Name _____ Date _____ Class _____

LESSON 1-1

Problem Solving

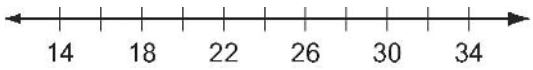
Measures of Central Tendency and Variation

Each week, Damien records the miles per gallon for his car, to the nearest whole number. Over a period of 10 weeks, the data are 18, 17, 19, 18, 18, 25, 29, 30, 26, 19. He wants to arrange and summarize his data so that he can analyze it.

1. Make a box-and-whisker plot of his data.
   a. Order the data from least to greatest. _____
   b. Identify the minimum, maximum, median, first quartile, and third quartile.

   _____

   c. Use the number line to make a box-and-whisker plot of the data. Find and label the interquartile range.



   d. Explain what the interquartile range represents in terms of the car's miles per gallon.

   _____

2. Find the standard deviation for the data.
   a. Write an equation and solve to find the mean. _____
   b. Complete the table to show the difference between the mean and each data value, and the square of that difference.

Data Value, *x*	18	17	19	18	18	25	29	30	26	19
$x - \bar{x}$										
$(x - \bar{x})^2$										

   c. Explain how to use the data from the table to find the standard deviation.

   _____

   d. What is the standard deviation for the data? _____
   e. Explain what the standard deviation represents in terms of the car's miles per gallon.

   _____

3. Damien thinks that the standard deviation is a more reliable measure of dispersion than the interquartile range. Is he correct? Explain.

   _____

   _____

   _____

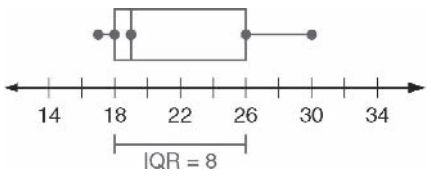
2. Impossible to determine; it may be the same or it may be greater depending on the distribution of the data.
3. Equal to; There were 6 zero scores. At least one value has to occur more than 10 times since 94 divided by 9 is greater than 10.
4. Less than; The set of 94 values ranges from 1 to 10 and so is not as spread out as the set of 100 values.
5. 12; the sum of the set of frequencies must equal 100.
6. The expected value is 4.81, which gives an expected result of 5.
7. Median is 5, Q1 is 3, Q3 is 7, and interquartile range is 4.

Problem Solving

1. a. 17, 18, 18, 18, 19, 19, 25, 26, 29, 30

   b. Minimum = 17; maximum = 30; median = 19; first quartile = 18; third quartile = 26

   c.



   d. Possible answer: Damien's car gets between 18 to 26 miles per gallon 50% of the time.

2. a. (18 + 17 + 19 + 18 + 18 + 25 + 29 + 30 + 26 + 19)/10 = 21.9

   b. –3.9; –4.9; –2.9; –3.9; –3.9; 3.1; 7.1; 8.1; 4.1; –2.9; 15.21; 24.01; 8.41; 15.21; 15.21; 9.61; 50.41; 65.61; 16.81; 8.41

   c. Find the square root of the mean of the $(x - \bar{x})^2$ terms.

   d. 4.78

   e. Possible answer: All but 3 data points are clustered within 1 standard deviation of the mean.

3. He is correct; possible answer: the standard deviation depends on the entire set of data values; whereas the interquartile range depends on only 2 values, the first and third quartiles.

Reading Strategies

1. a. Possible answer: Add the interquartile range to the first quartile. So the third quartile is 55 + 19 = 74.

   b. No; possible answer: the value of the median is between the first and third quartiles.

   c. 93 – 55 = 38

   d. The interquartile range; scores between 55 and 74

2. B
3. Possible answer: The whiskers are the lines drawn from the box to show the minimum and the maximum.

1-2 DATA GATHERING

Practice A

1. Yes; the sample is likely to be biased because people at an electronics store are more likely than other mall customers to be interested in an audio equipment store.
2. Possible answer: No; the sample is systematic and is likely to be representative of mall customers.
3. Yes; students who are in the expensive medical school will probably expect to have more debt than many other students studying different fields at other schools.
4. No; the sample is random and is likely to be representative of the population.
5. No; choosing a sample from a group that already goes to comedy movies may overrepresent the number of people who choose comedy movies
6. Yes; people who see all kinds of movies are likely to be selected, so the sample is not likely to be representative of the population.