Additional Practice

Find the mean, median, and mode of each data set.

1. { 12, 11, 17, 3, 9, 14, 16, 2 }
   a. Mean 10.5
   b. Median 11.5
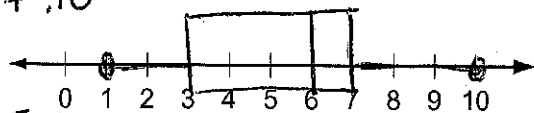   c. Mode none

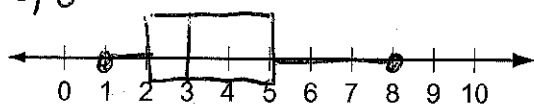2. { 6, 9, 9, 20, 4, 5, 9, 13, 10, 1 }
   a. Mean 8.6
   b. Median 9
   c. Mode 9

Make a box-and-whisker plot of the data. Find the interquartile range.

3. {3, 7, 7, 3, 10, 1, 6, 6}   1 3 3 6 6 7 7 ,10
   $$7 - 3 = 4$$

4. {1, 2, 3, 5, 3, 5, 8, 2}   1, 2, 2, 3, 3, 5, 5, 8
   $$5 - 2 = 3$$

Find the variance and standard deviation.

5. { 7, 4, 3, 9, 2 }
   $\bar{x} = 5$ $6^2 = 6.8$ $6 = 2.61$

6. { 35, 67, 21, 16, 24, 51, 18, 32 }
   $\bar{x} = 33$ $6^2 = 278$ $6 = 16.67$

7. { 19, 23, 17, 20, 25, 19, 15, 22 }
   $\bar{x} = 20$ $6^2 = 9.25$ $6 = 3.04$

8. { 5, 12, 10, 13, 8, 11, 15, 12 }
   $\bar{x} = 10.75$ $6^2 = 8.44$ $6 = 2.90$

Solve.

9. The probability distribution for the amount of rain that falls on Boston in May each year is given below. Find the expected amount of rain for Boston in May.

   $.05(5) + .10(6) + .64(7) + .21(8)$

   7.01 inches

Inches of Rain, n	5	6	7	8
Probability	0.05	0.10	0.64	0.21

10. A biologist is growing bacteria in the lab. For a certain species of bacteria, she records these doubling times: 41 min, 45 min, 39 min, 42 min, 38 min, 88 min, 43 min, 40 min, 44 min, 39 min, 42 min, and 40 min.

    a. Find the mean of the data.
       $\bar{x} = 45.08$
    b. Find the standard deviation.
       $6 = 13.10$
    c. Identify any outliers.
       88 min
    d. Describe how any outlier affects the mean and the standard deviation.
       When removed $\bar{x} = 41.18$ and $6 = 2.12$

    Outlier $\bar{x} \pm 36 :$ $45.08 \pm 3(13.10)$
    Calculation: $[5.78, 84.38]$

Problem Solving

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.

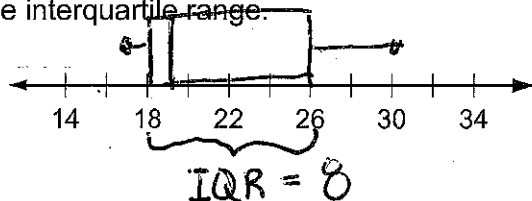   a. Order the data from least to greatest. 17, 18, 18, 18, 19, 19, 25, 26, 29, 30

   b. Identify the minimum, maximum, median, first quartile, and third quartile.

   min: 17   Q1: 18   Med: 19   Q3: 26   Max: 30

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

   IQR = 8

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

   50% of the time, the car should get between 18 and 26 mpg

2. Find the standard deviation for the data.

   a. Write an equation and solve to find the mean. $\bar{x} = 21.9$

   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
$x - \bar{x}$	3.9	4.9	2.9	3.9	3.9	3.1	7.1	8.1	4.1	2.9
$(x - \bar{x})^2$	15.21	24.01	8.41	15.21	15.21	9.61	50.41	65.61	16.81	8.41

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

   average squared deviations and square-root

   d. What is the standard deviation for the data? 4.78

   e. Explain what the standard deviation represents in terms of the car's miles per gallon.

   If normally distributed, 68% of the time the mpg will be within 4.78 of 21.9

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

   Yes, if he wants to extrapolate to larger samples, the standard deviation will be more accurate.