

Algebra 1 • Unit 1 Worksheet

One-Variable Statistics

Name: _____

Date: _____

Part A • Reading Data Displays

Sketch and interpret these displays. Calculations are part of the work — but the harder questions are about what the numbers mean.

1. Two classes recorded the number of hours of sleep students got last night.

a. Which class has greater variability? How do you know without computing standard deviation?

b. Both classes have a median of about 8. Why is that NOT enough to say they have similar sleep habits?

Class A data: 6, 6, 7, 7, 7, 8, 8, 8, 8, 9, 9, 10 (median = 8, mean $\approx$ 7.75)

Class B data: 4, 5, 7, 7, 8, 8, 8, 9, 9, 10, 11, 12 (median = 8, mean $\approx$ 8.17)

2. A histogram of test scores is skewed LEFT (tail on the low end).

a. Sketch the rough shape:

b. Which is larger: the mean or the median? Why?

Part B • Measures of Center and Spread

3. The data set is: 12, 14, 14, 15, 18, 19, 22, 25.

- Find the mean. _____
- Find the median. _____
- Find Q1, Q3, and the IQR. Q1 = _____ Q3 = _____ IQR = _____
- Now ADD the value 80 to the data set. Recompute the mean and the median.

e. Which changed more — the mean or the median? Explain why this happens.

4. Two data sets both have mean 50. Set X: 48, 49, 50, 51, 52. Set Y: 30, 40, 50, 60, 70.

Without computing, which has the larger standard deviation? Explain how you can tell just by looking.

Part C • Error Analysis

5. Priya argues: "The mean is always a better measure of center than the median, because it uses every data value." Do you agree? Give a specific example where one is more appropriate than the other, and explain.

6. Han computed the standard deviation of the data set {10, 10, 10, 10, 10} and got 2. What is the actual standard deviation, and what does Han's value tell you about the mistake he made?

Part D • Outliers and Interpretation

7. A box plot for monthly rents in a neighborhood has a min of \$700, Q1 of \$900, median of \$1100, Q3 of \$1300, and max of \$5500.

- a. Use the 1.5·IQR rule to identify whether the max is an outlier. Show your computation.

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- b. If you remove the \$5500 value, what happens to the mean? The median? The IQR?

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- c. If a journalist reports "average rent in this neighborhood," should they use mean or median? Defend your choice.

Part E • Comparing Distributions

8. Two basketball players' scoring records (points per game) for 10 games:

- a. Same mean. Whom would you rather have as your team's go-to scorer in a close playoff game? Why?

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- b. Whom would you choose if you needed a single 35-point breakout game to upset a rival? Why?

c. What does this question show about the limits of "average" alone?

Player A: 18, 20, 21, 21, 22, 22, 22, 23, 24, 27 (mean 22, SD $\approx$ 2.4)

Player B: 5, 10, 15, 22, 22, 25, 30, 32, 35, 24 (mean 22, SD $\approx$ 9.4)

Part F • Modeling and Reasoning

9. Design a statistical question you could investigate at your school.

a. The question:

b. How you would collect data (sample size, method, what could go wrong):

c. Which display you would use and why:

d. Which measure of center/spread is most appropriate for your data:

10. True or false — for each, justify briefly:

a. If two data sets have the same mean, they have the same shape. T F

b. Standard deviation can be negative. T F

c. If every value in a data set is multiplied by 3, the standard deviation is multiplied by 3. T F

d. Adding 10 to every value changes the median but not the IQR. T F
