RLP-ALG1A · RLP Algebra 1A — Data, Linear Equations and Systems

Unit 1: One-Variable Statistics

Practice Workbook. The same problems, in the same order, as the Practice sections of the online lessons.

Name _____ Period _____

Lesson 1.1 — Seeing the Shape of Data: Dot Plots, Histograms and Box Plots

FLUENCY

1. For the data 2, 3, 4, 8, 13, 13, 20, 28, 33, 36: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

2. For the data 2, 8, 9, 16, 17, 24, 26, 28, 30, 30: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

3. For the data 7, 13, 16, 19, 30, 33, 39: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

4. For the data 22, 24, 25, 30, 35, 36, 37, 38: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

5. For the data 19, 26, 28, 34, 36, 37, 38, 39: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

6. For the data 10, 15, 19, 19, 25, 30, 33: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

7. For the data 12, 15, 15, 18, 20, 22, 24, 25, 48, find the five-number summary, the IQR and the outlier fences, and list any outliers.

8. For the data 3, 8, 9, 10, 11, 12, 13, 14, 30, find the five-number summary, the IQR and the outlier fences, and list any outliers.

APPLICATION

9. A sixteenth student joins the Lesson 1.1 commute survey with a 42-minute commute. Find the new five-number summary and decide whether 42 or 55 is an outlier.

10. Daily highs (°F) for 14 July days in an inland Missouri city (illustrative): 92, 95, 97, 99, 101, 103, 104, 98, 96, 94, 100, 105, 108, 97. Make a frequency table with bins 90-94, 95-99, 100-104 and 105-109, and describe the shape.

11. Five-number summaries of daily air-quality index (AQI) values for one summer month (illustrative): City A (22, 35, 42, 51, 88); City B (30, 38, 44, 49, 63). Which city has the larger IQR, and is either maximum an outlier?

CHALLENGE

12. Write a data set of seven whole numbers with median 12, IQR 6 and range 20. Check your set.

REVIEW

13. Solve: $-7x = 63$

14. Compute $-3/4 + 5/6$.

15. 18 minutes is what percent of 24 minutes?

Lesson 1.2 — Measuring Center and Variability: Mean, Median and MAD

FLUENCY

1. For the data 2, 12, 21, 25, 31, 36, 39, 40: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

2. For the data 18, 20, 21, 29, 32, 34, 35, 38: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

3. For the data 8, 9, 15, 17, 19, 23, 40: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

4. Find the mean and the mean absolute deviation of 2, 4, 6, 8, 10.

5. Find the mean and the mean absolute deviation of 5, 7, 7, 9, 12.

6. Find the mean and the mean absolute deviation of 10, 12, 15, 15, 18, 20.

APPLICATION

7. A student's quiz scores are 78, 85, 92, 88. What score on the fifth quiz makes the mean exactly 86?

8. The inland week from Lesson 1.2 (88, 95, 101, 99, 92, 100, 97) gets an eighth day of 110°F. Find the new mean and median. Which changed more?

9. Two students time their bike commute in Columbia for a week (minutes). Ana: 22, 24, 25, 23, 26. Ben: 15, 30, 20, 28, 32. Compare means and MADs. Who is more consistent?

CHALLENGE

10. The data are 3, 8, 10 and x, where $x \geq 10$. Find x so that the mean equals the median.

REVIEW

11. Evaluate $|-7| + |3 - 10|$.

12. Evaluate $-4 - (-9)(2)$.

Lesson 1.3 — Outliers, Skew and Standard Deviation: Which Summary Tells the Truth?

FLUENCY

1. For the data 4, 6, 7, 13, 17, 29, 37: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

2. For the data 4, 5, 18, 18, 18, 22, 33, 34: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

3. For the data 7, 10, 13, 20, 28, 31, 39, 40, 40: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

4. Find the standard deviation (divide by n) of 2, 4, 4, 4, 5, 5, 7, 9, to two decimal places.

5. Find the standard deviation (divide by n) of 10, 12, 14, to two decimal places.

6. Find the standard deviation (divide by n) of 1, 3, 5, 7, 9, to two decimal places.

7. Find the standard deviation (divide by n) of 20, 20, 20, 20, to two decimal places.

APPLICATION

8. Annual salaries at a small business, in thousands of dollars (illustrative): 38, 41, 42, 45, 47, 250. Find the mean and median. Which better describes a typical employee, and why?

9. The data 4, 6, 7, 9, 14 have mean 8 and standard deviation about 3.41. If 5 is added to every value, what are the new mean and standard deviation?

10. If every value in 4, 6, 7, 9, 14 is doubled, what are the new mean and standard deviation?

CHALLENGE

11. The data are 10, 10, 10, 10 and x. Find every value of x for which the standard deviation (divide by n) is exactly 4.

REVIEW

12. Solve: $-7x + 3 = -39$

13. Evaluate $(-3)^2 - 4(2)$.

14. A price rises from \$40 to \$50. What is the percent increase?

Lesson 1.4 — Comparing Groups in Context: Units, Scale and Precision

FLUENCY

1. For the data 2, 4, 10, 10, 19, 25, 31, 39: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

2. For the data 2, 15, 17, 27, 36, 37, 38: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

3. For the data 10, 17, 21, 22, 22, 25, 28, 31, 34, 40: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

4. For the data 2, 6, 20, 26, 28, 39, 40: find the mean, median, range and interquartile range. (Find the quartiles as the medians of the lower and upper halves, leaving out the overall median when the count is odd.)

5. Convert 135 minutes to hours.

6. Convert 68°F to Celsius using $C = (5/9)(F - 32)$.

7. Sleep was recorded to the nearest quarter hour, and a mean came out as 7.456 hours. Report it to a sensible precision.

APPLICATION

8. Commute times (minutes) for ten workers in two neighborhoods (illustrative). C: 18, 22, 25, 25, 30, 32, 35, 40, 45, 60. D: 20, 24, 26, 27, 28, 29, 30, 31, 33, 35. Compare medians and IQRs.

9. In Lesson 1.4, Group A's median sleep was 7.5 hours and Group B's was 6.75 hours. By what percent of Group A's median is Group B's lower?

10. You are comparing box plots of two groups whose values run from 4 to 10 hours. One classmate draws them on separate axes, 4 to 10 and 5 to 9. What is wrong, and what scale should you use?

CHALLENGE

11. Class A has 24 students with a mean of 7.2 hours of sleep; class B has 30 students with a mean of 6.8 hours. Find the mean for all 54 students, to two decimal places. Why is it not 7.0?

REVIEW

12. Solve: $8x + 5 = -19$

13. A car travels 150 miles in 2.5 hours. What is its average speed?

14. What is 3/8 of 64?

Unit 1 checkpoint

1. For 2, 5, 7, 8, 12, 15, 20, what is the IQR?
   A. 10
   B. 7
   C. 8
   D. 18

2. Which display shows every individual value?
   A. Dot plot
   B. Histogram
   C. Box plot
   D. None of them
3. With Q1 = 10 and Q3 = 25, the upper outlier fence is _____.
4. The mean of 2, 4, 6, 8, 10 is _____ and its MAD is _____.
5. True or false: The signed deviations from the mean always add to zero.
6. Household incomes in a county are strongly skewed right. Which summary fits best?
   A. Median and IQR
   B. Mean and SD
   C. Mean and range
   D. Maximum and minimum
7. Adding 5 to every value in a data set changes which of these?
   A. The mean only
   B. The SD only
   C. Both mean and SD
   D. Neither
8. The standard deviation (divide by n) of 4, 6, 7, 9, 14 is about _____.
9. True or false: Deleting a real outlier to make the mean look typical is good statistical practice.
10. Data were recorded to the nearest half hour. Which is the best way to report a mean of 7.0500 hours?
    A. About 7 hours
    B. 7.0500 hours
    C. 7.05000 hours
    D. 7 hours exactly
11. True or false: Two box plots should be drawn on a common scale when they are compared.
12. Group B's sleep data 5, 5.5, 6, 6, 6.5, 7, 7, 8.5, 9, 10 have median _____.