

Centers and Spreads

Choose statistics that fit the data shape.

HIGH SCHOOL • HSS-ID.A.2

CCSS.Math.Content.HSS-ID.A.2 "Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets."

NAME _____

DATE _____

PICK THE RIGHT PAIR

If data are roughly symmetric, use mean and standard deviation. If data are skewed or have an outlier, use median and IQR. A larger spread statistic means less consistent data.

WORKED EXAMPLE

Both symmetric data sets use population standard deviation.
Compare A: 42, 44, 46, 48, 50 and
B: 52, 54, 56, 58, 60.

1. Mean $A = 230/5 = 46$; mean $B = 280/5 = 56$.
2. For A, squared deviations total 40, so $SD = \sqrt{40/5} = \sqrt{8}$.
3. B has the same squared deviations, so its SD is also $\sqrt{8}$.

Answer: B has the higher center. The sets have equal spread.

PRACTICE 5 problems

- 1** Both sets are symmetric. A has mean 18 and SD 3. B has mean 20 and SD 5. Which has the higher center? Which is more consistent?

ANSWER _____

- 2** Both sets are right-skewed. A has median 26 and IQR 4. B has median 29 and IQR 7. Compare center and spread.

ANSWER _____

- 3** A right-skewed set is 11, 13, 15, 17, 19, 31. Find the appropriate center and spread.

ANSWER _____

- 4** Data C is symmetric. Data D is right-skewed. Name the best statistic pair for each set.

ANSWER _____

- 5** Both sets are right-skewed. E has median 32 and IQR 2. F has median 30 and IQR 6. Which set has the higher center and less spread?

ANSWER _____

APPLY IT Show your work

- 1** An esports club compares upload times for two teams. Both time distributions are right-skewed. Red has median 18 minutes and IQR 3 minutes. Blue has median 21 minutes and IQR 5 minutes. Which team usually takes longer, and which team is more consistent?

WORK SPACE

ANSWER _____

- 2** Two students track minutes spent editing videos after school. Both distributions are symmetric. Jay has mean 24 minutes and SD 2 minutes. Nia has mean 28 minutes and SD 4 minutes. Who usually edits longer, and whose times are more consistent?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Both sets are right-skewed. A: 12, 13, 14, 15, 16, 63. B: 18, 19, 20, 21, 22, 28. A student uses the means and says A has the higher typical value. Is the claim valid? Find the appropriate center and spread for each set.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Both sets are symmetric. A has mean 18 and SD 3. B has mean 20 and SD 5. Which has the higher center? Which is more consistent?	B has the higher center. A is more consistent.
2	Both sets are right-skewed. A has median 26 and IQR 4. B has median 29 and IQR 7. Compare center and spread.	B has the higher center. A has less spread.
3	A right-skewed set is 11, 13, 15, 17, 19, 31. Find the appropriate center and spread.	Median = 16; IQR = 6.
4	Data C is symmetric. Data D is right-skewed. Name the best statistic pair for each set.	C: mean and standard deviation. D: median and IQR.
5	Both sets are right-skewed. E has median 32 and IQR 2. F has median 30 and IQR 6. Which set has the higher center and less spread?	E has the higher center and less spread.

PART 2 • APPLY IT

- Blue usually takes longer. Red is more consistent.** Compare medians for typical time and IQRs for spread. Blue's median is higher, while Red's IQR is smaller.
- Nia usually edits longer. Jay is more consistent.** Compare means for typical time and standard deviations for spread. Nia has the higher mean, and Jay has the lower SD.

CHALLENGE

No. A has median 14.5 and IQR 3. B has median 20.5 and IQR 3. B has the higher typical value, and the sets have equal IQRs. The mean for A is pulled up by 63.

Accept equivalent forms such as $14\frac{1}{2}$ for 14.5. For an even number of values, use the medians of the lower and upper halves to find Q1 and Q3.