LESSON MAKER PRO

Outlier Detectives

See how one far-away value changes a data set.

GRADE 6 · 6.PS.2.c

6.PS.2.c "Observe patterns in data to identify outliers and determine their effect on mean, median, mode, or range."

NAME _____ DATE _____

SPOT THE CHANGE

An outlier is a value much greater or much less than the other values. Find each statistic with the outlier, then without it, and compare the results.

WORKED EXAMPLE

Data: 41, 42, 42, 43, 90. How does the outlier affect the mean?

1. 90 is far from the other values, so it is the outlier.
2. With 90: (41 + 42 + 42 + 43 + 90) / 5 = 51 3/5.
3. Without 90: (41 + 42 + 42 + 43) / 4 = 42.

Answer: The outlier raises the mean by 9 3/5.

PRACTICE 5 problems

1 Data: 11, 12, 12, 13, 40. Name the outlier.

ANSWER _____

2 Data: 7, 8, 9, 10, 31. Find the mean with and without the outlier.

ANSWER _____

3 Data: 14, 14, 15, 16, 50. Find the median with and without the outlier.

ANSWER _____

4 Data: 21, 22, 22, 23, 60. Does the outlier change the mode?

ANSWER _____

5 Data: 30, 31, 32, 33, 80. Find the range with and without the outlier.

ANSWER _____

APPLY IT Show your work

1 A music club records daily practice minutes: 16, 17, 18, 19, 70. What is the outlier? How does it affect the mean?

WORK SPACE

ANSWER _____

2 A student tracks points earned in five rounds of a game: 7, 8, 9, 10, 35. How does 35 affect the median and range?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The data are 12, 13, 13, 14, x. Removing x makes the range 2 and makes the mean decrease by 4. Find x. Then state how removing x affects the median, mode, and range.

WORK SPACE AND ANSWER

ANSWER KEY

Outlier Detectives

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Data: 11, 12, 12, 13, 40. Name the outlier.	**40**
2	Data: 7, 8, 9, 10, 31. Find the mean with and without the outlier.	**With 31: 13. Without 31: 8.5.**
3	Data: 14, 14, 15, 16, 50. Find the median with and without the outlier.	**With 50: 15. Without 50: 14.5.**
4	Data: 21, 22, 22, 23, 60. Does the outlier change the mode?	**No. The mode is 22 with or without 60.**
5	Data: 30, 31, 32, 33, 80. Find the range with and without the outlier.	**With 80: 50. Without 80: 3.**

PART 2 · APPLY IT

1. **The outlier is 70. It raises the mean from 17.5 to 28.** The mean with 70 is 140 / 5 = 28. Without 70, the mean is 70 / 4 = 17.5.
2. **It raises the median from 8.5 to 9 and raises the range from 3 to 28.** With 35, the median is 9 and the range is 28. Without 35, the median is (8 + 9) / 2 = 8.5 and the range is 3.

CHALLENGE

x = 33. Removing it keeps the median at 13, keeps the mode at 13, and lowers the range from 21 to 2.

Accept decimals or equivalent fractions, such as 8.5 or 8 1/2. Accept clear statements that an outlier raises, lowers, or does not change a statistic.