LESSON MAKER PRO

What Is Typical?

Compare center and spread, even when one value stands out.

HIGH SCHOOL · FA.S.40

FA.S.40 "Without technology, fluently calculate the measures of central tendency (mean, median, mode), measures of spread (range, interquartile range), and understand the impact of extreme values (outliers) on each of these values. (6.SP.5, 8.SP.1...)"

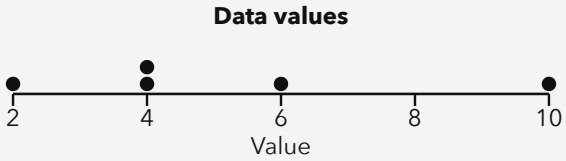
NAME _____ DATE _____

CHOOSE A USEFUL MEASURE

The mean is the sum divided by the count. The median is the middle value, the mode occurs most often, and the range is the largest value minus the smallest. To find the interquartile range, or IQR, subtract the median of the lower half from the median of the upper half. Leave out the overall median when the count is odd. An extreme value often changes the mean and range more than the median and IQR.

WORKED EXAMPLE

Find the mean, median, range, and IQR of the data shown.



1. In order, the values are 2, 4, 4, 6, 10.
2. Mean: (2 + 4 + 4 + 6 + 10) / 5 = 5.2.
3. Median: 4. Range: 10 - 2 = 8.
4. Lower-half median: 3. Upper-half median: 8. IQR: 8 - 3 = 5.

Answer: Mean 5.2; median 4; range 8; IQR 5.

PRACTICE 4 problems

1 Find the mean of 12, 14, 16, 18.

ANSWER _____

2 Find the median and mode of 11, 13, 13, 17, 21.

ANSWER _____

3 Find the range and IQR of 12, 14, 16, 18, 20, 22.

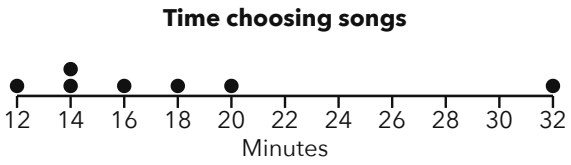
ANSWER _____

4 Replace 18 in 14, 15, 16, 17, 18 with 38. Find the mean and median before and after. Which changes more?

ANSWER _____

APPLY IT Show your work

1 The plot shows how many minutes seven students spent choosing songs for a playlist. Find the mean and median. Which better describes a typical time? Explain.



ANSWER _____

2 A student earned $40, $45, $45, $50, $55, $60, and $90 from seven weekend gigs. Find the range and IQR. Which better describes the spread of typical gigs? Why?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Six game scores are 11, 13, 15, 17, 19, 21. A seventh score x is greater than 21. The new mean is 19. Find x and the new median, range, and IQR. Which measure of center better describes a typical score? Explain.

WORK SPACE AND ANSWER

ANSWER KEY

What Is Typical?

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the mean of 12, 14, 16, 18.	**15**
2	Find the median and mode of 11, 13, 13, 17, 21.	**Median 13; mode 13.**
3	Find the range and IQR of 12, 14, 16, 18, 20, 22.	**Range 10; IQR 6.**
4	Replace 18 in 14, 15, 16, 17, 18 with 38. Find the mean and median before and after. Which changes more?	**Mean: 16 before, 20 after. Median: 16 before and after. The mean changes more.**

PART 2 · APPLY IT

1. **Mean 18 minutes; median 16 minutes. The median better describes a typical time because the high value of 32 raises the mean.** The values sum to 126, so the mean is 126 / 7 = 18. The fourth ordered value is 16.
2. **Range $50; IQR $15. The IQR better describes the spread of typical gigs because the $90 payment increases the range.** The range is 90 - 40 = 50. The lower-half median is 45 and the upper-half median is 60, so the IQR is 60 - 45 = 15.

CHALLENGE

x = 37; median 17; range 26; IQR 8. The median better describes a typical score because the high score of 37 raises the mean.

Accept explanations that identify an extreme value's effect on the mean or range and justify using the median or IQR for typical values.