

Centers Tell Stories

Use center and spread to compare data sets.

HIGH SCHOOL • AII-S.IC.6.a

AII-S.IC.6.a "Use the tools of statistics to draw conclusions from numerical summaries."

NAME _____

DATE _____

COMPARE THE SUMMARIES

A center, such as a mean or median, describes a typical value. A measure of spread, such as range, MAD, or IQR, describes how much the values vary. Use both center and spread when you make a conclusion about two data sets.

WORKED EXAMPLE

Sample A has median 72, Q1 68, and Q3 76. Sample B has median 69, Q1 63, and Q3 75. Which sample has the higher typical value and the more consistent middle half?

1. Find Sample A's IQR: $76 - 68 = 8$.
2. Find Sample B's IQR: $75 - 63 = 12$.
3. Compare centers: 72 is greater than 69.
4. Compare spreads: 8 is less than 12.

Answer: Sample A has the higher typical value and the more consistent middle half.

PRACTICE 6 problems

- 1** Find the median of this ordered data set: 2, 5, 9, 11, 14.

ANSWER _____

- 2** Find the mean of this data set: 3, 6, 10, 17.

ANSWER _____

- 3** This ordered data set has eight values: 15, 18, 22, 26, 30, 33, 37, 41. Find the IQR.

ANSWER _____

- 4** Group A has median 31 and IQR 5. Group B has median 28 and IQR 10. Which group has the higher typical value? Which group has the more consistent middle half?

ANSWER _____

- 5** Club P has mean 42 and MAD 3. Club Q has mean 44 and MAD 9. Which club has the higher average score? Which club's scores are more variable?

ANSWER _____

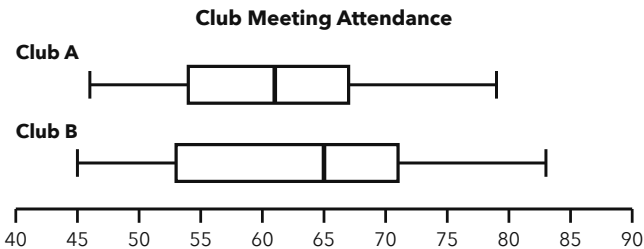
- 6** The data set is 4, 4, 6, 7, 38. Find the median and mean. Then name the better summary of a typical value and explain why.

ANSWER _____

APPLY IT Show your work

1

The box plots show attendance at five meetings for two student clubs. Which club had higher typical attendance? Which club had more consistent attendance in its middle half? Support both conclusions with numerical summaries.



ANSWER _____

2

A student council randomly surveys students about weekday study time. The students with after-school jobs report 18, 20, 23, 24, and 25 minutes. The students without after-school jobs report 16, 19, 21, 27, and 29 minutes. Find each group's median and range. What conclusion can the council make, and what causal claim should it avoid?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two samples of players took the same skills test. Team R had mean 84 and MAD 7. Team S had mean 81 and MAD 2. Use mean plus or minus MAD to make a typical interval for each team. A commentator says, "Team R is clearly stronger because its mean is higher." Is that conclusion justified? Explain using the summaries.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the median of this ordered data set: 2, 5, 9, 11, 14.	9
2	Find the mean of this data set: 3, 6, 10, 17.	9
3	This ordered data set has eight values: 15, 18, 22, 26, 30, 33, 37, 41. Find the IQR.	15
4	Group A has median 31 and IQR 5. Group B has median 28 and IQR 10. Which group has the higher typical value? Which group has the more consistent middle half?	Group A has the higher typical value and the more consistent middle half.
5	Club P has mean 42 and MAD 3. Club Q has mean 44 and MAD 9. Which club has the higher average score? Which club's scores are more variable?	Club Q has the higher average score and the greater variability.
6	The data set is 4, 4, 6, 7, 38. Find the median and mean. Then name the better summary of a typical value and explain why.	Median = 6; mean = 11.8. The median is the better summary because 38 is an outlier.

PART 2 • APPLY IT

- Club B had higher typical attendance because its median was 65, compared with 61 for Club A. Club A was more consistent in its middle half because its IQR was 13, compared with 18 for Club B.** Read the medians to compare typical attendance. Compute each IQR by subtracting Q1 from Q3.
- Students with jobs: median 23 and range 7. Students without jobs: median 21 and range 13. In this survey, students with jobs had a higher typical study time and less variation. The council cannot conclude that having a job causes students to study more.** Find the middle value and subtract the least value from the greatest value for each ordered set. Because students were not assigned to have jobs, the survey cannot establish cause and effect.

CHALLENGE

Team R's typical interval is 77 to 91. Team S's typical interval is 79 to 83. No, the conclusion is not justified. Team R has a higher sample mean, but the intervals overlap and Team R has greater variability, so these summaries do not show that Team R is clearly stronger.

Accept equivalent wording that correctly compares both center and spread. For conclusions from the survey and team summaries, accept cautious statements that avoid claiming causation or certainty beyond the data.