Chapter 3

Problem # 1

Write T for true or F for false in the appropriate space in the table in the first page (1 point each)

1. The median is the measure of central tendency that divides a population or sample into four equal parts. (F)

2. The mode is the measurement in a sample or population that occurs most frequently. (F)

3. The population mean is the point estimate of the sample mean. (F)

4. The median is said to be resistant to extreme values. (T)

5. The range of the measurement is the largest measurement plus the small measurement. (F)

6. It is appropriate to use the Empirical Rule to describe a population that is extremely skewed. (F)

Select the best answer and write it in the appropriate space in the table in the first page (1 point each)

7. A bell-shaped population has 99.7 percent of the population measurements within _____ standard deviations of the mean.
   A) One
   B) Two
   C) Three
   D) Four

8. Which percentile describes the third quartile, Q3?
   A) 25th
   B) 50th
   C) 75th
   D) 100th
9. Which of the following descriptive measures cannot easily be approximated from a box-and-whisker plot?
   
   A) The variance
   B) The range
   C) The interquartile range
   D) All of the above

9. If a population distribution is skewed to the right, then given a random sample from that population, one would expect that:
   
   A) The median would be greater than the mean.
   B) The mode would be equal to the mean.
   C) The median would be less than the mean.
   D) The median would be equal to the mean.

Problem # 2

Use the following box-and-whisker plot to find

![Box-and-whisker plot]

a. The median: (1 pt.)
   
   7

b. The interquartile range: (1 pt.)
   
   $9 - 6 = 3$
c. The smallest observation: 4

d. Outliers, if any: None

e. The lower fence must be less than 4

Problem # 3

A large company is interested in investigating the length of service of its employees. Twenty employees were randomly selected, and the length of service (in years) is determined for each employee. The data are given in a stem-and-leaf display:

<table>
<thead>
<tr>
<th>Leaf units: One's</th>
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<tbody>
<tr>
<td>0</td>
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<td>5</td>
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</tbody>
</table>

1. Using the above stem-and-leaf display, find

   a. The median: (1 pt.)
   We have 20 observations, so the median must be between the 10th and the 11th observation.
   Median = \((16+18)/2 = 17\)

   b. Interquartile range: (3 pt.)
   \(Q_1 = (6+11)/2 = 8.5\)
   \(Q_3 = (24+26)/2 = 25\)
   IQR = \(Q_3 - Q_1 = 25-8.5 = 16.5\)

   c. Lower fence: (1 pt.)
   \(LF = Q_1 - 1.5 \times IQR = 8.5 - 1.5 \times 16.5 = -16.25\)
Problem # 4

The following data are the time (minutes) taken by ten students to commute from Al-Khaldiya campus to Shuwaikh campus.

10 12 18 9 11 16 8 10 12 14

a. Find the average of the commuting time. (2pts.)
\[
\bar{x} = \frac{\sum x}{n} = 120/10 = 12
\]

b. Find the standard deviations for the commuting time? (2 pts.)
\[
s = \sqrt{\frac{1530 - 14.4}{9}} = 12.976
\]