2024 MCAS Sample Student Work and Scoring Guide

Grade 10 Mathematics
Question 6: Constructed-Response

Reporting Category: Statistics and Probability
Standards: AI.S-ID.A.2 - Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
MI.S-ID.A.2 - Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
Item Description: Calculate the range and the median of a set of real-world data and determine the values of additional data based on changes in measures of center.
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 Statistics and Probability concepts involved in using statistics appropriate to the shape of the data distribution to compare center and spread of two different data sets. The student correctly calculates measures of center and spread for a set of data and calculates new measures based on additional data.
4B	
3	The student response demonstrates a good understanding of the Statistics and Probability concepts involved in using statistics appropriate to the shape of the data distribution to compare center and spread of two different data sets. 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 statistics appropriate to the shape of the data distribution to compare center and spread of two different data sets. 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 statistics appropriate to the shape of the data distribution to compare center and spread of two different data sets.
0	The student response contains insufficient evidence of an understanding of the Statistics and Probability concepts involved in using statistics appropriate to the shape of the data distribution to compare center and spread of two different data sets. 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 prices, in dollars, of ten magazines for sale at a newsstand are shown in this list.

7.00	7.50	7.50	7.50	8.00
8.00	8.00	8.00	8.50	10.00

Part A

What is the range of the prices, in dollars, of the ten magazines? Show or explain how you got your answer.

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

> The range of the prices in dollars is $3.00. In order to find the range you must subtract the lowest number from the highest number, therefore $10.00 - 7.00 = 3.00$

Part B

What is the **median** price, in dollars, of the ten magazines? Show or explain how you got your answer.

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

> The median price in dollars is $8.00. In order to find the median you must find the middle number of all of the data and in this case, it is $8.00.

Part C

Two new magazines will be for sale at the newsstand.

- Each new magazine will have the same price.

- The prices of both new magazines will be included in the list.

The median price of all the magazines in the list, including the two new magazines, will **not** change.

What **could be** the price, in dollars, of each new magazine? Show or explain how you got your answer.

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

> The price in dollars of each new magazine could be $8.00 or greater. It does not matter the exact price of the magazines as long as the price of both the magazines are $8.00 or greater. The median will not change because $8.00 will still be the price directly in the middle.

Part D

The **mean** price of all the magazines for sale at the newsstand will increase by $1.00 when the prices of the two new magazines are included in the list.

Based on this information, what will be the **actual** price, in dollars, of each new magazine? Show or explain how you got your answer.

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

The actual price in dollars of each new magazine is $14.00. In order to do this, you must increase the mean of $8 to $9, multiply by the amount of magazines which is now 12 and get 108. Then you must subtract the orginal $80 from the beginning 10 magazines and get $28. This is the price of both the 2 new magazines, so the price of one is $14.00.

Back to Scoring Guide

Score Point 4B

This question has four parts.

The prices, in dollars, of ten magazines for sale at a newsstand are shown in this list.

7.00	7.50	7.50	7.50	8.00
8.00	8.00	8.00	8.50	10.00

Part A

What is the range of the prices, in dollars, of the ten magazines? Show or explain how you got your answer.

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

Range = max value - min value

Range = $10 - 7$

Range = 3.00 dollars

Part B

What is the **median** price, in dollars, of the ten magazines? Show or explain how you got your answer.

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

The median is the value in the middle

Median = 8.00 dollars

Part C

Two new magazines will be for sale at the newsstand.

- Each new magazine will have the same price.

- The prices of both new magazines will be included in the list.

The median price of all the magazines in the list, including the two new magazines, will **not** change.

What **could be** the price, in dollars, of each new magazine? Show or explain how you got your answer.

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

> The price of the new magazines could be $12, so the new list would look like this:
>
> 7.00, 7.50, 7.50, 7.50, 8,00, 8.00, 8,00, 8,00, 8,50, 10,00, 12.00, 12.00
>
> The median of this list is still 8.00 dollars

Part D

The **mean** price of all the magazines for sale at the newsstand will increase by $1.00 when the prices of the two new magazines are included in the list.

Based on this information, what will be the **actual** price, in dollars, of each new magazine? Show or explain how you got your answer.

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

> Average of original list =
>
> $$\frac{(7+7.5+7.5+7.5+8+8+8+8+8.5+10)}{10} = 8$$
>
> Average of new list =
>
> $$\frac{(7+7.5+7.5+7.5+8+8+8+8+8.5+10+2x)}{12} = 9$$
>
> $$\frac{(80+2x)}{12} = 9$$
>
> $$80 + 2x = 108$$
>
> $$2x = 28$$
>
> $$x = 14$$
>
> The actual price of the new magazines is $14.00

[Back to Scoring Guide](#)

Score Point 3

This question has four parts.

The prices, in dollars, of ten magazines for sale at a newsstand are shown in this list.

7.00	7.50	7.50	7.50	8.00
8.00	8.00	8.00	8.50	10.00

Part A

What is the range of the prices, in dollars, of the ten magazines? Show or explain how you got your answer.

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

> 3 dollars
>
> i got this answer by subtracting 7.00 dollars by 10.00 dollars

Part B

What is the **median** price, in dollars, of the ten magazines? Show or explain how you got your answer.

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

> 8.00 dollars
>
> i got this answer by crossing off two numbers on each end until i got to the middle

Part C

Two new magazines will be for sale at the newsstand.

- Each new magazine will have the same price.

- The prices of both new magazines will be included in the list.

The median price of all the magazines in the list, including the two new magazines, will **not** change.

What **could be** the price, in dollars, of each new magazine? Show or explain how you got your answer.

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

8.00 dollars

i got this because 8.00 dollars was already the median so i just put two more of the number that would be the median in so the medain would stay the same

Part D

The **mean** price of all the magazines for sale at the newsstand will increase by $1.00 when the prices of the two new magazines are included in the list.

Based on this information, what will be the **actual** price, in dollars, of each new magazine? Show or explain how you got your answer.

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

9 dollars

Back to Scoring Guide

Score Point 2

This question has four parts.

The prices, in dollars, of ten magazines for sale at a newsstand are shown in this list.

7.00	7.50	7.50	7.50	8.00
8.00	8.00	8.00	8.50	10.00

Part A

What is the range of the prices, in dollars, of the ten magazines? Show or explain how you got your answer.

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

add up all of the values and divide by the number of values in the set

range=8

Part B

What is the **median** price, in dollars, of the ten magazines? Show or explain how you got your answer.

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

the middle number when the set is placed from least to greatest

median=8.00 dollars

Part C

Two new magazines will be for sale at the newsstand.

- Each new magazine will have the same price.
- The prices of both new magazines will be included in the list.

The median price of all the magazines in the list, including the two new magazines, will **not** change.

What **could be** the price, in dollars, of each new magazine? Show or explain how you got your answer.

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

The price could be 8.00 dollars, becasue adding more of the same median will not change it

Part D

The **mean** price of all the magazines for sale at the newsstand will increase by $1.00 when the prices of the two new magazines are included in the list.

Based on this information, what will be the **actual** price, in dollars, of each new magazine? Show or explain how you got your answer.

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

$6.75

$$\frac{81}{12} = 6.75$$

[Back to Scoring Guide](#)

Score Point 1

This question has four parts.

The prices, in dollars, of ten magazines for sale at a newsstand are shown in this list.

7.00	7.50	7.50	7.50	8.00
8.00	8.00	8.00	8.50	10.00

Part A

What is the range of the prices, in dollars, of the ten magazines? Show or explain how you got your answer.

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

> The range of the prices of the ten magazines is 3. This is because the range is the maximum value - the minimum value.

Part B

What is the **median** price, in dollars, of the ten magazines? Show or explain how you got your answer.

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

> The median price of the magazines is $8.50 because the median is the highest and lowest value divided by 2.

Part C

Two new magazines will be for sale at the newsstand.

- Each new magazine will have the same price.
- The prices of both new magazines will be included in the list.

The median price of all the magazines in the list, including the two new magazines, will **not** change.

What **could be** the price, in dollars, of each new magazine? Show or explain how you got your answer.

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

> The prices of the magazines could be anything in the middle of the magazines in the list, like 7.50, 8.00, or 8.50. It could not be 7.00 or 10.00 because those are the values used to calculate the median price.

Part D

The **mean** price of all the magazines for sale at the newsstand will increase by $1.00 when the prices of the two new magazines are included in the list.

Based on this information, what will be the **actual** price, in dollars, of each new magazine? Show or explain how you got your answer.

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

> The actual price of each new magazine would be $7.00 because that doesn't throw off the mean. To find the mean, you add all the values together and then divide it by 2.

Back to Scoring Guide

Score Point 0

This question has four parts.

The prices, in dollars, of ten magazines for sale at a newsstand are shown in this list.

7.00	7.50	7.50	7.50	8.00
8.00	8.00	8.00	8.50	10.00

Part A

What is the range of the prices, in dollars, of the ten magazines? Show or explain how you got your answer.

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

> 8 is the range because you add up all the number and then divide them by how many numbers there are

Part B

What is the **median** price, in dollars, of the ten magazines? Show or explain how you got your answer.

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

> 7.50 because since there are 10 number even you would have to average both of the number you landed on

Part C

Two new magazines will be for sale at the newsstand.

- Each new magazine will have the same price.
- The prices of both new magazines will be included in the list.

The median price of all the magazines in the list, including the two new magazines, will **not** change.

What **could be** the price, in dollars, of each new magazine? Show or explain how you got your answer.

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

> 7.00 dollars because the would add another number to the data and would keep the median the same

Part D

The **mean** price of all the magazines for sale at the newsstand will increase by $1.00 when the prices of the two new magazines are included in the list.

Based on this information, what will be the **actual** price, in dollars, of each new magazine? Show or explain how you got your answer.

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

$104 you just add 1 to all of the prices