LESSON MAKER PRO

Center or Spread?

Compare data sets, outliers, and distribution shape.

HIGH SCHOOL · MA.912.DP.2.1

MA.912.DP.2.1 "For two or more sets of numerical univariate data, calculate and compare the appropriate measures of center and measures of variability, accounting for possible effects of outliers..."

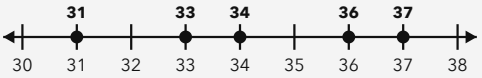
NAME _____ DATE _____

CHOOSE MEASURES WISELY

For data with no clear outliers, compare the mean and a measure of spread such as the range. If an outlier pulls the mean or range, use the median and IQR instead, then describe whether the data look roughly symmetric or skewed.

WORKED EXAMPLE

Use the number line. Find the mean, median, and range. Describe the shape.



1. Add the values: 31 + 33 + 34 + 36 + 37 = 171.
2. Divide by 5: 171/5 = 34.2.
3. The middle value is 34, and 37 - 31 = 6.
4. The values are roughly symmetric with no clear outlier.

Answer: Mean = 34.2, median = 34, range = 6; roughly symmetric.

PRACTICE 4 problems

1 For 2, 4, 6, 8, 10, find the mean and range.

ANSWER _____

2 For 5, 6, 7, 8, 25, identify the outlier. Which center is more appropriate, mean or median? Give its value.

ANSWER _____

3 Set A: 9, 11, 13, 15, 17. Set B: 5, 11, 13, 15, 21. Compare the means and ranges. Which set is more variable?

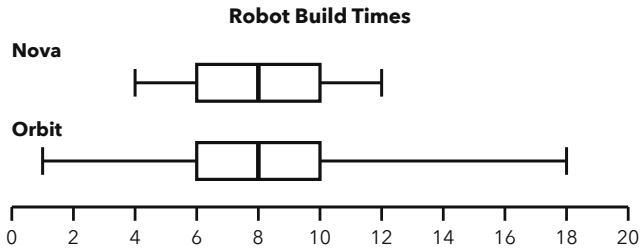
ANSWER _____

4 For 1, 2, 4, 5, 6, 20, find the median and IQR. These are better than the mean and range because of which value?

ANSWER _____

APPLY IT Show your work

1 Two robotics teams recorded build times, in minutes. Use the box plots. State each team's median and IQR. Which team has the wider overall range?



ANSWER _____

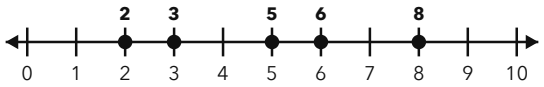
2 Two gaming clubs tracked weekly practice hours. Club Red: 10, 12, 14, 16, 18. Club Blue: 6, 12, 14, 16, 22. Find each mean and range. Which club is more consistent?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The number line shows five first-round scores in a skills contest. A sixth score of 30 is added. Find the old and new means and medians. Which center should be reported after the new score? Explain.



WORK SPACE AND ANSWER

ANSWER KEY

Center or Spread?

HIGH SCHOOL · MA.912.DP.2.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	For 2, 4, 6, 8, 10, find the mean and range.	**Mean = 6; range = 8.**
2	For 5, 6, 7, 8, 25, identify the outlier. Which center is more appropriate, mean or median? Give its value.	**Outlier = 25; use the median, 7.**
3	Set A: 9, 11, 13, 15, 17. Set B: 5, 11, 13, 15, 21. Compare the means and ranges. Which set is more variable?	**Both means are 13. Range A = 8 and range B = 16, so Set B is more variable.**
4	For 1, 2, 4, 5, 6, 20, find the median and IQR. These are better than the mean and range because of which value?	**Median = 4.5; IQR = 4; the value 20 is an outlier.**

PART 2 · APPLY IT

1. **Nova: median 8, IQR 4. Orbit: median 8, IQR 4. Orbit has the wider range, 17 minutes compared with 8 minutes.** Both medians are 8, and both IQRs are 10 - 6 = 4. Orbit's range is 18 - 1 = 17; Nova's range is 12 - 4 = 8.
2. **Both means are 14 hours. Red's range is 8 hours and Blue's range is 16 hours, so Club Red is more consistent.** Each set totals 70, so each mean is 70/5 = 14. Compare ranges: 18 - 10 = 8 and 22 - 6 = 16.

CHALLENGE

Old mean = 4.8 and old median = 5. New mean = 9 and new median = 5.5. Report the median because 30 is an outlier that changes the mean much more.

Accept equivalent calculations and wording that correctly identifies an outlier's effect. For distribution descriptions, accept roughly symmetric, skewed, or a clear statement supported by the data.