### Statistics for Managers Using Microsoft Exce Global 8th Edition Levine Test Bank

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Numerical Descriptive Measures 3-1

# **CHAPTER 3: NUMERICAL DESCRIPTIVE MEASURES**

- 1. Which of the following statistics is not a measure of central tendency?
  - a) Arithmetic mean.
  - b) Median.
  - c) Mode.
  - d) Q<sub>3</sub>.

ANSWER:

d

TYPE: MC DIFFICULTY: Easy

KEYWORDS: measure of central tendency, arithmetic mean, median, mode, quartiles

- 2. Which measure of central tendency can be used for both numerical and categorical variables?
  - a) Arithmetic mean.
  - b) Median.
  - c) Mode.
  - d) Geometric mean.

### ANSWER:

с

TYPE: MC DIFFICULTY: Easy

KEYWORDS: measure of central tendency, mode, arithmetic mean, median, geometric mean

- 3. Which of the arithmetic mean, median, mode, and geometric mean are resistant measures of central tendency?
  - a) The arithmetic mean and median only.
  - b) The median and mode only.
  - c) The mode and geometric mean only.
  - d) The arithmetic mean and mode only.

ANSWER:

b

TYPE: MC DIFFICULTY: Moderate

KEYWORDS: measure of central tendency, resistant to outliers, mean, median, mode

- 4. In a right-skewed distribution
  - a) the median equals the arithmetic mean.
  - b) the median is less than the arithmetic mean.
  - c) the median is greater than the arithmetic mean.
  - d) none of the above.

ANSWER: b TYPE: MC DIFFICULTY: Easy KEYWORDS: shape

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- 5. Which of the following statements about the median is not true?
  - a) It is more affected by extreme values than the arithmetic mean.
  - b) It is a measure of central tendency.
  - c) It is equal to  $Q_2$ .
  - d) It is equal to the mode in bell-shaped "normal" distributions.

а

TYPE: MC DIFFICULTY: Easy

KEYWORDS: median, measure of central tendency, resistant to outliers, quartile

- 6. In a perfectly symmetrical bell-shaped "normal" distribution
  - a) the arithmetic mean equals the median.
  - b) the median equals the mode.
  - c) the arithmetic mean equals the mode.
  - d) All the above.

# ANSWER:

d

TYPE: MC DIFFICULTY: Easy KEYWORDS: shape, normal distribution

- 7. In a perfectly symmetrical distribution
  - a) the range equals the interquartile range.
  - b) the interquartile range equals the arithmetic mean.
  - c) the median equals the arithmetic mean.
  - d) the variance equals the standard deviation.

# ANSWER:

c TYPE: MC DIFFICULTY: Easy KEYWORDS: shape

- 8. When extreme values are present in a set of data, which of the following descriptive summary measures are most appropriate:
  - a) CV and range.
  - b) arithmetic mean and standard deviation.
  - c) interquartile range and median.
  - d) variance and interquartile range.

### ANSWER:

с

TYPE: MC DIFFICULTY: Easy

KEYWORDS: resistant to outliers, coefficient of variation, range, arithmetic mean, standard deviation, interquartile range, median, variance

- 9. In general, which of the following descriptive summary measures cannot be easily approximated from a boxplot?
  - a) The variance.
  - b) The range.
  - c) The interquartile range.
  - d) The median.

a

TYPE: MC DIFFICULTY: Easy

KEYWORDS: boxplot, variance, range, interquartile range, median

10. The smaller the spread of scores around the arithmetic mean,

- a) the smaller the interquartile range.
- b) the smaller the standard deviation.
- c) the smaller the coefficient of variation.
- d) All the above.

ANSWER:

d

TYPE: MC DIFFICULTY: Moderate

KEYWORDS: variation, arithmetic mean, interquartile range, standard deviation, coefficient of variation

11. Which descriptive summary measures are considered to be resistant statistics?

- a) The arithmetic mean and standard deviation.
- b) The interquartile range and range.
- c) The mode and variance.
- d) The median and interquartile range.

### ANSWER:

d

TYPE: MC DIFFICULTY: Moderate

KEYWORDS: resistant to outliers, arithmetic mean, standard deviation, interquartile range, range, mode, variance, median

12. In right-skewed distributions, which of the following is the correct statement?

- a) The distance from  $Q_1$  to  $Q_2$  is greater than the distance from  $Q_2$  to  $Q_3$ .
- b) The distance from  $Q_1$  to  $Q_2$  is less than the distance from  $Q_2$  to  $Q_3$ .
- c) The arithmetic mean is less than the median.
- d) The mode is greater than the arithmetic mean.

# ANSWER:

b

TYPE: MC DIFFICULTY: Easy KEYWORDS: shape, quartiles, arithmetic mean, mode

- 13. In perfectly symmetrical distributions, which of the following is NOT a correct statement?
  - a) The distance from  $Q_1$  to  $Q_2$  equals to the distance from  $Q_2$  to  $Q_3$ .
  - b) The distance from the smallest observation to  $Q_1$  is the same as the distance from  $Q_3$  to the largest observation.
  - c) The distance from the smallest observation to  $Q_2$  is the same as the distance from  $Q_2$  to the largest observation.
  - d) The distance from  $Q_1$  to  $Q_3$  is half of the distance from the smallest to the largest observation.

ANSWER: d TYPE: MC DIFFICULTY: Easy KEYWORDS: five-number summary, shape, quartiles

14. In left-skewed distributions, which of the following is the correct statement?

- a) The distance from  $Q_1$  to  $Q_2$  is smaller than the distance from  $Q_2$  to  $Q_3$ .
- b) The distance from the smallest observation to  $Q_1$  is larger than the distance from  $Q_3$  to the largest observation.
- c) The distance from the smallest observation to  $Q_2$  is less than the distance from  $Q_2$  to the largest observation.
- d) The distance from  $Q_1$  to  $Q_3$  is twice the distance from the  $Q_1$  to  $Q_2$ .

### ANSWER:

b TYPE: MC DIFFICULTY: Easy KEYWORDS:, five-number summary, shape, quartiles

- 15. According to the empirical rule, if the data form a "bell-shaped" normal distribution, percent of the observations will be contained within 2 standard deviations around the arithmetic mean.
  - a) 68.26
  - b) 88.89
  - c) 93.75
  - d) 95.44

ANSWER:

d

TYPE: MC DIFFICULTY: Moderate KEYWORDS: empirical rule, normal distribution

- 16. According to the empirical rule, if the data form a "bell-shaped" normal distribution, \_\_\_\_\_\_ percent of the observations will be contained within 1 standard deviation around the arithmetic mean.
  - a) 68.26
  - b) 75.00
  - c) 88.89
  - d) 93.75

а

TYPE: MC DIFFICULTY: Moderate KEYWORDS: empirical rule, normal distribution

- 17. According to the empirical rule, if the data form a "bell-shaped" normal distribution, \_\_\_\_\_\_ percent of the observations will be contained within 3 standard deviations around the arithmetic mean.
  - a) 68.26
  - b) 75.00
  - c) 95.0
  - d) 99.7

# ANSWER:

d TYPE: MC DIFFICULTY: Moderate KEYWORDS: empirical rule, normal distribution

# 18. Which of the following is NOT a measure of central tendency?

- a) The arithmetic mean.
- b) The geometric mean.
- c) The mode.
- d) The interquartile range.

# ANSWER:

d

TYPE: MC DIFFICULTY: Easy

KEYWORDS: measure of central tendency, arithmetic mean, geometric mean, mode, interquartile range

# 19. Which of the following is NOT sensitive to extreme values?

- a) The range.
- b) The standard deviation.
- c) The interquartile range.
- d) The coefficient of variation.

# ANSWER:

с

TYPE: MC DIFFICULTY: Moderate

KEYWORDS: resistant to outliers, range, standard deviation, interquartile range, coefficient of variation

- 20. Which of the following is sensitive to extreme values?
  - a) The median.
  - b) The interquartile range.
  - c) The arithmetic mean.
  - d) The 1<sup>st</sup> quartile.

### с

TYPE: MC DIFFICULTY: Moderate

KEYWORDS: resistant to outliers, median, interquartile range, arithmetic mean, quartiles

### 21. Which of the following is the easiest to compute?

- a) The arithmetic mean.
- b) The median.
- c) The mode.
- d) The geometric mean.

# ANSWER:

с

TYPE: MC DIFFICULTY: Easy KEYWORDS: mode, arithmetic mean, median, geometric mean

- 22. According to the Chebyshev rule, at least 75% of all observations in any data set are contained within a distance of how many standard deviations around the mean?
  - a) 1
  - b) 2
  - c) 3
  - d) 4

ANSWER:

b TYPE: MC DIFFICULTY: Easy KEYWORDS: Chebyshev rule

- 23. According to the Chebyshev rule, at least 93.75% of all observations in any data set are contained within a distance of how many standard deviations around the mean?
  - a) 1
  - b) 2
  - c) 3
  - d) 4

ANSWER: d TYPE: MC DIFFICULTY: Moderate KEYWORDS: Chebyshev rule

- 24. According to the Chebyshev rule, at least what percentage of the observations in any data set are contained within a distance of 3 standard deviations around the mean?
  - a) 67%
  - b) 75%
  - c) 88.89%
  - d) 99.7%

c TYPE: MC DIFFICULTY: Easy KEYWORDS: Chebyshev rule

- 25. According to the Chebyshev rule, at least what percentage of the observations in any data set are contained within a distance of 2 standard deviations around the mean?
  - a) 67%
  - b) 75%
  - c) 88.89%
  - d) 95%

ANSWER: b TYPE: MC DIFFICULTY: Easy KEYWORDS: Chebyshev rule 26. A manufacturer of flashlight batteries took a sample of 130 batteries from a day's production and used them continuously until they were drained. The number of hours until failure are recorded. Given below is the boxplot of the number of hours it took to drain each of the 130 batteries. The distribution of the number of hours is



- b) left-skewed
- c) symmetrical
- d) none of the above

# ANSWER:

a TYPE: MC DIFFICULTY: Easy KEYWORDS: boxplot

Data on the change in the cost of tuition, a shared dormitory room, and the most popular 27. meal plan from one academic year to the next academic year for a sample of 100 public universities are collected. Below is the boxplot for the change in cost in dollars. The distribution of the change in cost is



- c) symmetrical
- d) none of the above

### ANSWER:

а TYPE: MC DIFFICULTY: Easy **KEYWORDS**: boxplot

# **SCENARIO 3-1**

Health care issues are receiving much attention in both academic and political arenas. A sociologist recently conducted a survey of citizens over 60 years of age whose net worth is too high to qualify for Medicaid. The ages of 25 senior citizens were as follows:

60 61	62	63	64	65	66	68	68	69	70	73	73
74 75	76	76	81	81	82	86	87	89	90	92	

28. Referring to Scenario 3-1, calculate the arithmetic mean age of the senior citizens to the nearest hundredth of a year.

ANSWER: 74.04 years TYPE: PR DIFFICULTY: Easy **KEYWORDS**: arithmetic mean

29. Referring to Scenario 3-1, determine the median age of the senior citizens.

ANSWER: 73 years TYPE: PR DIFFICULTY: Easy **KEYWORDS**: median

### 3-10 Numerical Descriptive Measures

30. Referring to Scenario 3-1 determine the first quartile of the ages of the senior citizens.

ANSWER: 65.5 years TYPE: PR DIFFICULTY: Moderate KEYWORDS: quartiles

31. Referring to Scenario 3-1 determine the third quartile of the ages of the senior citizens.

ANSWER: 81.5 years TYPE: PR DIFFICULTY: Moderate KEYWORDS: quartiles

32. Referring to Scenario 3-1, determine the interquartile range of the ages of the senior citizens.

ANSWER: 16 years TYPE: PR DIFFICULTY: Moderate KEYWORDS: interquartile range

33. Referring to Scenario 3-1, determine which of the following is the correct statement.

- a) One fourth of the senior citizens sampled are below 65.5 years of age.
- b) The middle 50% of the senior citizens sampled are between 65.5 and 73.0 years of age.
- c) The mean age of senior citizens sampled is 73.5 years of age.
- d) All of the above are correct.

ANSWER:

a TYPE: MC DIFFICULTY: Moderate KEYWORDS: quartiles, arithmetic mean

34. Referring to Scenario 3-1, identify which of the following is the correct statement.

- a) One fourth of the senior citizens sampled are below 64 years of age.
- b) The middle 50% of the senior citizens sampled are between 65.5 and 73.0 years of age.
- c) 25% of the senior citizens sampled are older than 81.5 years of age.
- d) All of the above are correct.

### ANSWER:

c TYPE: MC DIFFICULTY: Moderate KEYWORDS: quartiles

35. Referring to Scenario 3-1, calculate the skewness statistic for the age of the senior citizens accurate to two decimal places.

ANSWER: 0.36 TYPE: PR DIFFICULTY: Moderate KEYWORDS: skewness, shape 36. Referring to Scenario 3-1, what type of shape does the distribution of the sample appear to have?

ANSWER: Slightly positive or right-skewed. TYPE: PR DIFFICULTY: Moderate KEYWORDS: shape, skewness

37. Referring to Scenario 3-1, calculate the kurtosis statistic for the age of the senior citizens accurate to two decimal places.

ANSWER: -1.01 TYPE: PR DIFFICULTY: Moderate KEYWORDS: kurtosis, shape

38. Referring to Scenario 3-1, does the distribution of the sample appear to be lepokurtic or platykurtic?

ANSWER: lepokurtic TYPE: PR DIFFICULTY: Easy KEYWORDS: kurtosis, shape

39. Referring to Scenario 3-1, calculate the variance of the ages of the senior citizens correct to the nearest hundredth of a year squared.

ANSWER: 94.96 years<sup>2</sup> TYPE: PR DIFFICULTY: Moderate KEYWORDS: variance

40. Referring to Scenario 3-1, calculate the standard deviation of the ages of the senior citizens correct to the nearest hundredth of a year.

ANSWER: 9.74 years TYPE: PR DIFFICULTY: Moderate KEYWORDS: standard deviation

41. Referring to Scenario 3-1, calculate the coefficient of variation of the ages of the senior citizens.

ANSWER: 13.16% TYPE: PR DIFFICULTY: Moderate KEYWORDS: coefficient of variation 42. True or False: The median of the values 3.4, 4.7, 1.9, 7.6, and 6.5 is 1.9.

ANSWER: False TYPE: TF DIFFICULTY: Moderate KEYWORDS: median

43. True or False: The median of the values 3.4, 4.7, 1.9, 7.6, and 6.5 is 4.05.

ANSWER: False TYPE: TF DIFFICULTY: Moderate KEYWORDS: median

44. True or False: In a set of numerical data, the value for  $Q_3$  can never be smaller than the value for  $Q_1$ .

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: quartiles

45. True or False: In a set of numerical data, the value for  $Q_2$  is always halfway between  $Q_1$  and  $Q_3$ .

ANSWER: False TYPE: TF DIFFICULTY: Easy KEYWORDS: quartiles

46. True or False: If the distribution of a data set were perfectly symmetrical, the distance from  $Q_1$  to the median would always equal the distance from  $Q_3$  to the median in a boxplot.

ANSWER: True TYPE: TF DIFFICULTY: Moderate KEYWORDS: boxplot, quartiles, shape

47. True or False: In right-skewed distributions, the distance from  $Q_3$  to the largest value is greater than the distance from the smallest observation to  $Q_1$ .

ANSWER: True TYPE: TF DIFFICULTY: Moderate KEYWORDS: quartiles, shape 48. True or False: In left-skewed distributions, the distance from the smallest value to  $Q_1$  is greater than the distance from  $Q_3$  to the largest value.

ANSWER: True TYPE: TF DIFFICULTY: Moderate KEYWORDS: five-number summary, quartiles, shape

49. True or False: A boxplot is a graphical representation of a five-number summary.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: boxplot, five-number summary

50. True or False: The five-number summary consists of the smallest value, the first quartile, the median, the third quartile, and the largest value.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: five-number summary

51. True or False: In a boxplot, the box portion represents the data between the first and third quartile values.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: boxplot

52. True or False: The line drawn within the box of the boxplot always represents the arithmetic mean.

ANSWER: False TYPE: TF DIFFICULTY: Easy KEYWORDS: boxplot, arithmetic mean

53. True or False: The line drawn within the box of the boxplot always represents the median.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: boxplot, median 54. True or False: In a sample of size 40, the sample mean is 15. In this case, the sum of all observations in the sample is  $\sum X_i = 600$ .

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: arithmetic mean

55. True or False: A population with 200 elements has an arithmetic mean of 10. From this information, it can be shown that the population standard deviation is 15.

ANSWER: False TYPE: TF DIFFICULTY: Easy KEYWORDS: arithmetic mean, standard deviation

56. True or False: In exploratory data analysis, a boxplot can be used to illustrate the median, quartiles, and extreme values.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: boxplot, five-number summary

57. True or False: The median of a data set with 20 items would be the average of the 10th and the 11th items in the ordered array.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: median, arithmetic mean

58. True or False: The coefficient of variation measures variability in a data set relative to the size of the arithmetic mean.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: coefficient of variation

59. True or False: The coefficient of variation is expressed as a percentage.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: coefficient of variation 60. True or False: The coefficient of variation is a measure of central tendency in the data.

ANSWER: False TYPE: TF DIFFICULTY: Easy KEYWORDS: coefficient of variation, measure of variation

61. True or False: The interquartile range is a measure of variation or dispersion in a set of data.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: interquartile range, measure of variation

62. True or False: The interquartile range is a measure of central tendency in a set of data.

ANSWER: False TYPE: TF DIFFICULTY: Easy KEYWORDS: interquartile range, measure of variation

63. True or False: The geometric mean is a measure of variation or dispersion in a set of data.

ANSWER: False TYPE: TF DIFFICULTY: Easy KEYWORDS: geometric mean, measure of central tendency

64. True or False: The geometric mean is useful in measuring the rate of change of a variable over time.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: geometric mean

65. True or False: If a set of data is perfectly symmetrical, the arithmetic mean must be identical to the median.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: shape, arithmetic mean, median

66. True or False: The coefficient of variation is a measure of relative variation.ANSWER:TrueTYPE: TF DIFFICULTY: ModerateKEYWORDS: coefficient of variation

67. True or False: If the data set is approximately bell-shaped, the empirical rule will more accurately reflect the greater concentration of data close to the mean as compared to the Chebyshev rule.

ANSWER: True TYPE: TF DIFFICULTY: Moderate KEYWORDS: empirical rule, Chebyshev rule, normal distribution

68. If the arithmetic mean of a numerical data set is greater than the median, the data are considered to be \_\_\_\_\_\_ skewed.

ANSWER: positive or right TYPE: FI DIFFICULTY: Easy KEYWORDS: shape, arithmetic mean, median

SCENARIO 3-2 The data below represent the amount of grams of carbohydrates in a serving of breakfast cereal in a sample of 11 different servings.

11 15 23 29 19 22 21 20 15 25 17

69. Referring to Scenario 3-2, the arithmetic mean carbohydrates in this sample is \_\_\_\_\_ grams.

ANSWER: 217/11 = 19.73 TYPE: FI DIFFICULTY: Moderate KEYWORDS: arithmetic mean

70. Referring to Scenario 3-2, the median carbohydrate amount in the cereal is \_\_\_\_\_ grams.

ANSWER: 20 TYPE: FI DIFFICULTY: Moderate KEYWORDS: median

71. Referring to Scenario 3-2, the skewness statistic for the carbohydrate amount in the cereal is

ANSWER: 0.09 TYPE: FI DIFFICULTY: Moderate KEYWORDS: skewness, shape

72. Referring to Scenario 3-2, is the carbohydrate amount in the cereal right- or left-skewed?

ANSWER: Right-skewed TYPE: PR DIFFICULTY: Easy KEYWORDS: skewness, shape 73. Referring to Scenario 3-2, the kurtosis statistic for the carbohydrate amount in the cereal is

# ANSWER: -0.06 TYPE: FI DIFFICULTY: Moderate KEYWORDS: kurtosis, shape

74. Referring to Scenario 3-2, is the carbohydrate amount in the cereal leptokurtic or platykurtic?

ANSWER: platykurtic TYPE: PR DIFFICULTY: Easy KEYWORDS: kurtosis, shape

75. Referring to Scenario 3-2, the first quartile of the carbohydrate amounts is \_\_\_\_\_ grams.

ANSWER: 15 TYPE: FI DIFFICULTY: Moderate KEYWORDS: quartiles

76. Referring to Scenario 3-2, the third quartile of the carbohydrate amounts is \_\_\_\_\_ grams.

ANSWER: 23 TYPE: FI DIFFICULTY: Moderate KEYWORDS: quartiles

77. Referring to Scenario 3-2, the range in the carbohydrate amounts is \_\_\_\_\_\_ grams.

ANSWER: 18 TYPE: FI DIFFICULTY: Easy KEYWORDS: range

78. Referring to Scenario 3-2, the interquartile range in the carbohydrate amounts is \_\_\_\_\_\_ grams.

ANSWER: 8 TYPE: FI DIFFICULTY: Moderate KEYWORDS: interquartile range

79. Referring to Scenario 3-2, the variance of the carbohydrate amounts is \_\_\_\_\_ (grams squared).

ANSWER: 26.02 TYPE: FI DIFFICULTY: Moderate KEYWORDS: variance 80. Referring to Scenario 3-2, the standard deviation of the carbohydrate amounts is \_\_\_\_\_\_ grams.

ANSWER: 5.10 TYPE: FI DIFFICULTY: Moderate KEYWORDS: standard deviation

ANSWER: 25.86% TYPE: FI DIFFICULTY: Moderate KEYWORDS: coefficient of variation

82. Referring to Scenario 3-2, the five-number summary of the carbohydrate amounts consists of

ANSWER: 11, 15, 20, 23, 29 TYPE: FI DIFFICULTY: Moderate KEYWORDS: five-number summary

83. Referring to Scenario 3-2, construct a boxplot for the carbohydrate amounts.

\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

### ANSWER:



TYPE: PR DIFFICULTY: Moderate KEYWORDS: boxplot

The ordered array below represents the number of vitamin supplements sold by a health food store in a sample of 16 days. 19, 19, 20, 20, 22, 23, 25, 26, 27, 30, 33, 34, 35, 36, 38, 41

*Note*: For this sample, the sum of the values is 448, and the sum of the squared differences between each value and the mean is 812.

84. Referring to Scenario 3-3, the arithmetic mean of the number of vitamin supplements sold in this sample is \_\_\_\_\_.

ANSWER: 28 TYPE: FI DIFFICULTY: Easy KEYWORDS: arithmetic mean

85. Referring to Scenario 3-3, the first quartile of the number of vitamin supplements sold in this sample is \_\_\_\_\_.

ANSWER: 20 TYPE: FI DIFFICULTY: Moderate KEYWORDS: quartiles

86. Referring to Scenario 3-3, the third quartile of the number of vitamin supplements sold in this sample is \_\_\_\_\_.

ANSWER: 35 TYPE: FI DIFFICULTY: Moderate KEYWORDS: quartiles

87. Referring to Scenario 3-3, the median number of vitamin supplements sold in this sample is

ANSWER: 26.5 TYPE: FI DIFFICULTY: Moderate KEYWORDS: median

88. Referring to Scenario 3-3, the skewness statistic of the number of vitamin supplements sold in this sample is \_\_\_\_\_.

ANSWER: 0.29 TYPE: FI DIFFICULTY: Moderate KEYWORDS: skewness, shape 89. Referring to Scenario 3-3, is the number of vitamin supplements sold in this sample right- or left-skewed?

ANSWER: Right-skewed TYPE: PR DIFFICULTY: Easy KEYWORDS: skewness, shape

90. Referring to Scenario 3-3, the kurtosis statistic of the number of vitamin supplements sold in this sample is \_\_\_\_\_.

ANSWER: -1.32 TYPE: FI DIFFICULTY: Moderate KEYWORDS: kurtosis, shape

91. Referring to Scenario 3-3, is the number of vitamin supplements sold in this sample lepokurtic or platykurtic?

ANSWER: platykurtic TYPE: PR DIFFICULTY: Easy KEYWORDS: kurtosis, shape

92. Referring to Scenario 3-3, the range of the number of vitamin supplements sold in this sample is

ANSWER: 22 TYPE: FI DIFFICULTY: Easy KEYWORDS: range

93. Referring to Scenario 3-3, the interquartile range of the number of vitamin supplements sold in this sample is \_\_\_\_\_.

ANSWER: 15 TYPE: FI DIFFICULTY: Moderate KEYWORDS: interquartile range

94. Referring to Scenario 3-3, the variance of the number of vitamin supplements sold in this sample is \_\_\_\_\_.

ANSWER: 54.13 TYPE: FI DIFFICULTY: Easy KEYWORDS: variance 95. Referring to Scenario 3-3, the standard deviation of the number of vitamin supplements sold in this sample is \_\_\_\_\_.

ANSWER: 7. 36 TYPE: FI DIFFICULTY: Easy KEYWORDS: standard deviation

96. Referring to Scenario 3-3, the coefficient of variation of the number of vitamin supplements sold in this sample is \_\_\_\_\_\_ percent.

ANSWER: 26.3% TYPE: FI DIFFICULTY: Moderate KEYWORDS: coefficient of variation

97. Referring to Scenario 3-3, the five-number summary of the data in this sample consists of

ANSWER: 19, 20, 26.5, 35, 41 TYPE: FI DIFFICULTY: Moderate KEYWORDS: five-number summary

98. Referring to Scenario 3-3, construct a boxplot for the data in this sample.

ANSWER:



# TYPE: PR DIFFICULTY: Moderate KEYWORDS: boxplot

**Box-and-whisker Plot** 

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_,

99. Referring to Scenario 3-3, what type of shape does the distribution of the sample appear to have?

ANSWER: Slightly positive or right-skewed. TYPE: PR DIFFICULTY: Moderate KEYWORDS: shape SCENARIO 3-4

The ordered array below represents the number of cargo manifests approved by customs inspectors of the Port of New York in a sample of 35 days: 16, 17, 18, 18, 19, 20, 20, 21, 21, 21, 22, 22, 22, 23, 23, 23, 23, 24, 24, 24, 25, 25, 26, 26, 26, 27, 28, 28, 29, 29, 31, 31, 32, 32

*Note*: For this sample, the sum of the values is 838, and the sum of the squared differences between each value and the mean is 619.89.

100. Referring to Scenario 3-4, the arithmetic mean of the customs data is \_\_\_\_\_.

ANSWER: 23.9 TYPE: FI DIFFICULTY: Easy KEYWORDS: arithmetic mean

101. Referring to Scenario 3-4, the median of the customs data is \_\_\_\_\_.

ANSWER: 23 TYPE: FI DIFFICULTY: Moderate KEYWORDS: median

102. Referring to Scenario 3-4, the first quartile of the customs data is \_\_\_\_\_.

ANSWER: 21 TYPE: FI DIFFICULTY: Moderate KEYWORDS: quartiles

103. Referring to Scenario 3-4, the third quartile of the customs data is \_\_\_\_\_.

ANSWER: 27 TYPE: FI DIFFICULTY: Moderate KEYWORDS: quartiles

104. Referring to Scenario 3-4, the range of the customs data is \_\_\_\_\_.

ANSWER: 16 TYPE: FI DIFFICULTY: Easy KEYWORDS: range 105. Referring to Scenario 3-4, the interquartile range of the customs data is \_\_\_\_\_.

ANSWER: 6 TYPE: FI DIFFICULTY: Moderate KEYWORDS: interquartile range

106. Referring to Scenario 3-4, the variance of the customs data is \_\_\_\_\_.

ANSWER: 18.2 TYPE: FI DIFFICULTY: Easy KEYWORDS: variance

107. Referring to Scenario 3-4, the standard deviation of the customs data is \_\_\_\_\_.

ANSWER: 4.3 TYPE: FI DIFFICULTY: Easy KEYWORDS: standard deviation

108. Referring to Scenario 3-4, the coefficient of variation of the customs data is \_\_\_\_\_\_ percent.

ANSWER: 17.8% or 18% TYPE: FI DIFFICULTY: Moderate KEYWORDS: coefficient of variation

109. Referring to Scenario 3-4, the five-number summary for the data in the customs sample consists of \_\_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_.

ANSWER: 16, 21, 23, 27, 32 TYPE: FI DIFFICULTY: Moderate KEYWORDS: five-number summary

# 3-24 Numerical Descriptive Measures

110. Referring to Scenario 3-4, construct a boxplot of this sample.



ANSWER:

TYPE: PR DIFFICULTY: Moderate KEYWORDS: boxplot

The rate of return of a Fortune 500 company over the past 15 years are: 3.17%, 4.43%, 5.93%, 5.43%, 7.29%, 8.21%, 6.23%, 5.23%, 4.34%, 6.68%, 7.14%, -5.56%, -5.23%, -5.73%, -10.34%

111. Referring to Scenario 3-5, compute the arithmetic mean rate of return per year.

ANSWER: 2.48% TYPE: PR DIFFICULTY: Easy KEYWORDS: arithmetic mean

112. Referring to Scenario 3-5, compute the geometric mean rate of return per year for the first four years.

ANSWER: 4.73% TYPE: PR DIFFICULTY: moderate KEYWORDS: geometric mean rate of return

113. Referring to Scenario 3-5, what is the range of the rate of return?

ANSWER: 18.55% TYPE: PR DIFFICULTY: Easy KEYWORDS: range

114. Referring to Scenario 3-5, construct a boxplot for the rate of return.

ANSWER:



TYPE: PR DIFFICULTY: Easy KEYWORDS: boxplot

115. Referring to Scenario 3-5, what is the shape of the distribution for the rate of return?

ANSWER: Left-skewed TYPE: PR DIFFICULTY: Easy KEYWORDS: shape

The rate of return of an Internet Service Provider over a 10 year period are: 10.25%, 12.64%, 8.37%, 9.29%, 6.23%, 42.53%, 29.23%, 15.25%, 21.52%, -2.35%.

116. Referring to Scenario 3-6, compute the arithmetic mean rate of return per year.

ANSWER: 15.30% TYPE: PR DIFFICULTY: Easy KEYWORDS: arithmetic mean

117. Referring to Scenario 3-6, compute the geometric mean rate of return per year for the first three years.

ANSWER: 10.41% TYPE: PR DIFFICULTY: Moderate KEYWORDS: geometric mean rate of return

118. Referring to Scenario 3-6, construct a boxplot for the rate of return

ANSWER:



119. Referring to Scenario 3-6, what is the shape of the distribution for the rate of return?

ANSWER: Right-skewed TYPE: PR DIFFICULTY: Moderate KEYWORDS: boxplot, shape 120. You were told that the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> quartiles of female students' weight at a major university are 95 lbs, 125 lbs, and 138 lbs. What percentage of the students weigh more than 138 lbs?

ANSWER: 25 percent TYPE: PR DIFFICULTY: Moderate KEYWORDS: quartile

121. You were told that the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> quartiles of female students' weight at a major university are 95 lbs, 125 lbs, and 138 lbs. What percentage of the students weigh less than 95 lbs?

ANSWER: 25 percent TYPE: PR DIFFICULTY: Moderate KEYWORDS: quartile

122. You were told that the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> quartiles of female students' weight at a major university are 95 lbs, 125 lbs, and 138 lbs. What percentage of the students weigh between 95 and 138 lbs?

ANSWER: 50 percent TYPE: PR DIFFICULTY: Moderate KEYWORDS: quartile

123. You were told that the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> quartiles of female students' weight at a major university are 95 lbs, 125 lbs, and 138 lbs. What percentage of the students weigh more than 125 lbs?

ANSWER: 50 percent TYPE: PR DIFFICULTY: Moderate KEYWORDS: quartile

124. The *Z* scores can be used to identify outliers.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: Z scores

125. The larger the Z score, the farther is the distance from the value to the median.

ANSWER: False TYPE: TF DIFFICULTY: Moderate KEYWORDS: Z scores

126. As a general rule, a value is considered an extreme value if its Z score is greater than -3.

ANSWER: False TYPE: TF DIFFICULTY: Easy KEYWORDS: Z score 127. As a general rule, a value is considered an extreme value if its Z score is greater than 3.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: *Z* score 128. As a general rule, a value is considered an extreme value if its *Z* score is less than 3.

ANSWER: False TYPE: TF DIFFICULTY: Easy KEYWORDS: Z score

129. As a general rule, a value is considered an extreme value if its Z score is less than -3.

ANSWER: True TYPE: TF DIFFICULTY: Easy KEYWORDS: Z score

130. The *Z* score of a value can never be negative.

ANSWER: False TYPE: TF DIFFICULTY: Moderate KEYWORDS: Z score

131. The Z score of a value measures how many standard deviations the value is from the mean.

ANSWER: True TYPE: TF DIFFICULTY: Moderate KEYWORDS: *Z* score

132. The 12-month rate of returns over a three year period of a particular stock is 0.099, -0.289, and 0.089. The geometric mean rate of return per year for this stock is \_\_\_\_\_.

ANSWER: -5.24% or -0.0524 TYPE: FI DIFFICULTY: moderate KEYWORDS: geometric mean rate of return

133. The rate of return for the S&P 500 over a four year period is -0.029, -0.061, -0.493, and -0.286. The geometric mean rate of return per year is \_\_\_\_\_.

ANSWER: -24.20% or -0.2420 TYPE: FI DIFFICULTY: moderate KEYWORDS: geometric mean rate of return 134. The rate of return for a stock over a three year period is 0.527, 0.145, and 0.684. The geometric mean rate of return is \_\_\_\_\_.

ANSWER: 43.33% or 0.4333 TYPE: FI DIFFICULTY: moderate KEYWORDS: geometric mean rate of return

In a recent academic year, many public universities in the United States raised tuition and fees due to a decrease in state subsidies. The change in the cost of tuition, a shared dormitory room, and the most popular meal plan from the previous academic year for a sample of 10 public universities were as follows: \$1,589, \$593, \$1,223, \$869, \$423, \$1,720, \$708, \$1425, \$922 and \$308.

135. Referring to Scenario 3-7, what is the mean and median change in the cost?

ANSWER: \$978, \$895.5 TYPE: PR DIFFICULTY: Moderate KEYWORDS: mean

136. Referring to Scenario 3-7, what is the five-number summary of the change in the cost?

ANSWER: \$308, \$593, \$895.5, \$1425, and \$1720 TYPE: PR DIFFICULTY: Moderate KEYWORDS: five-number summary

137. Referring to Scenario 3-7, what is the standard deviation of the change in the cost?

ANSWER: \$491.8 TYPE: PR DIFFICULTY: Moderate KEYWORDS: standard deviation

138. Referring to Scenario 3-7, what is the interquartile range of the change in the cost?

ANSWER: \$832 TYPE: PR DIFFICULTY: Moderate KEYWORDS: interquartile range

139. Referring to Scenario 3-7, what is the coefficient of variation of the change in cost?

ANSWER: 50.29% TYPE: PR DIFFICULTY: Moderate KEYWORDS: coefficient of variation

140. Referring to Scenario 3-7, what is the skewness statistic of the change in the cost?

ANSWER: 0.22 TYPE: PR DIFFICULTY: Moderate KEYWORDS: skewness, shape 141. Referring to Scenario 3-7, is the change in the cost right- or left-skewed?

ANSWER: Right-skewed TYPE: PR DIFFICULTY: Easy KEYWORDS: skewness, shape

142. Referring to Scenario 3-7, what is the kurtosis statistic of the change in the cost?

ANSWER: -1.32 TYPE: PR DIFFICULTY: Moderate KEYWORDS: kurtosis, shape

143. Referring to Scenario 3-7, is the change in the cost lepokurtic or platykurtic?

ANSWER: platykurtic TYPE: PR DIFFICULTY: Easy KEYWORDS: skewness, shape

144. Referring to Scenario 3-7, what are the (absolute values of) the Z scores of the change in cost?

ANSWER: 1.24, 0.78, 0.50, 0.22, 1.13, 1.51, 0.55, 0.91, 0.11, 1.36 TYPE: PR DIFFICULTY: Moderate KEYWORDS: Z scores

145. Referring to Scenario 3-7, are the data skewed? If so, how?

ANSWER: skewed to the right TYPE: PR DIFFICULTY: Moderate KEYWORDS: shape

The time period from 2010 to 2013 saw a great deal of volatility in the value of stocks. The data in the following table represent the total rate of return of our companies from 2010 to 2013.

Year	Company A	<b>Company B</b>	Company C	Company D
2013	25.30	26.40	45.40	29.40
2012	-15.01	-22.10	-21.58	-20.90
2011	-5.44	-11.90	-1.03	-10.97
2010	-6.20	-9.10	-3.02	-10.89

146. Referring to Scenario 3-8, calculate the geometric mean rate of return per year for Company A.

ANSWER: -1.42 TYPE: PR DIFFICULTY: Moderate KEYWORDS: geometric mean rate of return

147. Referring to Scenario 3-8, calculate the geometric mean rate of return per year for Company B.

ANSWER: -5.77% TYPE: PR DIFFICULTY: Moderate KEYWORDS: geometric mean rate of return

148. Referring to Scenario 3-8, calculate the geometric mean rate of return per year for Company C.

ANSWER: 2.28% TYPE: PR DIFFICULTY: Moderate KEYWORDS: geometric mean rate of return

149. Referring to Scenario 3-8, calculate the geometric mean rate of return per year for Company D.

ANSWER: -5.07% TYPE: PR DIFFICULTY: Moderate KEYWORDS: geometric mean rate of return

The following table represents the assets in billions of dollars of the five largest bond funds sometime in the past.

Bond Fund	Assets (Billions \$)
PIMCO Total Return Fund	246
Vanguard Total Bond Market Index Fund	110
Templeton Global Bond Fund	57
Vanguard Total Bond Market Index Fund II	56
Vanguard Inflation-Protected Securities	43

150. Referring to Scenario 3-9, what is the mean for this population of the five largest bond funds?

ANSWER: \$102.4 billions TYPE: PR DIFFICULTY: Easy KEYWORDS: population mean

151. Referring to Scenario 3-9, what are the variance and standard deviation for this population?

# ANSWER: 5,684.24 squared billion dollars, \$75.39 billions, respectively TYPE: PR DIFFICULTY: Moderate KEYWORDS: population variance, population standard deviation

SCENARIO 3-10

The population of eight analysts at a software firm were asked to estimate the reuse rate when developing a new software system. The following data are given as a percentage of the total code written for a software system that is part of the reuse database.

50, 62.5, 37.5, 75.0, 45.0, 47.5, 15.0, 25.0

152. Referring to Scenario 3-10, what is the mean percentage of the total code that is part of the reuse database?

ANSWER: 44.69 TYPE: PR DIFFICULTY: Easy KEYWORDS: population mean

153. Referring to Scenario 3-10, what are the variance and standard deviation of the total code that is part of the reuse database?

ANSWER: 324.12 and 18.00, respectively TYPE: PR DIFFICULTY: Moderate KEYWORDS: population variance, population standard deviation

Given below are the closing prices for the Dow Jones Industrial Average (DJIA) and the Standard & Poor's (S&P) 500 Index over a 10-week sometime in the past.

Dow Jones	10,421	10,110	9,862	10,475	9,920	10,592	11,213	10,933	11,134	10,316
S&P 500	1,379	1,356	1,343	1,410	1,389	1,463	1,529	1,499	1,516	1,355

154. Referring to Scenario 3-11, what is the sample covariance between the DJIA and the S&P 500 index?

ANSWER: 31594.7333 TYPE: PR DIFFICULTY: Easy KEYWORDS: covariance

155. Referring to Scenario 3-11, what is the sample correlation coefficient between the DJIA and the S&P 500 index?

ANSWER: 0.9274 TYPE: PR DIFFICULTY: Easy KEYWORDS: coefficient of correlation

- 156. Referring to Scenario 3-11, how will you classify the linear relationship between the DJIA and the S&P 500 index?
  - a) Weak
  - b) Moderate
  - c) Strong
  - d) No relationship

ANSWER:

c TYPE: MC DIFFICULTY: Easy KEYWORDS: coefficient of correlation, interpretation

- 157. Referring to Scenario 3-11, for the week when the DJIA is high, you will expect the S&P index in that week to
  - a) be about the same value as the DJIA
  - b) be low
  - c) be high
  - d) have no relationship with the DJIA value

ANSWER:

с

TYPE: MC DIFFICULTY: Easy KEYWORDS: coefficient of correlation, interpretation

- 158. Referring to Scenario 3-11, you will expect an increase in the DJIA to be associated with
  - a) an increase in the S&P 500 index
  - b) a decrease in the S&P 500 index
  - c) no predictable change in the DJIA
  - d) no predictable change in the S&P 500 index

a TYPE: MC DIFFICULTY: Easy KEYWORDS: coefficient of correlation, interpretation

### SCENARIO 3-12

Given below are the rating and performance scores of 15 laptop computers.

Performance Score	115	191	153	194	236	184	184	216
Overall Rating	74	78	79	80	84	76	77	92
Performance Score	185	183	189	202	192	141	187	
Overall Rating	83	78	77	78	78	73	77	

159. Referring to Scenario 3-12, what is the sample covariance between the performance scores and the rating?

ANSWER: 88.8905 TYPE: PR DIFFICULTY: Moderate KEYWORDS: covariance

160. Referring to Scenario 3-12, what is the sample correlation coefficient between the performance scores and the rating?

ANSWER: 0.6629 TYPE: PR DIFFICULTY: Moderate KEYWORDS: coefficient of correlation

- 161. Referring to Scenario 3-12, how will you classify the linear relationship between the performance scores and the rating?
  - a) Weak
  - b) Moderate
  - c) Strong
  - d) No relationship

b

TYPE: MC DIFFICULTY: Easy

KEYWORDS: coefficient of correlation, interpretation

- 162. Referring to Scenario 3-12, for a laptop computer that has a high rating, you will expect its performance score to
  - a) be about the same as its rating
  - b) be low
  - c) be high
  - d) have no relationship with its rating

# ANSWER:

с

TYPE: MC DIFFICULTY: Easy KEYWORDS: coefficient of correlation, interpretation

163. Referring to Scenario 3-12, you will expect a decrease in the performance score of one laptop computer to be associated with

- a) an increase in its rating
- b) a decrease in its rating
- c) no predictable change in its rating
- d) no predictable change in the performance score of another laptop computer

# ANSWER:

b TYPE: MC DIFFICULTY: Easy KEYWORDS: coefficient of correlation, interpretation

Energy drink consumption has continued to gain in popularity since the 1997 debut of Red Bull, the current leader in the energy drink market. Given below are the exam scores and the number of 12-ounce energy drinks consumed within a week prior to the exam of 10 college students.

Exam Scores	75	92	84	64	64	86	81	61	73	93
Number of Drinks	5	3	2	4	2	7	3	0	1	0

164. Referring to Scenario 3-13, what is the sample covariance between the exam scores and the number of energy drinks consumed?

ANSWER: 3.7667 TYPE: PR DIFFICULTY: Moderate KEYWORDS: covariance

165. Referring to Scenario 3-13, what is the sample correlation coefficient between the exam scores and the number of energy drinks consumed?

ANSWER: 0.1450 TYPE: PR DIFFICULTY: Moderate KEYWORDS: coefficient of correlation

- 166. Referring to Scenario 3-13, how will you classify the linear relationship between the exam scores and the number of energy drinks consumed?
  - a) Weak
  - b) Moderate
  - c) Strong
  - d) No relationship

### ANSWER:

a

TYPE: MC DIFFICULTY: Easy KEYWORDS: coefficient of correlation, interpretation

- 167. Referring to Scenario 3-13, for a student who has consumed a high number of energy drinks within the week prior to the exam, you will expect his/her exam score to
  - a) be noticeably higher than the exam score had he/she not consume as much energy drink.
  - b) be noticeably lower than the exam score had he/she not consume as much energy drink.
  - c) not be noticeably different from the amount of energy drinks that he/she consumed.
  - d) not be noticeably different from the exam score had he/she not consumed as much.

### ANSWER:

d TYPE: MC DIFFICULTY: Moderate KEYWORDS: coefficient of correlation, interpretation

- 168. Referring to Scenario 3-13, you will expect a decrease in the amount of energy drink consumed within the week prior to the exam to be associated with
  - a) no predictable change in the amount of energy drink consumed after the exam
  - b) an increase in the exam score
  - c) a decrease in the exam score
  - d) no predictable change in the exam score

d

TYPE: MC DIFFICULTY: Easy

KEYWORDS: coefficient of correlation, interpretation

### SCENARIO 3-14-A

You are the quality control manager of a water bottles company. One of the biggest complaints in the past years has been the breakage and, hence, the concern on the durability of the connector between the lid and the bottle which many users use as a handle for the bottles. To collect evidence before implementing any modification to the production process, your department has subjected 100 water bottles to a durability test and the following data on the number of times the handles have been used to lift the bottles before they break are contained in the file Scenario3-14-DataA.XLSX.

495	499	502	500	491	498	498	495	488	516
513	486	504	503	493	504	489	500	495	499
501	507	511	496	486	497	510	504	493	482
511	502	520	514	486	514	500	505	512	500
504	498	503	514	474	489	488	506	517	490

169. Referring to Scenario 3-14-A, the arithmetic mean of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

# ANSWER: 500.04 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: arithmetic mean

170. Referring to Scenario 3-14-A, the first quartile of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

# ANSWER:

### 493

TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: quartiles

171. Referring to Scenario 3-14-A, a quarter of the bottles in this sample have a broken handle after being used to lift the bottles for less than how many times?

### ANSWER:

### 493

TYPE: PR DIFFICULTY: Moderate (using PHStat)

**KEYWORDS**: quartiles, interpretation

172. Referring to Scenario 3-14-A, the third quartile of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 506 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: quartiles 173. Referring to Scenario 3-14-A, three quarters of the bottles in this sample have a broken handle after being used to lift the bottles for less than how many times?

ANSWER: 506 TYPE: PR DIFFICULTY: Moderate (using PHStat) KEYWORDS: quartiles, interpretation

174. Referring to Scenario 3-14-A, the median number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 500 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: median

175. Referring to Scenario 3-14-A, half of the bottles in this sample have a broken handle after being used to lift the bottles for less than how many times?

ANSWER: 500 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: median, interpretation

176. Referring to Scenario 3-14-A, the skewness statistic of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: -0.1576 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: skewness, shape

177. Referring to Scenario 3-14-A, is the number of times the handles have been used to lift the bottles before they break in this sample right- or left- skewed?

ANSWER: Left-skewed TYPE: PR DIFFICULTY: Easy (using PHStat) KEYWORDS: skewness, shape

178. Referring to Scenario 3-14-A, the kurtosis statistic of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: -0.2143 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: kurtosis, shape 179. Referring to Scenario 3-14-A, is the number of times the handles have been used to lift the bottles before they break in this sample lepokurtic or platykurtic?

ANSWER: platykurtic TYPE: PR DIFFICULTY: Moderate (using PHStat) KEYWORDS: kurtosis, shape

180. Referring to Scenario 3-14-A, the least number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 474 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: minimum, interpretation

181. Referring to Scenario 3-14-A, the most number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 520 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: maximum, interpretation

182. Referring to Scenario 3-14-A, the range of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 46 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: range

183. Referring to Scenario 3-14-A, the difference between the most and the least number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 46 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: range

184. Referring to Scenario 3-14-A, the interquartile range of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 13 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: interquartile range 185. Referring to Scenario 3-14-A, the middle 50% of the bottles have the number of times the handles have been used to lift the bottles before they break spread over what value?

ANSWER: 13 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: interquartile range, interpretation

186. Referring to Scenario 3-14-A, the variance of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 99.9984 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: variance

187. Referring to Scenario 3-14-A, the standard deviation of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 9.9999 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: standard deviation

188. Referring to Scenario 3-14-A, the average spread around the mean of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 9.9999 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: standard deviation, interpretation

189. Referring to Scenario 3-14-A, the coefficient of variation of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_ percent.

ANSWER: 2.00% TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: coefficient of variation

190. Referring to Scenario 3-14-A, the standard deviation of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_ percent of the mean.

ANSWER: 2.00% TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: coefficient of variation, interpretation 191. Referring to Scenario 3-14-A, the five-number summary of the data in this sample consists of

•

ANSWER: 474, 493, 500, 506, 520 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: five-number summary

\_, \_\_\_\_\_

\_, \_\_\_\_, \_\_\_\_, \_\_\_

192. Referring to Scenario 3-14-A, construct a boxplot for the data in this sample.





TYPE: PR DIFFICULTY: Easy (using PHStat) KEYWORDS: boxplot

193. Referring to Scenario 3-14-A, what type of shape does the distribution of the sample appear to have based on the boxplot?

ANSWER: Slightly negative or left-skewed. TYPE: PR DIFFICULTY: Moderate (using PHStat) KEYWORDS: shape

### SCENARIO 3-14-B

You are the quality control manager of a water bottles company. One of the biggest complaints in the past years has been the breakage and, hence, the concern on the durability of the connector between the lid and the bottle which many users use as a handle for the bottles. To collect evidence before implementing any modification to the production process, your department has subjected 100 water bottles to a durability test and the following data on the number of times the handles have been used to lift the bottles before they break are contained in the file Scenario3-14-DataB.XLSX.

493	506	515	491	500	505	517	510	506	503
503	491	495	496	496	505	493	486	504	483
514	494	497	501	493	490	510	494	494	495
494	486	495	506	506	507	502	498	510	501
500	505	492	486	501	496	501	521	510	498

194. Referring to Scenario 3-14-B, the arithmetic mean of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 499.9 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: arithmetic mean

195. Referring to Scenario 3-14-B, the first quartile of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

# ANSWER: 494 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: quartiles

196. Referring to Scenario 3-14-B, a quarter of the bottles in this sample have a broken handle after being used to lift the bottles for less than how many times?

ANSWER: 494 TYPE: PR DIFFICULTY: Moderate (using PHStat) KEYWORDS: quartiles, interpretation

197. Referring to Scenario 3-14-B, the third quartile of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 506 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: quartiles 198. Referring to Scenario 3-14-B, three quarters of the bottles in this sample have a broken handle after being used to lift the bottles for less than how many times?

ANSWER: 506 TYPE: PR DIFFICULTY: Moderate (using PHStat) KEYWORDS: quartiles, interpretation

199. Referring to Scenario 3-14-B, the median number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_\_.

ANSWER: 500 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: median

200. Referring to Scenario 3-14-B, half of the bottles in this sample have a broken handle after being used to lift the bottles for less than how many times?

ANSWER: 500 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: median, interpretation

201. Referring to Scenario 3-14-B, the skewness statistic of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 0.2978 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: skewness, shape

202. Referring to Scenario 3-14-B, is the number of times the handles have been used to lift the bottles before they break in this sample right- or left- skewed?

# ANSWER:

Right-skewed TYPE: PR DIFFICULTY: Easy (using PHStat) KEYWORDS: skewness, shape

203. Referring to Scenario 3-14-B, the kurtosis statistic of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: -0.1938 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: kurtosis, shape 204. Referring to Scenario 3-14-B, is the number of times the handles have been used to lift the bottles before they break in this sample lepokurtic or platykurtic?

ANSWER: platykurtic TYPE: PR DIFFICULTY: Easy (using PHStat) KEYWORDS: kurtosis, shape

205. Referring to Scenario 3-14-B, the least number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 483 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: minimum, interpretation

206. Referring to Scenario 3-14-B, the most number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 521 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: maximum, interpretation

207. Referring to Scenario 3-14-B, the range of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 38 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: range

208. Referring to Scenario 3-14-B, the difference between the most and the least number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 38 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: range

209. Referring to Scenario 3-14-B, the interquartile range of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 12 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: interquartile range 210. Referring to Scenario 3-14-B, the middle 50% of the bottles have the number of times the handles have been used to lift the bottles before they break spread over what value?

ANSWER: 12 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: interquartile range, interpretation

211. Referring to Scenario 3-14-B, the variance of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 71.3163 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: variance

212. Referring to Scenario 3-14-B, the standard deviation of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 8.4449 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: standard deviation

213. Referring to Scenario 3-14-B, the average spread around the mean of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_.

ANSWER: 8.4449 TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: standard deviation, interpretation

214. Referring to Scenario 3-14-B, the coefficient of variation of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_ percent.

ANSWER: 1.69% TYPE: FI DIFFICULTY: Easy (using PHStat)

**KEYWORDS:** coefficient of variation

215. Referring to Scenario 3-14-B, the standard deviation of the number of times the handles have been used to lift the bottles before they break in this sample is \_\_\_\_\_ percent of the mean.

ANSWER: 1.69% TYPE: FI DIFFICULTY: Moderate (using PHStat) KEYWORDS: coefficient of variation, interpretation

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3-48 Numerical Descriptive Measures

216. Referring to Scenario 3-14-B, the five-number summary of the data in this sample consists of

ANSWER: 483, 494, 500, 506, 521 TYPE: FI DIFFICULTY: Easy (using PHStat) KEYWORDS: five-number summary

217. Referring to Scenario 3-14-B, construct a boxplot for the data in this sample.

ANSWER:



TYPE: PR DIFFICULTY: Easy (using PHStat) KEYWORDS: boxplot

218. Referring to Scenario 3-14-B, what type of shape does the distribution of the sample appear to have based on the boxplot?

ANSWER: Slightly positive or right-skewed. TYPE: PR DIFFICULTY: Moderate (using PHStat) KEYWORDS: shape