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Score Point 4B

This question has four parts.

This graph models the linear relationship between the distance a car traveled and time.



Part A

What does the point $(6, 300)$ represent in this situation?

Enter your answer in the space provided.

The point when the car had reached 300 miles after 6 hours.

Part B

Based on the graph, what was the average speed of the car? Show or explain how you got your answer.

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

The average speed was 50 mph because at one hour the car was at 50 miles and at two it was 100.

Part C

A second car traveled a distance of 209 miles in 5 hours and 6 minutes. **Estimate** the average speed of the second car. Show or explain how you got your answer.

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

About 42 miles because the first car went 250 in 5 hours so the second car must be going just a bit slower.

Part D

A third car traveled at an average speed of 61 miles per hour for 8 hours and 28 minutes. **Estimate** the total distance the third car traveled. Show or explain how you got your answer.

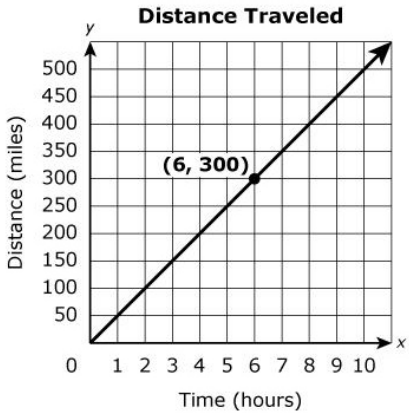
Enter your answer and your work or explanation in the space provided.

About 500 miles because 8×61 is 488 and the extra minutes would likely bring it close to 500.

Score Point 3

This question has four parts.

This graph models the linear relationship between the distance a car traveled and time.



Part A

What does the point $(6, 300)$ represent in this situation?

Enter your answer in the space provided.

a car traveled 300 miles in 6 hours

Part B

Based on the graph, what was the average speed of the car? Show or explain how you got your answer.

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

the average speed of the car was 50 mph because the chart shows that the car was at a consistent speed and if u look at 1 hour, it showsthe car went 50 miles

Part C

A second car traveled a distance of 209 miles in 5 hours and 6 minutes. **Estimate** the average speed of the second car. Show or explain how you got your answer.

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

because i am estimating, i rounded the numbers down so 209 goes to 200 and 5 hours and 6 minutes goes to 5 hours. with this info the car went 200 miles in 5 hours. the average speed of the second car is 40 mph

Part D

A third car traveled at an average speed of 61 miles per hour for 8 hours and 28 minutes. **Estimate** the total distance the third car traveled. Show or explain how you got your answer.

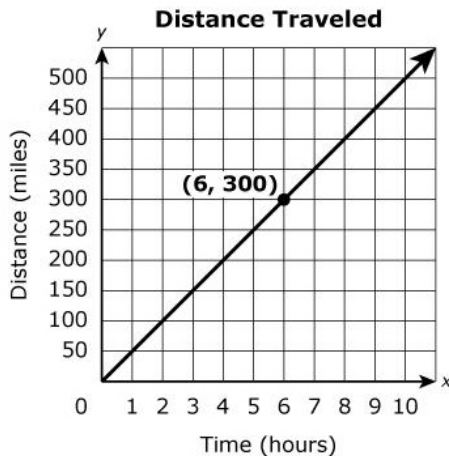
Enter your answer and your work or explanation in the space provided.

again, rounding down because it is a estimate. 60 miles per hour for 8 hours. the car traveled 64 mph

Score Point 2

This question has four parts.

This graph models the linear relationship between the distance a car traveled and time.



Part A

What does the point (6, 300) represent in this situation?

Enter your answer in the space provided.

The destination

Part B

Based on the graph, what was the average speed of the car? Show or explain how you got your answer.

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

50 miles per hour because $\frac{50}{1} = 50$ and $\frac{100}{2} = 50$ and so on as you progress through the chart.

Part C

A second car traveled a distance of 209 miles in 5 hours and 6 minutes. **Estimate** the average speed of the second car. Show or explain how you got your answer.

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

$\frac{200}{5} = 40$ so they were traveling at about 40 miles per hour.

Part D

A third car traveled at an average speed of 61 miles per hour for 8 hours and 28 minutes. **Estimate** the total distance the third car traveled. Show or explain how you got your answer.

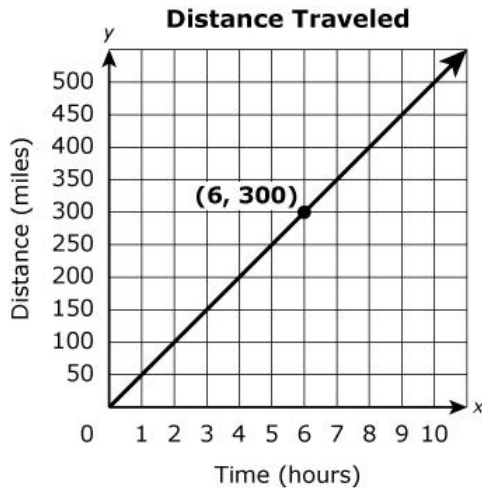
Enter your answer and your work or explanation in the space provided.

$60 \times 8 = 480$ then you add on the extra time and speed so they went about 450 miles.

Score Point 1

This question has four parts.

This graph models the linear relationship between the distance a car traveled and time.



Part A

What does the point $(6, 300)$ represent in this situation?

Enter your answer in the space provided.

how many miles the car has left

Part B

Based on the graph, what was the average speed of the car? Show or explain how you got your answer.

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

50 miles per hour

I know this because at 1 hour, the car traveled 50 miles, and at 2 hours it traveled 100, and at 3 it traveled 150, and so on as the pattern continues

Part C

A second car traveled a distance of 209 miles in 5 hours and 6 minutes. **Estimate** the average speed of the second car. Show or explain how you got your answer.

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

About 23.9 miles per hour

I calculated this by finding the amount of minutes the car traveled which is 506. I then divided 506 by 209 and got 2.3. I multiplied that by 12 to get miles per hour instead of miles per minute.

Part D

A third car traveled at an average speed of 61 miles per hour for 8 hours and 28 minutes. **Estimate** the total distance the third car traveled. Show or explain how you got your answer.

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

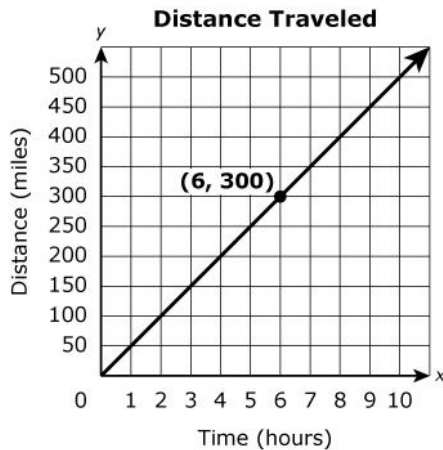
About 25.2 miles per hour. I calculated this by finding the amount of minutes that were traveled, which is 134. I then divided that by 61 and got about 2.1. I then multiplied that by 12 to get miles per hour instead of miles per minute and got 25.2

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Score Point 0

This question has four parts.

This graph models the linear relationship between the distance a car traveled and time.



Part A

What does the point (6, 300) represent in this situation?

Enter your answer in the space provided.

it represents the distance in meters.

Part B

Based on the graph, what was the average speed of the car? Show or explain how you got your answer.

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

well if you go by the piont on the graph then they traveled for 6 hours, but if you don't go by the piont then they traveled 10 hours.

Part C

A second car traveled a distance of 209 miles in 5 hours and 6 minutes. **Estimate** the average speed of the second car. Show or explain how you got your answer.

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

if they traveled a distance of 209 miles in 5hours and 6 minutes then they had to of been going at least 50 – 55 maybe even faster

Part D

A third car traveled at an average speed of 61 miles per hour for 8 hours and 28 minutes. **Estimate** the total distance the third car traveled. Show or explain how you got your answer.

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

they had to of been going 30 – 40 for the speed limate