LESSON MAKER PRO

Middle Meets Mean

Track what changes when a data point is added or removed.

GRADE 8 · PA.D.1.1

PA.D.1.1 "Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Create data displays using technology to examine this impact."

NAME _____ DATE _____

THE BIG IDEA

Find the mean by dividing the sum of the values by the number of values. To find the median, order the values and use the middle value, or average the middle two. After you add or remove a point, find both measures again; a dot plot can help you see the middle values.

WORKED EXAMPLE

The data are 2, 6, and 10. Add 18. How do the mean and median change?

1. Original mean: (2 + 6 + 10) / 3 = 6. Original median: 6.
2. Add 18. The ordered data are 2, 6, 10, 18.
3. New mean: (2 + 6 + 10 + 18) / 4 = 9.
4. New median: (6 + 10) / 2 = 8.

Answer: The mean rises from 6 to 9. The median rises from 6 to 8.

PRACTICE 6 problems

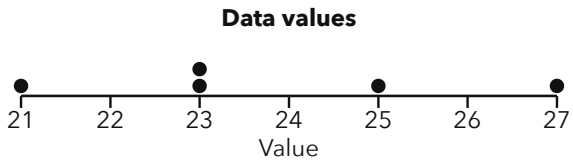
1 The data are 11, 13, and 15. Add 17. What are the new mean and median?

ANSWER _____

2 The data are 12, 14, 16, and 20. Remove 20. How do the mean and median change?

ANSWER _____

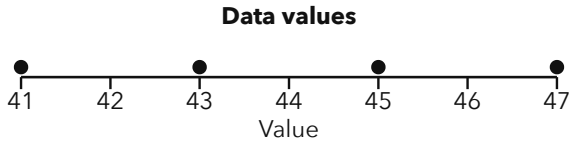
3 The dot plot shows a data set. Remove one 27. How do the mean and median change?



ANSWER _____

_____

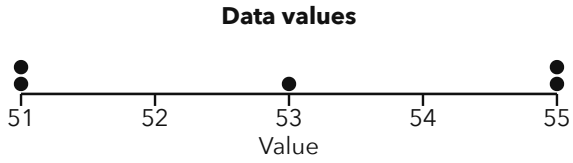
4 The dot plot shows a data set. Add one 43. What are the new mean and median?



ANSWER _____

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5 The dot plot shows a data set. Remove the 53. How do the mean and median change?



ANSWER _____

_____

6 The data are 61, 63, 65, 67, and 69. Add 95. Which changes more, the mean or the median, and by how much more?

ANSWER _____

_____

APPLY IT Show your work

1 The dot plot shows how many minutes you spent on a game each day. On another day, you play for 55 minutes. How do the mean and median daily times change?



ANSWER _____

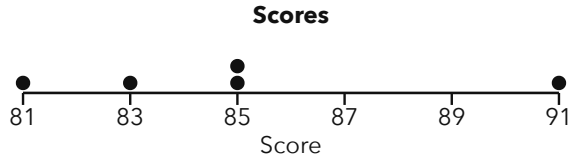
2 At a skate park, your trick scores are 32, 34, 36, 38, and 60. The 60-point run is removed because it broke a rule. What are your new mean and median scores, and how did each change?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The dot plot shows five scores. Find a score x to add so the mean rises by 2 but the median stays the same. Explain why the median stays the same.



WORK SPACE AND ANSWER

ANSWER KEY

Middle Meets Mean

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The data are 11, 13, and 15. Add 17. What are the new mean and median?	**Mean: 14. Median: 14.**
2	The data are 12, 14, 16, and 20. Remove 20. How do the mean and median change?	**The mean falls from 15.5 to 14. The median falls from 15 to 14.**
3	The dot plot shows a data set. Remove one 27. How do the mean and median change?	**The mean falls from 23.8 to 23. The median stays 23.**
4	The dot plot shows a data set. Add one 43. What are the new mean and median?	**Mean: 43.8. Median: 43.**
5	The dot plot shows a data set. Remove the 53. How do the mean and median change?	**Neither changes. The mean and median are both 53 before and after the removal.**
6	The data are 61, 63, 65, 67, and 69. Add 95. Which changes more, the mean or the median, and by how much more?	**The mean rises from 65 to 70, a change of 5. The median rises from 65 to 66, a change of 1. The mean changes by 4 more.**

PART 2 · APPLY IT

1. **The mean rises from 25 to 30 minutes. The median rises from 25 to 26 minutes.** The original sum is 125 minutes. Adding 55 gives a mean of 180 / 6 = 30; the new middle values are 25 and 27.
2. **The new mean and median are both 35. The mean falls from 40 to 35, and the median falls from 36 to 35.** The original sum is 200. Removing 60 leaves 140 points across four runs, so the mean is 35 and the median is (34 + 36) / 2 = 35.

CHALLENGE

x = 97. The original mean is 85, so the new mean must be 87. Since 6 × 87 = 522 and the original sum is 425, x = 522 - 425 = 97. The middle two scores are still 85 and 85, so the median stays 85.

Accept equivalent fractions in place of decimals. For change questions, look for both the original and new values or the correct amount and direction of each change.