Chapter 4
Describing Data: Displaying and Exploring Data

True/False

Multiple Choice

46. The test scores for a class of 147 students are computed. What is the location of the test score associated with the third quartile?
   A) 111
   B) 37
   C) 74
   D) 75%
   Answer: A

51. Mr. and Mrs. Jones live in a neighborhood where the mean family income is $45,000 with a standard deviation of $9,000. Mr. and Mrs. Smith live in a neighborhood where the mean is $100,000 and the standard deviation is $30,000. What is the relative dispersion of the family incomes in the two neighborhoods?
   A) Jones 40%, Smith 20%
   B) Jones 20%, Smith 30%
   C) Jones 30%, Smith 20%
   D) Jones 50%, Smith 33%
   E) None of the above
   Answer: B

52. A large oil company is studying the number of gallons of gasoline purchased per customer at self-service pumps. The mean number of gallons is 10.0 with a standard deviation of 3.0 gallons. The median is 10.75 gallons. What is the Pearson's coefficient of skewness?
   A) -1.00
   B) -0.75
   C) +0.75
   D) +1.00
   Answer: B

53. What is the value of the Pearson coefficient of skewness for a distribution with a mean of 17, median of 12 and standard deviation of 6?
   A) +2.5
   B) -2.5
   C) +0.83
   D) -0.83
   Answer: A
59. A sample of experienced typists revealed that their mean typing speed is 87 words per minute and the median is 73. The standard deviation is 16.9 words per minute. What is the Pearson's coefficient of skewness?
   A) -2.5  
   B) -4.2  
   C) +4.2  
   D) +2.5  
   Answer: D

60. A study of the net sales of a sample of small corporations revealed that the mean net sales is $2.1 million, the median $2.4 million, the modal sales $2.6 million and the standard deviation of the distribution is $500,000. What is the Pearson's coefficient of skewness?
   A) -9.1  
   B) +6.3  
   C) -3.9  
   D) +2.4  
   E) None of the above  
   Answer: E

**Fill-in-the-Blank**

64. For a stem-and-leaf display, what is the stem for the value 67? ____.
   Answer: 6

**Essay**

65. Construct a stem-and-leaf display for the following data:

   29 32 37 34 38 22
   33 57 21 65 35 52
   46 35 54 26 55 59
   22 30 38 39 31 20
   69 19 58 42 50 51

   Answer:
   1| 9
   2| 0 1 2 2 6 9
   3| 0 1 2 3 4 5 5 7 8 8 9
   4| 2 6
   5| 0 1 2 4 5 7 8 9
   6| 5 9

66. From the following stem-and-leaf display, find the minimum value, the 1st quartile, the median, the 3rd quartile, and the maximum value. List and interpret the interquartile range.

   1| 9
   2| 0 1 2 2 6 9
   3| 0 1 2 3 4 5 5 7 8 8 9
   4| 2 6
   5| 0 1 2 4 5 7 8 9
   6| 5 9
Answer: Minimum = 19, 1st quartile = 29.75, median = 37.5, 3rd quartile = 52.5, Maximum = 69. 
Interquartile range is 52.5 - 29.75 = 22.75. It means that 50% or 15 of the 30 observations are between 52.5 and 29.75.

**Fill-in-the-Blank**

67. For a stem-and-leaf display, what is the leaf for the value 123? ____.
Answer: 3

68. If you are constructing a stem-and-leaf display, the "3" in 19.3 would be the ____________.
Answer: leaf

69. If you are constructing a stem-and-leaf display, the "20" in 20.5 would be the ____________.
Answer: stem

71. What is the main advantage of a stem-and-leaf chart over a histogram? ________________
Answer: The identity of each observation is not lost

76. If the mean of a distribution is smaller than the median and mode, what is the sign of Pearson's coefficient of skewness? ________________
Answer: negative

78. For a set of data, how many quartiles are there? _____
Answer: three

80. What unit of measurement is used to express the coefficient of variation? _________
Answer: percent

81. The coefficient of variation is a measure of ________________.
Answer: relative dispersion

82. The research director of a large oil company conducted a study of the buying habits of consumers with respect to the amount of gasoline purchased at full-service pumps. The arithmetic mean amount is 11.5 gallons and the median amount is 11.95 gallons. The standard deviation of the sample is 4.5 gallons. What is the Pearson's coefficient of skewness? ________
Answer: -0.30

84. The annual incomes of the five vice presidents of Elly's Industries are: $41,000, $38,000, $32,000, $33,000 and $50,000. The annual incomes of Unique, another firm similar to Elly's Industries, were also studied and found to have a mean of $38,900 and a standard deviation of $6,612. What company has the greater coefficient of variation? __________
Answer: Elly, (19.0) > Unique (17.0)

86. The lengths of stay on the cancer floor of Community Hospital were organized into a frequency distribution. The mean length was 28 days, the median 25 days and the modal length 23 days. The
standard deviation was computed to be 4.2 days. What is the Pearson's coefficient of skewness?

Answer: 2.14

87. A sample of the homes currently offered for sale revealed that the mean asking price is $75,900, the median $70,100 and the modal price is $67,200. The standard deviation of the distribution is $5,900. What is the Pearson's coefficient of skewness? __________
Answer: 2.95

88. The Pearson's coefficient of skewness (Sk) measures the amount of skewness and may range from -3.0 to +3.0. It is computed by subtracting the median from the mean, multiplying the result by 3 and dividing by? ________________
Answer: standard deviation

Essay

89. Given the sample information in the following table regarding public opinion on gun control, who is more likely to favor gun control?

<table>
<thead>
<tr>
<th>Party Affiliation</th>
<th>Favor</th>
<th>Oppose</th>
<th>No opinion</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Democrat</td>
<td>90</td>
<td>98</td>
<td>46</td>
<td>234</td>
</tr>
<tr>
<td>Republican</td>
<td>90</td>
<td>54</td>
<td>10</td>
<td>154</td>
</tr>
<tr>
<td>Total</td>
<td>180</td>
<td>152</td>
<td>56</td>
<td>388</td>
</tr>
</tbody>
</table>

Answer: Republicans are more likely to favor gun control with 58% favoring gun control. Only 38% of democrats favor gun control.

Fill-in-the-Blank

Use the following to answer questions 90-94:
A telemarketing firm is monitoring the performance of its employees based on the number of sales per hour. One employee had the following sales for the last 20 hours:

<table>
<thead>
<tr>
<th>9</th>
<th>5</th>
<th>2</th>
<th>6</th>
<th>5</th>
<th>6</th>
<th>4</th>
<th>4</th>
<th>4</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4</td>
<td>7</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

90. What is the median for the distribution of number of sales per hour? ____________
Answer: Median = 5 sales per hour

91. What is the first quartile for the distribution of number of sales per hour? ________________
Answer: Q1 = 4 sales per hour

92. What is the third quartile for the distribution of number of sales per hour? _____________
Answer: Q3 = 6.5 sales per hour

93. For the distribution of number of sales per hour, 50% are greater than ____________
Answer: The median or 5 sales per hour
94. For the distribution of number of sales per hour, 50% of the observations are between _________
   and _________.
   Answer: Q1 (4) and Q3 (6.5)

Use the following to answer questions 95-101:
The following stem and leaf display reports the number of boat shipments per week by Ottertail Boats, Inc.

11| 1 5 9
12| 0 1 2 2 6 9
13| 0 1 2 3 4 5 5 7 8 8 9
14| 2 6 8
15| 0 1 2 4 5 7 8 9
16| 1 5 7 9

95. How many weeks were included in the study?___________
   Answer: 35 weeks

96. How many observations are in the third class?___________
   Answer: 11 weeks

97. What are the smallest and largest values?___________
   Answer: 111 and 169 orders

98. List the actual values in the fourth class._______________
   Answer: 142, 146, and 148 orders

99. How often did the company complete 111 shipments? _____________
   Answer: 1 or once

100. How often did the company complete more than 140 shipments? __________
    Answer: 15 times

101. What is the median value? _______________
    Answer: 138 shipments,

Essay

102. What is the common purpose of a scatter diagram and a contingency table?
    Answer: Both are used to summarize two variables:

103. What is the difference between a scatter diagram and a contingency table?
    Answer: A scatter diagram requires interval or ratio scaled variables, a contingency table requires
           nominal or ordinal variables.