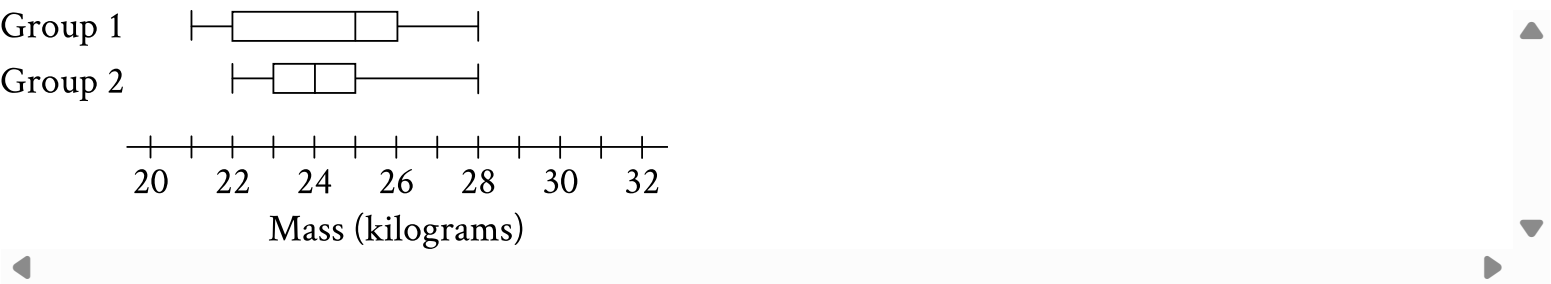


Question ID 59b7ef3e

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: 59b7ef3e



The box plots summarize the masses, in kilograms, of two groups of gazelles. Based on the box plots, which of the following statements must be true?

- A. The mean mass of group 1 is greater than the mean mass of group 2.
- B. The mean mass of group 1 is less than the mean mass of group 2.
- C. The median mass of group 1 is greater than the median mass of group 2.
- D. The median mass of group 1 is less than the median mass of group 2.

ID: 59b7ef3e Answer

Correct Answer: C

Rationale

Choice C is correct. The median of a data set represented in a box plot is represented by the vertical line within the box. It follows that the median mass of the gazelles in group 1 is 25 kilograms, and the median mass of the gazelles in group 2 is 24 kilograms. Since 25 kilograms is greater than 24 kilograms, the median mass of group 1 is greater than the median mass of group 2.

Choice A is incorrect. The mean mass of each of the two groups cannot be determined from the box plots.

Choice B is incorrect. The mean mass of each of the two groups cannot be determined from the box plots.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Hard

# Question ID df636b8e

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: df636b8e

Data set A consists of the heights of **75** objects and has a mean of **25** meters. Data set B consists of the heights of **50** objects and has a mean of **65** meters. Data set C consists of the heights of the **125** objects from data sets A and B. What is the mean, in meters, of data set C?

ID: df636b8e Answer

Correct Answer: 41

Rationale

The correct answer is 41. The mean of a data set is computed by dividing the sum of the values in the data set by the number of values in the data set. It's given that data set A consists of the heights of 75 objects and has a mean of 25 meters. This can be represented by the equation  $\frac{x}{75} = 25$ , where  $x$  represents the sum of the heights of the objects, in meters, in data set A. Multiplying both sides of this equation by 75 yields  $x = 7525$ , or  $x = 1,875$  meters. Therefore, the sum of the heights of the objects in data set A is 1,875 meters. It's also given that data set B consists of the heights of 50 objects and has a mean of 65 meters. This can be represented by the equation  $\frac{y}{50} = 65$ , where  $y$  represents the sum of the heights of the objects, in meters, in data set B. Multiplying both sides of this equation by 50 yields  $y = 5065$ , or  $y = 3,250$  meters. Therefore, the sum of the heights of the objects in data set B is 3,250 meters. Since it's given that data set C consists of the heights of the 125 objects from data sets A and B, it follows that the mean of data set C is the sum of the heights of the objects, in meters, in data sets A and B divided by the number of objects represented in data sets A and B, or  $\frac{1,875 + 3,250}{125}$ , which is equivalent to 41 meters. Therefore, the mean, in meters, of data set C is 41.

Question Difficulty: Hard

# Question ID 30a4f4a3

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: 30a4f4a3

Data set A consists of the heights of **75** buildings and has a mean of **32** meters. Data set B consists of the heights of **50** buildings and has a mean of **62** meters. Data set C consists of the heights of the **125** buildings from data sets A and B. What is the mean, in meters, of data set C?

ID: 30a4f4a3 Answer

Correct Answer: 44

Rationale

The correct answer is 44. The mean of a data set is computed by dividing the sum of the values in the data set by the number of values in the data set. It's given that data set A consists of the heights of 75 buildings and has a mean of 32 meters. This can be represented by the equation  $\frac{x}{75} = 32$ , where  $x$  represents the sum of the heights of the buildings, in meters, in data set A. Multiplying both sides of this equation by 75 yields  $x = 7532$ , or  $x = 2,400$  meters. Therefore, the sum of the heights of the buildings in data set A is 2,400 meters. It's also given that data set B consists of the heights of 50 buildings and has a mean of 62 meters. This can be represented by the equation  $\frac{y}{50} = 62$ , where  $y$  represents the sum of the heights of the buildings, in meters, in data set B. Multiplying both sides of this equation by 50 yields  $y = 5062$ , or  $y = 3,100$  meters. Therefore, the sum of the heights of the buildings in data set B is 3,100 meters. Since it's given that data set C consists of the heights of the 125 buildings from data sets A and B, it follows that the mean of data set C is the sum of the heights of the buildings, in meters, in data sets A and B divided by the number of buildings represented in data sets A and B, or  $\frac{2,400 + 3,100}{125}$ , which is equivalent to 44 meters. Therefore, the mean, in meters, of data set C is 44.

Question Difficulty: Hard

# Question ID 052af884

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: 052af884

Data set F consists of 55 integers between 170 and 290. Data set G consists of all the integers in data set F as well as the integer 10. Which of the following must be less for data set F than for data set G?

- I. The mean

II. The median
- A. I only

B. II only

C. I and II

D. Neither I nor II

ID: 052af884 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that data set F consists of 55 integers between 170 and 290 and data set G consists of all the integers in data set F as well as the integer 10. Since the integer 10 is less than all the integers in data set F, the mean of data set G must be less than the mean of data set F. Thus, the mean of data set F isn't less than the mean of data set G. When a data set is in ascending order, the median is between the two middle values when there is an even number of values and the median is the middle value when there is an odd number of values. It follows that the median of data set F is either greater than or equal to the median of data set G. Therefore, the median of data set F isn't less than the median of data set G. Thus, neither the mean nor the median must be less for data set F than for data set G.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Hard

# Question ID adcab929

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: adcab929

| Data value | Frequency |
|------------|-----------|
| 6          | 3         |
| 7          | 3         |
| 8          | 8         |
| 9          | 8         |
| 10         | 9         |
| 11         | 11        |
| 12         | 9         |
| 13         | 0         |
| 14         | 6         |

The frequency table summarizes the 57 data values in a data set. What is the maximum data value in the data set?

ID: adcab929 Answer

Correct Answer: 14

Rationale

The correct answer is 14. The maximum value is the largest value in the data set. The frequency refers to the number of times a data value occurs. The given frequency table shows that for this data set, the data value 6 occurs three times, the data value 7 occurs three times, the data value 8 occurs eight times, the data value 9 occurs eight times, the data value 10 occurs nine times, the data value 11 occurs eleven times, the data value 12 occurs nine times, the data value 13 occurs zero times, and the data value 14 occurs six times. Therefore, the maximum data value in the data set is 14.

Question Difficulty: Hard

# Question ID 3c4d9ad7

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: 3c4d9ad7

The table shown summarizes the number of employees at each of the **17** restaurants in a town.

| Number of employees | Number of restaurants |
|---------------------|-----------------------|
| 2 to 7              | 2                     |
| 8 to 13             | 4                     |
| 14 to 19            | 2                     |
| 20 to 25            | 7                     |
| 26 to 31            | 2                     |

Which of the following could be the median number of employees for the restaurants in this town?

- A. 2
- B. 9
- C. 15
- D. 21

ID: 3c4d9ad7 Answer

Correct Answer: D

Rationale

Choice D is correct. If a data set contains an odd number of data values, the median is represented by the middle data value in the list when the data values are listed in ascending or descending order. Since the numbers of employees are given as ranges of values rather than specific values, it's only possible to determine the range in which the median falls, rather than the exact median. Since there are 17 restaurants included in the data set and the numbers of employees are listed in ascending order, it follows that the median number of employees will be represented by the ninth restaurant in the list. Since the first 2 restaurants each have 2 to 7 employees, numbers of employees in the 2 to 7 range would be represented by the first and second restaurants in the list. The next 4 restaurants each have 8 to 13 employees. Therefore, numbers of employees in the 8 to 13 range will be represented by the third through sixth restaurants in the list. The next 2 restaurants each have 14 to 19 employees. Therefore, numbers of employees in the 14 to 19 range will be represented by the seventh and eighth restaurants in the list. Since the next 7 restaurants each have 20 to 25 employees, numbers of employees in the 20 to 25 range will be represented by the ninth through fifteenth restaurants in the list. This means that the ninth restaurant in the list, which has the median number of employees for the restaurants in this town, has a number of employees in the 20 to 25 range. Of the given choices, the only number of employees in the 20 to 25 range is 21.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the position of the median in the list, not the value of the median.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Hard

# Question ID 6a85d2ca

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: 6a85d2ca

Each of the following frequency tables represents a data set. Which data set has the greatest mean?

A.

| Value | Frequency |
|-------|-----------|
| 70    | 4         |
| 80    | 5         |
| 90    | 6         |
| 100   | 7         |

B.

| Value | Frequency |
|-------|-----------|
| 70    | 6         |
| 80    | 6         |
| 90    | 6         |
| 100   | 6         |

C.

| Value | Frequency |
|-------|-----------|
| 70    | 7         |
| 80    | 6         |
| 90    | 6         |
| 100   | 7         |

D.

| Value | Frequency |
|-------|-----------|
| 70    | 8         |
| 80    | 5         |
| 90    | 5         |
| 100   | 8         |

Correct Answer: A

Rationale

Choice A is correct. The tables in choices B, C, and D each represent a data set where the values 80 and 90 have the same frequency and the values 70 and 100 have the same frequency. It follows that each of these data sets is symmetric around the value halfway between 80 and 90, or 85. When a data set is symmetric around a value, that value is the mean of the data set. Therefore, the data sets represented by the tables in choices B, C, and D each have a mean of 85. The table in choice A represents a data set where the value 90 has a greater frequency than the value 80 and the value 100 has a greater frequency than the value 70. It follows that this data set has a mean greater than 85. Therefore, of the given choices, choice A represents the data set with the greatest mean.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Hard

Question ID 877d34aa

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: 877d34aa



The dot plot represents the **15** values in data set A. Data set B is created by adding **56** to each of the values in data set A. Which of the following correctly compares the medians and the ranges of data sets A and B?

- A. The median of data set B is equal to the median of data set A, and the range of data set B is equal to the range of data set A.
- B. The median of data set B is equal to the median of data set A, and the range of data set B is greater than the range of data set A.
- C. The median of data set B is greater than the median of data set A, and the range of data set B is equal to the range of data set A.
- D. The median of data set B is greater than the median of data set A, and the range of data set B is greater than the range of data set A.

ID: 877d34aa Answer

Correct Answer: C

Rationale

Choice C is correct. The median of a data set with an odd number of values, in ascending or descending order, is the middle value of the data set, and the range of a data set is the positive difference between the maximum and minimum values in the data set. Since the dot plot shown gives the values in data set A in ascending order and there are 15 values in the data set, the eighth value in data set A, 23, is the median. The maximum value in data set A is 26 and the minimum value is 22, so the range of data set A is  $26 - 22$ , or 4. It's given that data set B is created by adding 56 to each of the values in data set A. Increasing each of the 15 values in data set A by 56 will also increase its median value by 56 making the median of data set B 79. Increasing each value of data set A by 56 does not change the range, since the maximum value of data set B is  $26 + 56$ , or 82, and the minimum value is  $22 + 56$ , or 78, making the range of data set B  $82 - 78$ , or 4. Therefore, the median of data set B is greater than the median of data set A, and the range of data set B is equal to the range of data set A.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

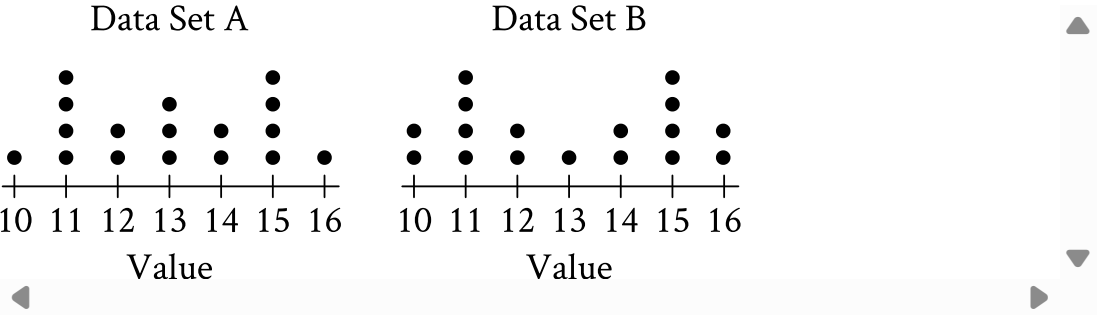


Question ID a24e4c19

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: a24e4c19

The dot plots represent the distributions of values in data sets A and B.



Which of the following statements must be true?

- I. The median of data set A is equal to the median of data set B.

II. The standard deviation of data set A is equal to the standard deviation of data set B.
- A. I only

B. II only

C. I and II

D. Neither I nor II

ID: a24e4c19 Answer

Correct Answer: A

Rationale

Choice A is correct. The median of a data set with an odd number of values that are in ascending or descending order is the middle value of the data set. Since the distribution of the values of both data set A and data set B form symmetric dot plots, and each data set has an odd number of values, it follows that the median is given by the middle value in each of the dot plots. Thus, the median of data set A is 13, and the median of data set B is 13. Therefore, statement I is true. Data set A and data set B have the same frequency for each of the values 11, 12, 14, and 15. Data set A has a frequency of 1 for values 10 and 16, whereas data set B has a frequency of 2 for values 10 and 16. Standard deviation is a measure of the spread of a data set; it is larger when there are more values further from the mean, and smaller when there are more values closer to the mean. Since both distributions are symmetric with an odd number of values, the mean of each data set is equal to its median. Thus, each data set has a mean of 13. Since more of the values in data set A are closer to 13 than data set B, it follows that data set A has a smaller standard deviation than data set B. Thus, statement II is false. Therefore, only statement I must be true.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

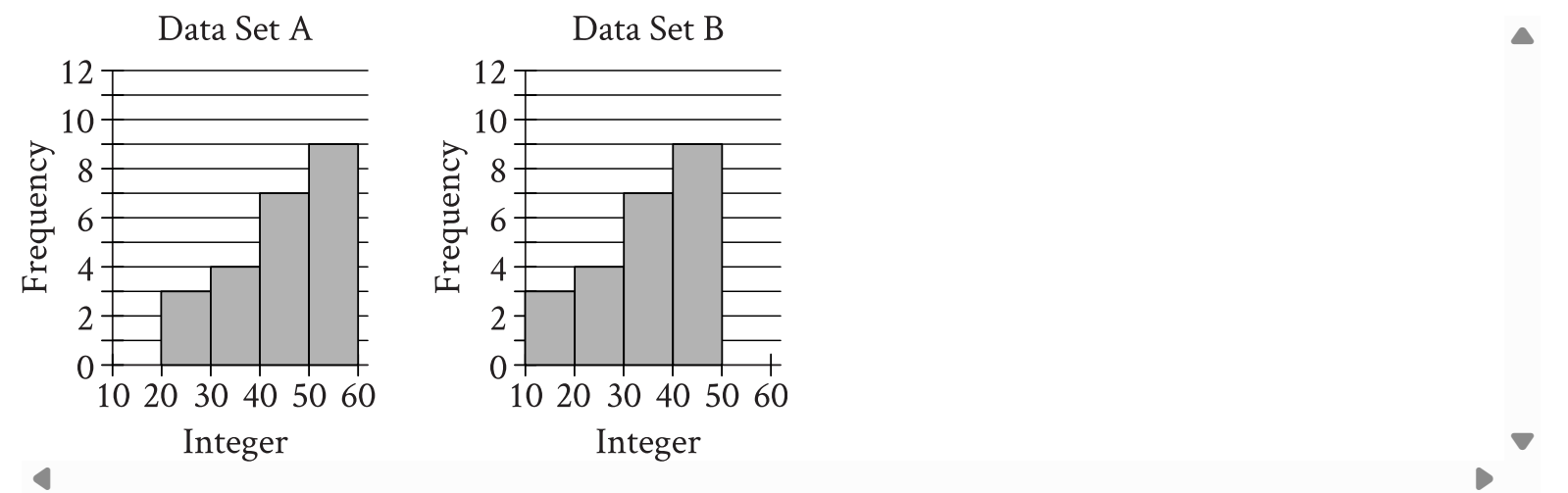
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Hard

Question ID 8d82c32b

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: 8d82c32b



Two data sets of **23** integers each are summarized in the histograms shown. For each of the histograms, the first interval represents the frequency of integers greater than or equal to **10**, but less than **20**. The second interval represents the frequency of integers greater than or equal to **20**, but less than **30**, and so on. What is the smallest possible difference between the mean of data set A and the mean of data set B?

- A. 0
- B. 1
- C. 10
- D. 23

ID: 8d82c32b Answer

Correct Answer: B

Rationale

Choice B is correct. The histograms shown have the same shape, but data set A contains values between 20 and 60 and data set B contains values between 10 and 50. Thus, the mean of data set A is greater than the mean of data set B. Therefore, the smallest possible difference between the mean of data set A and the mean of data set B is the difference between the smallest possible mean of data set A and the greatest possible mean of data set B. In data set A, since there are 3 integers in the interval greater than or equal to 20 but less than 30, 4 integers greater than or equal to 30 but less than 40, 7 integers greater than or equal to 40 but less than 50, and 9 integers greater than or equal to 50 but less than 60, the smallest possible mean for data set A is  $\frac{3 \cdot 20 + 4 \cdot 30 + 7 \cdot 40 + 9 \cdot 50}{23}$ . In data set B, since there are 3 integers greater than or equal to 10 but less than 20, 4 integers greater than or equal to 20 but less than 30, 7 integers greater than or equal to 30 but less than 40, and 9 integers greater than or equal to 40 but less than 50, the largest possible mean for data set B is  $\frac{3 \cdot 19 + 4 \cdot 29 + 7 \cdot 39 + 9 \cdot 49}{23}$ . Therefore, the smallest possible difference between the mean of data set A and the mean of data set B is  $\frac{3 \cdot 20 + 4 \cdot 30 + 7 \cdot 40 + 9 \cdot 50}{23} - \frac{3 \cdot 19 + 4 \cdot 29 + 7 \cdot 39 + 9 \cdot 49}{23}$ , which is equivalent to

$\frac{3 \cdot 20 - 3 \cdot 19 + 4 \cdot 30 - 4 \cdot 29 + 7 \cdot 40 - 7 \cdot 39 + 9 \cdot 50 - 9 \cdot 49}{23}$ . This expression can be rewritten as  $\frac{320 - 19 + 430 - 29 + 740 - 39 + 950 - 49}{23}$ , or  $\frac{23}{23}$ , which is equal to 1. Therefore, the smallest possible difference between the mean of data set A and the mean of data set B is 1.

Choice A is incorrect. This is the smallest possible difference between the ranges, not the means, of the data sets.

Choice C is incorrect. This is the difference between the greatest possible mean, not the smallest possible mean, of data set A and the greatest possible mean of data set B.

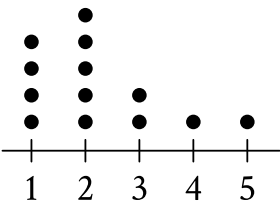
Choice D is incorrect. This is the smallest possible difference between the sum of the values in data set A and the sum of the values in data set B, not the smallest possible difference between the means.

Question Difficulty: Hard

Question ID 8521e464

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: 8521e464



Number of bursts

The dot plot represents a data set of the number of bursts for **13** eruptions of a steam vent. If an additional eruption with **11** bursts is added to this data set to create a new data set of **14** eruptions, which of the following measures will be greater for the new data set than for the original data set?

- I. The median number of bursts

II. The mean number of bursts
- A. I and II

B. I only

C. II only

D. Neither I nor II

ID: 8521e464 Answer

Correct Answer: C

Rationale

Choice C is correct. It’s given that the dot plot represents a data set of the number of bursts for 13 eruptions of a steam vent. The median of a data set with an odd number of elements is the middle element when the elements are in numerical order. For 13 elements in numerical order, this is the 7th element. For this data set, the first 4 elements have a value of 1, and the next 5 elements have a value of 2. Thus, the 7th element in the ordered data set is 2 and the median number of bursts for the original data set is 2. If an additional eruption with 11 bursts is added to this data set to create a new data set of 14 eruptions, the median of the new data set will be between the 7th and 8th elements in the ordered set, which will also be 2. Therefore, the median number of bursts for the new data set will be the same as the median number of bursts for the original data set. The mean number of bursts for the original data set is found by adding the values of all 13 elements and dividing that sum by the number of elements, 13. Since the data is shown in a dot plot, the sum of the values of the elements can be found by multiplying each element’s value by its frequency:  $14 + 25 + 32 + 41 + 51$ , or 29. Therefore, the mean number of bursts for the original data set is  $\frac{29}{13}$ . If an additional eruption with 11 bursts is added to this data set to create a new data set of 14 bursts, the mean number of bursts for the new data set is  $\frac{29 + 11}{14}$ , or  $\frac{40}{14}$ . Since  $\frac{40}{14} > \frac{29}{13}$ , the mean number of bursts for the new data set is greater than the mean

number of bursts for the original data set. Therefore, of the median number of bursts and the mean number of bursts, only the mean number of bursts is greater for the new data set than for the original data set.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Hard

# Question ID d029366d

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: d029366d

Data set A consists of **10** positive integers less than **60**. The list shown gives **9** of the integers from data set A.

**43, 45, 44, 43, 38, 39, 40, 46, 40**

The mean of these **9** integers is **42**. If the mean of data set A is an integer that is greater than **42**, what is the value of the largest integer from data set A?

ID: d029366d Answer

Correct Answer: 52

Rationale

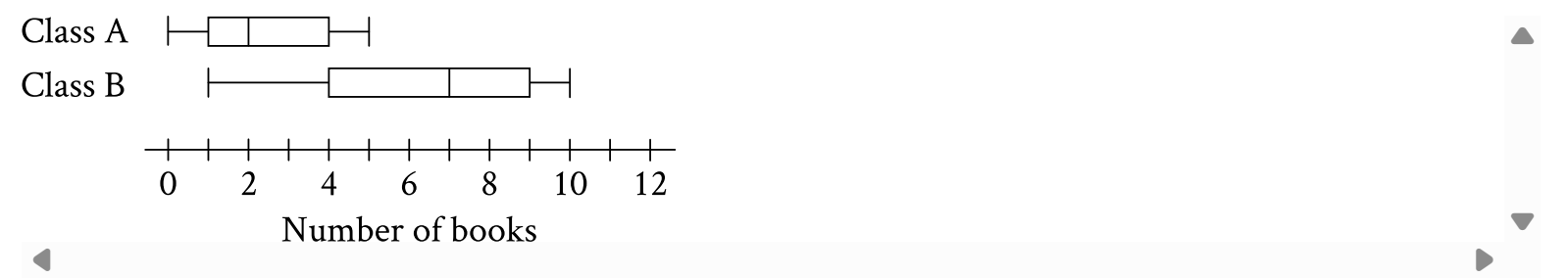
The correct answer is 52. The mean of a data set is calculated by dividing the sum of the data values by the number of values. It's given that data set A consists of 10 values, 9 of which are shown. Let  $x$  represent the 10th data value in data set A, which isn't shown. The mean of data set A can be found using the expression  $\frac{43 + 45 + 44 + 43 + 38 + 39 + 40 + 46 + 40 + x}{10}$ , or  $\frac{378 + x}{10}$ . It's given that the mean of the 9 values shown is 42 and that the mean of all 10 numbers is greater than 42. Consequently, the 10th data value,  $x$ , is larger than 42. It's also given that the data values in data set A are positive integers less than 60. Thus,  $42 < x < 60$ . Finally, it's given that the mean of data set A is an integer. This means that the sum of the 10 data values,  $378 + x$ , is divisible by 10. Thus,  $378 + x$  must have a ones digit of 0. It follows that  $x$  must have a ones digit of 2. Since  $42 < x < 60$  and  $x$  has a ones digit of 2, the only possible value of  $x$  is 52. Since 52 is larger than any of the integers shown, the largest integer from data set A is 52.

Question Difficulty: Hard

Question ID 31511d69

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                          |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|-------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div></div> <div></div> <div></div> |

ID: 31511d69



The two box plots show the distribution of number of books read over the summer by the students in two different English classes. What is the positive difference between the ranges of number of books read over the summer for the two classes?

ID: 31511d69 Answer

Correct Answer: 4

Rationale

The correct answer is 4. It's given that the two boxplots show the distribution of number of books read over the summer by the students in two different English classes. In a boxplot, the first vertical line represents the minimum value of the data set and the last vertical line represents the maximum value of the data set. The range of a data set is the difference between its maximum value and its minimum value. In class A, the maximum number of books read is 5 and the minimum number of books read is 0. The difference between those values is  $5 - 0$ , or 5. Therefore, the range of the number of books read in class A is 5. In class B, the maximum number of books read is 10 and the minimum number of books read is 1. The difference between those values is  $10 - 1$ , or 9. Therefore, the range of the number of books read in class B is 9. To find the positive difference between the ranges of the number of books read for the two classes, the smaller range must be subtracted from the larger range. Therefore, the positive difference between the ranges of number of books read over the summer for the two classes is  $9 - 5$ , or 4.

Question Difficulty: Hard

# Question ID 124cbdca

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: 124cbdca

The table shows the frequency of values in a data set.

| Value | Frequency |
|-------|-----------|
| 19    | 7         |
| 21    | 1         |
| 23    | 7         |
| 25    | 4         |

What is the minimum value of the data set?

ID: 124cbdca Answer

Correct Answer: 19

Rationale

The correct answer is 19. The minimum value of a data set is the least value in the data set. The frequency refers to the number of times a value occurs. The given table shows that for this data set, the value 19 occurs 7 times, the value 21 occurs 1 time, the value 23 occurs 7 times, and the value 25 occurs 4 times. Therefore, of the values 19, 21, 23, and 25 given in the data set, the minimum value of the data set is 19.

Question Difficulty: Hard

Question ID ab74cba9

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: ab74cba9

| Value | Data set A frequency | Data set B frequency |
|-------|----------------------|----------------------|
| 30    | 2                    | 9                    |
| 34    | 4                    | 7                    |
| 38    | 5                    | 5                    |
| 42    | 7                    | 4                    |
| 46    | 9                    | 2                    |

Data set A and data set B each consist of **27** values. The table shows the frequencies of the values for each data set. Which of the following statements best compares the means of the two data sets?

- A. The mean of data set A is greater than the mean of data set B.
- B. The mean of data set A is less than the mean of data set B.
- C. The mean of data set A is equal to the mean of data set B.
- D. There is not enough information to compare the means of the data sets.

ID: ab74cba9 Answer

Correct Answer: A

Rationale

Choice A is correct. The mean value of a data set is the sum of the values of the data set divided by the number of values in the data set. When a data set is represented in a frequency table, the sum of the values in the data set is the sum of the products of each value and its frequency. For data set A, the sum of products of each value and its frequency is  $302 + 344 + 385 + 427 + 469$ , or 1,094. It's given that there are 27 values in data set A. Therefore, the mean of data set A is  $\frac{1,094}{27}$ , or approximately 40.52. Similarly, the mean of data B is  $\frac{958}{27}$ , or approximately 35.48. Therefore, the mean of data set A is greater than the mean of data set B.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

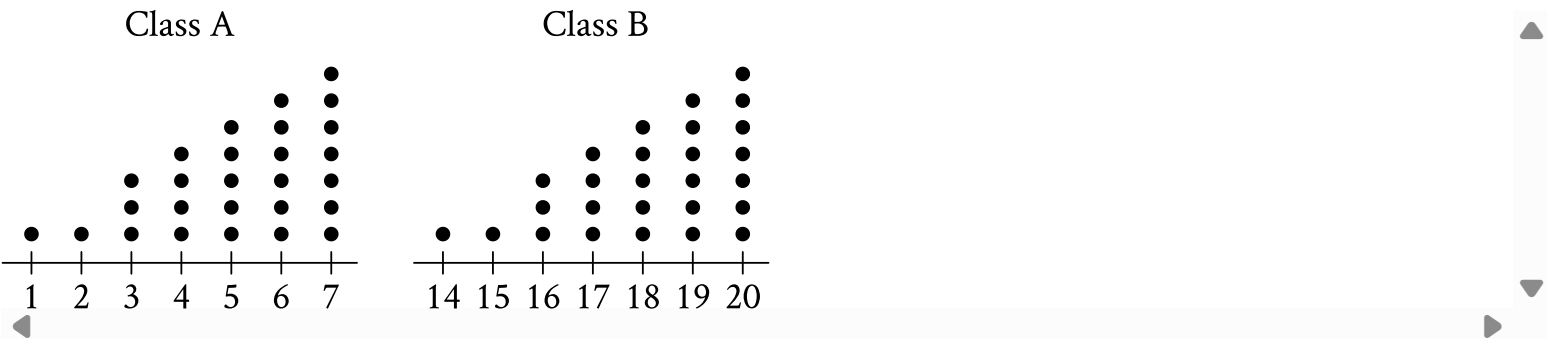
Choice D is incorrect and may result from conceptual or calculation errors.



Question ID e6f6cf0d

| Assessment           | Test | Domain                            | Skill                                                              | Difficulty                                   |
|----------------------|------|-----------------------------------|--------------------------------------------------------------------|----------------------------------------------|
| PSAT/NMSQT & PSAT 10 | Math | Problem-Solving and Data Analysis | One-variable data: Distributions and measures of center and spread | <div><div></div><div></div><div></div></div> |

ID: e6f6cf0d



Each of the dot plots shown represents the number of glue sticks brought in by each student for two classes, class A and class B. Which statement best compares the standard deviations of the numbers of glue sticks brought in by each student for these two classes?

- A. The standard deviation of the number of glue sticks brought in by each student for class A is less than the standard deviation of the number of glue sticks brought in by each student for class B.
- B. The standard deviation of the number of glue sticks brought in by each student for class A is equal to the standard deviation of the number of glue sticks brought in by each student for class B.
- C. The standard deviation of the number of glue sticks brought in by each student for class A is greater than the standard deviation of the number of glue sticks brought in by each student for class B.
- D. There is not enough information to compare these standard deviations.

ID: e6f6cf0d Answer

Correct Answer: B

Rationale

Choice B is correct. Standard deviation is a measure of the spread of a data set from its mean. The dot plot for class A and the dot plot for class B have the same shape. Thus, the frequency distributions for both class A and class B are the same. Since both class A and class B have the same frequency distribution of glue sticks brought in by each student, it follows that both class A and class B have the same spread of the number of glue sticks brought in by each student from their respective means. Therefore, the standard deviation of the number of glue sticks brought in by each student for class A is equal to the standard deviation of the number of glue sticks brought in by each student for class B.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

