# 2022 MCAS Sample Student Work and Scoring Guide

## Grade 8 Mathematics
## Question 4: Constructed-Response

**Reporting Category:** Statistics and Probability
**Standard:** 8.SP.A.3 - Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
**Item Description:** Interpret the meanings of the parts of an equation that represents a real-world context and use the equation to solve a real-world problem.
**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**<br><br>**4B** | The student response demonstrates an exemplary understanding of the Statistics and Probability concepts involved in using the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. |
| **3** | The student response demonstrates a good understanding of the Statistics and Probability concepts involved in using the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. 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 Statistics and Probability concepts involved in using the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. 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 Statistics and Probability concepts involved in using the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. |
| **0** | The student response contains insufficient evidence of an understanding of the Statistics and Probability concepts involved in using the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. 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.**

The coach of a basketball team recorded $x$, the number of hours the team practiced before each game last season, and $y$, the number of points the team scored in each game. The coach made a scatter plot and drew a line of best fit for the data, as shown on this coordinate plane.

**Points Scored Last Season**
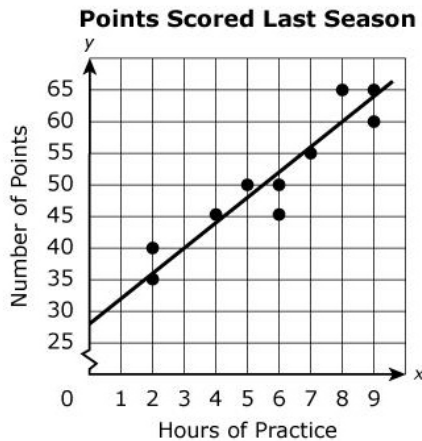


The equation for the line of best fit is $y = 4x + 28$.

**Part A**

What does the $y$-intercept of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> The y-intercept represents about how many points the team scores with 0 hours of practice. This is because the y-intercept is located where x, the number of hours of practice, equals 0.

**Part B**

What does the slope of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> The slope of the line represents about how many more points the team will score with each additional hour of practice. This is because the slope of the line is $\frac{4}{1}$, or 4 points for every 1 hour of practice.

**Part C**

Based on the line of best fit for the data, how many points would the team be expected to score in a game if they practiced for 8 hours before the game? Show or explain how you got your answer.

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

> $y = 4x + 28$
> $y = 4\,(8) + 28$
> $y = 60$
> 60 points

**Part D**

Based on the line of best fit for the data, for how many hours would the team need to practice if they wanted to score $70$ points in a game? Show or explain how you got your answer.

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

$70 = 4x + 28$
$70 - 28 = 4x$
$42 = 4x$
$10.5 = x$
10.5 hours

## Score Point 4B

**This question has four parts.**

The coach of a basketball team recorded $x$, the number of hours the team practiced before each game last season, and $y$, the number of points the team scored in each game. The coach made a scatter plot and drew a line of best fit for the data, as shown on this coordinate plane.

**Points Scored Last Season**
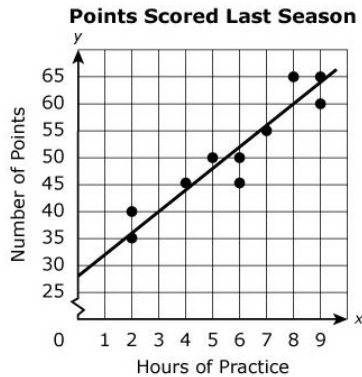


The equation for the line of best fit is $y = 4x + 28$.

**Part A**

What does the $y$-intercept of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> The $y - intercept$ shows that if the team practiced for 0 hours, they would score about 28 points.

**Part B**

What does the slope of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> For every hour the team practices, they score 4 more points. For every hour to the right, the line best fit move up 4 points.

**Part C**

Based on the line of best fit for the data, how many points would the team be expected to score in a game if they practiced for 8 hours before the game? Show or explain how you got your answer.

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

> They would be expected to score 60 because if you go to 8 hours and go up until the line that represents the teams points, it is at 60.

**Part D**

Based on the line of best fit for the data, for how many hours would the team need to practice if they wanted to score $70$ points in a game? Show or explain how you got your answer.
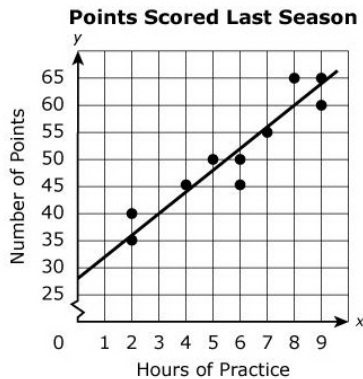
Enter your answer and your work or explanation in the space provided.

> To score 70 points in a game, the team must practice for 10.5 hours. If you plug 70 into y in the equation and solve for x, x equals $10.5$.

## Score Point 3

**This question has four parts.**

The coach of a basketball team recorded $x$, the number of hours the team practiced before each game last season, and $y$, the number of points the team scored in each game. The coach made a scatter plot and drew a line of best fit for the data, as shown on this coordinate plane.

**Points Scored Last Season**



The equation for the line of best fit is $y = 4x + 28$.

**Part A**

What does the $y$-intercept of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> The $y - intercept$ of this equation is the line that best shows the amount of time they practiced compared to the points they scored as an average.

**Part B**

What does the slope of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> The slope of the line is that for each hour they practice before the game they will score about 4 more points from the baseline of 28

**Part C**

Based on the line of best fit for the data, how many points would the team be expected to score in a game if they practiced for 8 hours before the game? Show or explain how you got your answer.

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

> The team would be expected to score 60 points after practicing for 8 hours before the game becasue $8 \times 4 = 32$ then $32 + 28 = 60$.

**Part D**

Based on the line of best fit for the data, for how many hours would the team need to practice if they wanted to score 70 points in a game? Show or explain how you got your answer.
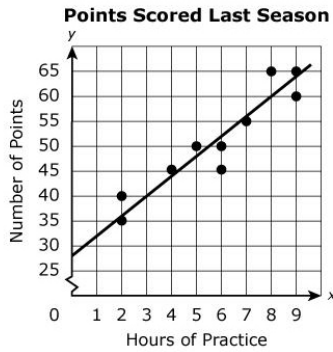
Enter your answer and your work or explanation in the space provided.

> They would need to prectice for about 10.5 hours before the game becasue $10.5 \times 4 = 42$. then $42 + 28 = 70$.

## Score Point 2

**This question has four parts.**

The coach of a basketball team recorded $x$, the number of hours the team practiced before each game last season, and $y$, the number of points the team scored in each game. The coach made a scatter plot and drew a line of best fit for the data, as shown on this coordinate plane.

**Points Scored Last Season**



The equation for the line of best fit is $y = 4x + 28$.

**Part A**

What does the $y$-intercept of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> the y intercept best represents 28 points because I made an estimate of where the line crossed the $y$ axis.

**Part B**

What does the slope of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> the slope is $\frac{4}{5}$ because I counted the rise over run.

**Part C**

Based on the line of best fit for the data, how many points would the team be expected to score in a game if they practiced for 8 hours before the game? Show or explain how you got your answer.

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

> $y = 4(8) + 28$
> $y = 32 + 28$
> $y = 60$
>
> 60 points after 8 hours.

**Part D**

Based on the line of best fit for the data, for how many hours would the team need to practice if they wanted to score 70 points in a game? Show or explain how you got your answer.

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

> they would need to practice for 10.5 hours.
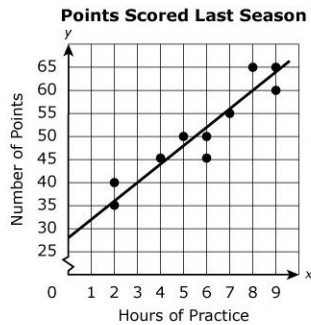> $y = 4(10.5) + 28$
> $y = 42 + 28$
> $y = 70$

## Score Point 1

**This question has four parts.**

The coach of a basketball team recorded $x$, the number of hours the team practiced before each game last season, and $y$, the number of points the team scored in each game. The coach made a scatter plot and drew a line of best fit for the data, as shown on this coordinate plane.

**Points Scored Last Season**



The equation for the line of best fit is $y = 4x + 28$.

**Part A**

What does the $y$-intercept of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> The y intercept of this line is 28. I say this because in the equation $y = 4x + 28$, 28 would be the $y - intercept$ according to the formula $y = mx + b$ .

**Part B**

What does the slope of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> The slope of the line is $\frac{4}{1}$ or 4. I say this because to get to the next point on the graph you use the rise over run meaning you rise 4 and to the right 1.

**Part C**

Based on the line of best fit for the data, how many points would the team be expected to score in a game if they practiced for 8 hours before the game? Show or explain how you got your answer.

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

> The team would be expected to score 60 points if they praticed for 8 hours before the game. I say this because, if you look at the graph a start at 8 hours of pratice, then you'll find that they would score 60 points.

**Part D**

Based on the line of best fit for the data, for how many hours would the team need to practice if they wanted to score 70 points in a game? Show or explain how you got your answer.

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

> The team would need to pratice for 10 hours if they wanted to score 70 points in a game. I say this because if you look on the graph, if the team scored 70 points, then you would go donw to how ever many hours of practice they would need, 10 hours would line up with the 70 points they would score.

## Score Point 0

**This question has four parts.**

The coach of a basketball team recorded $x$, the number of hours the team practiced before each game last season, and $y$, the number of points the team scored in each game. The coach made a scatter plot and drew a line of best fit for the data, as shown on this coordinate plane.

**Points Scored Last Season**



The equation for the line of best fit is $y = 4x + 28$.

**Part A**

What does the $y$-intercept of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> It fits the number of points scored in each game of basketball a team won.

**Part B**

What does the slope of the line of best fit represent in the context of this situation? Explain your reasoning.

Enter your answer and your explanation in the space provided.

> It shows that when they practiced for four hours, they ended up scoring 28 points in their next game.

**Part C**

Based on the line of best fit for the data, how many points would the team be expected to score in a game if they practiced for 8 hours before the game? Show or explain how you got your answer.

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

> The team would be expected to win 56 points in their next game.

**Part D**

Based on the line of best fit for the data, for how many hours would the team need to practice if they wanted to score 70 points in a game? Show or explain how you got your answer.

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

> To be expected to score seventy points in a game they would need to practice for 7.5 hours.