#### CHAPTER 1

# INTRODUCTION TO STATISTICS

## CHAPTER LEARNING OBJECTIVES

1. ***Define statistics and list example applications of statistics in business.*** Statistics is an important decision-making tool in business and is used in virtually every area of business. In this text, the word *statistics* is defined as the science of gathering, analyzing, interpreting, and presenting data.

2. ***Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.*** The study of statistics can be subdivided into two main areas: *descriptive statistics* and *inferential statistics.* Descriptive statistics result from gathering data from a body, group, or population and reaching conclusions only about that group. Inferential statistics are generated from the process of gathering sample data from a group, body, or population and reaching conclusions about the larger group from which the sample was drawn.

3. ***Explain the difference between variables, measurement, and data.*** Most business statistics studies contain *variables*, measurements, and data. A variable is a characteristic of any entity being studied that is capable of taking on different values. Examples of variables might include monthly household food spending, time between arrivals at a restaurant, and patient satisfaction rating. A *measurement* is when a standard process is used to assign numbers to particular attributes or characteristics of a variable. Measurements of monthly household food spending might be taken in dollars, time between arrivals might be measured in minutes, and patient satisfaction might be measured using a 5-point scale. *Data* are recorded measurements. It is data that are analyzed by business statisticians in order to learn more about the variables being studied.

4. ***Compare the four different levels of data: nominal, ordinal, interval, and ratio.*** Two major types of inferential statistics are (1) *parametric statistics* and (2) *nonparametric statistics.* Use of parametric statistics requires interval or ratio data and certain assumptions about the distribution of the data. The techniques presented in this text are largely parametric. If data are only nominal or ordinal in level, nonparametric statistics must be used. The appropriate type of statistical analysis depends on the level of data measurement, which can be (1) *nominal,* (2) *ordinal,* (3) *interval,* or (4) *ratio.* Nominal is the lowest level, representing the classification of only data such as geographic location, sex, or social insurance number. The next level is ordinal, which provides rank ordering measurements in which the intervals between consecutive numbers do not necessarily represent equal distances. Interval is the next to highest level of data measurement, in which the distances represented by consecutive numbers are equal. The highest level of data measurement is ratio, which has all the qualities of interval measurement, but ratio data contain an absolute zero and ratios between numbers are meaningful. Interval and ratio data are sometimes called *metric* or *quantitative* data. Nominal and ordinal data are sometimes called *nonmetric* or *qualitative* data.

The computer allows for the storage, retrieval, and transfer of large data sets. Furthermore, computer soft ware has been developed to analyze data by means of sophisticated statistical techniques. Business statisticians use many popular statistical soft ware packages, including Minitab, SAS, and SPSS. In this text, the computer statistical output presented is from the Microsoft Excel software, which in spite of its limitations, is the most commonly used package in the business environment.

## TRUE-FALSE STATEMENTS

1. Virtually all areas of business use statistics in decision making.

Answer: True

Difficulty: Easy

Learning Objective: Define statistics and list example applications of statistics in business.

Section Reference: 1.1 Statistics in Business

2. The complete collection of all entities under study is called the sample.

Answer: False

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

3. A portion or subset of the entities under study is called the statistic.

Answer: False

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

4. A descriptive measure of the population is called a parameter.

Answer: True

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

5. A census is the process of gathering data on all the entities in the population.

Answer: True

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

6. Statistics is commonly divided into two branches called descriptive statistics and summary statistics.

Answer: False

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

7. A descriptive measure of the sample is called a statistic.

Answer: True

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

8. Gathering data from a sample to reach conclusions about the population from which the sample was drawn is called descriptive statistics.

Answer: False

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

9. Calculation of population parameters is usually either impossible or excessively time-consuming and costly.

Answer: True

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

10. The basis for inferential statistics is the ability to make decisions about population parameters without having to complete a census of the population.

Answer: True

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

11. All numerical data must be analyzed statistically in the same way because all of them are represented by numbers.

Answer: False

Difficulty: Hard

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

12. The manner in which numerical data can be analyzed statistically depends on the level of data measurement represented by numbers being analyzed.

Answer: True

Difficulty: Hard

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

13. The lowest level of data measurement is the ratio level.

Answer: False

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

14. The highest level of data measurement is the ratio level.

Answer: True

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

15. Numbers which are used to classify or categorize the observations represent data measured at the nominal level.

Answer: True

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

16. Numbers which are used to rank-order the performance of workers represent data measured at the interval level.

Answer: False

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

17. Nominal and ordinal data are sometimes referred to as qualitative data.

Answer: True

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

18. Nominal and ordinal data are sometimes referred to as quantitative data.

Answer: False

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

19. With interval-level data, the zero point is a matter of convention and does *not* mean the absence of the phenomenon under observation.

Answer: True

Difficulty: Hard

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

20. Interval- and ratio-level data are sometimes referred to as quantitative data.

Answer: True

Difficulty: Hard

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

**MULTIPLE CHOICE QUESTIONS**

21. Manuel Banales, Marketing Director of Plano Power Plants, Inc.'s Electrical Division, is directing a study to identify and assess the relative importance of product features. Manuel directs his staff to design a survey questionnaire for distribution to all of Plano’s 954 customers. For this study, the set of 954 customers is \_\_\_.

a) a parameter

b) a sample

c) the population

d) a statistic

e) the frame

Answer: c

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

22. Manuel Banales, Marketing Director of Plano Power Plants, Inc.'s Electrical Division, is directing a study to identify and assess the relative importance of product features. Manuel directs his staff to design a survey questionnaire for distribution to 100 of Plano’s 954 customers. For this study, the set of 100 customers is \_\_\_.

a) a parameter

b) a sample

c) the population

d) a statistic

e) the frame

Answer: b

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

23. Sue Taylor, Director of Global Industrial Sales, is concerned by a deteriorating sales trend. Specifically, the number of industrial customers is stable at 1,500, but they are purchasing less each year. She orders her staff to search for causes of the downward trend by surveying all 1,500 industrial customers. For this study, the set of 1,500 industrial customers is \_\_\_.

a) a parameter

b) a sample

c) the population

d) a statistic

e) the frame

Answer: c

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

24. Sue Taylor, Director of Global Industrial Sales, is concerned by a deteriorating sales trend. Specifically, the number of industrial customers is stable at 1,500, but they are purchasing less each year. She orders her staff to search for causes of the downward trend by selecting a focus group of 40 industrial customers. For this study, the set of 40 industrial customers is \_\_\_.

a) a parameter

b) a sample

c) the population

d) a statistic

e) the frame

Answer: b

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

25. Marc Fortier, Director of Human Resources, is exploring the causes of employee absenteeism at Lennoxville Bottling during the last operating year (January 1, 2013 through December 31, 2013). For this study the set of all employees who worked at Batesville Bottling during the last operating year is \_\_\_.

a) a parameter

b) a sample

c) the population

d) a statistic

e) the frame

Answer: c

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

26. Marc Fortier, Director of Human Resources, is exploring the causes of employee absenteeism at Lennoxville Bottling during the last operating year. Personnel records for 50 of the plant's 250 employees are selected for analysis. For this study, the group of 50 employees is a \_\_\_.

a) parameter

b) sample

c) population

d) statistic

e) frame

Answer: b

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

27. When a person collects information from the entire population, this is called a \_\_\_.

a) parameter

b) sample

c) population

d) census

e) statistic

Answer: d

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

28. Manuel Banales, Marketing Director of Plano Power Plants, Inc.'s Electrical Division, is leading a study to identify and assess the relative importance of product features. Manuel directs his staff to design a survey questionnaire and distribute it to all of Plano’s 954 customers. Manuel is ordering a \_\_\_.

a) statistic from the customers

b) census of the customers

c) sample of the customers

d) sorting of the customers

e) parameter of the customers

Answer: b

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

29. Manuel Banales, Marketing Director of Plano Power Plants, Inc.'s Electrical Division, is leading a study to identify and assess the relative importance of product features. Manuel directs his staff to design a survey questionnaire and distribute it 100 of Plano’s 954 customers. Manuel is ordering a \_\_\_.

a) statistic from the customers

b) census of the customers

c) sample of the customers

d) sorting of the customers

e) parameter of the customers

Answer: c

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

30. Sue Taylor, Director of Global Industrial Sales, is concerned by a deteriorating sales trend. Specifically, the number of customers is stable at 1,500, but they are purchasing less each year. She orders her staff to search for causes of the downward trend by surveying all 1,500 industrial customers. Sue is ordering a \_\_\_.

a) statistic from the industrial customers

b) census of the industrial customers

c) sample of the industrial customers

d) sorting of the industrial customers

e) parameter of the industrial customers

Answer: b

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

31. Sue Taylor, Director of Global Industrial Sales, is concerned by a deteriorating sales trend. Specifically, the number of customers is stable at 1,500, but they are purchasing less each year. She orders her staff to search for causes of the downward trend by selecting a focus group of 40 industrial customers. Sue is ordering a \_\_\_.

a) statistic from the industrial customers

b) census of the industrial customers

c) sample of the industrial customers

d) sorting of the industrial customers

e) parameter of the industrial customers

Answer: c

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

32. Pinky Bauer, Chief Financial Officer of Harrison Haulers, Inc., suspects irregularities in the payroll system, and orders an inspection of "each and every payroll voucher issued since January 1, 2013." Pinky is ordering a \_\_\_.

a) statistic from the payroll vouchers

b) census of the payroll vouchers

c) sample of the payroll vouchers

d) sorting of the payroll vouchers

e) parameter of the payroll vouchers

Answer: b

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

33. Pinky Bauer, Chief Financial Officer of Harrison Haulers, Inc., suspects irregularities in the payroll system, and orders an inspection of "every tenth payroll voucher issued since January 1, 2013." Pinky is ordering a \_\_\_.

a) statistic from the payroll vouchers

b) census of the payroll vouchers

c) sample of the payroll vouchers

d) sorting of the payroll vouchers

e) parameter of the payroll vouchers

Answer: c

Difficulty: Easy

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

34. On discovering an improperly adjusted drill press, Jack Joyner, Director of Quality Control, ordered a 100% inspection of all castings drilled during the evening shift. Jack is ordering a \_\_\_.

a) statistic from the castings

b) census of the castings

c) sample of the castings

d) sorting of the castings

e) parameter of the castings

Answer: b

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

35. On discovering an improperly adjusted drill press, Jack Joyner, Director of Quality Control, ordered an inspection of every fifth casting drilled during the evening shift. Jack is ordering a \_\_\_.

a) statistic from the castings

b) census of the castings

c) sample of the castings

d) sorting of the castings

e) parameter of the castings

Answer: c

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

36. Using data from a group to generalize to a larger group involves the use of \_\_\_.

a) descriptive statistics

b) inferential statistics

c) population derivation

d) sample persuasion

e) relative level data

Answer: b

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

37. A student makes an 82 on the first test in a statistics course. From this, she estimates that her average at the end of the semester (after other tests) will be about 82. This is an example of \_\_\_.

a) descriptive statistics

b) inferential statistics

c) population derivation

d) sample persuasion

e) relative level data

Answer: b

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

38. Jessica Salas, president of Salas Products, is reviewing the warranty policy for her company's new model of automobile batteries. Life tests performed on a sample of 100 batteries indicated an average life of seven years under normal usage. Jessica recommended a six-year warranty period for the new model. This is an example of \_\_\_.

a) descriptive statistics

b) executive forecasting

c) population derivation

d) sample persuasion

e) inferential statistics

Answer: e

Difficulty: Hard

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

39. On discovering an improperly adjusted drill press, Jack Joyner, Director of Quality Control, ordered an inspection of every fifth casting drilled during the evening shift. Less than 1% of the castings were defective, so Jack released the evening shift's production to assembly. This is an example of \_\_\_.

a) nonparametric statistics

b) nominal data

c) descriptive statistics

d) inferential statistics

e) judgmental statistics

Answer: d

Difficulty: Hard

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

40. A new sales person is paid a commission on each sale. This person made $2,000 his first month on the job. From this he concludes that he will make $24,000 during his first year. This is an example of \_\_\_.

a) inferential statistics

b) nominal data

c) descriptive statistics

d) deferential statistics

e) nonparametric statistics

Answer: a

Difficulty: Hard

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

41. A statistics instructor collects information about the background of his students. About 30% of the students have taken economics and about 40% have taken accounting. There are 23 male students and 27 female students in this class. This is an example of \_\_\_.

a) nonparametric statistics

b) nominal data

c) descriptive statistics

d) inferential statistics

e) census

Answer: c

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

42. A market researcher is interested in determining the average income for families in Simcoe County, Ontario. To accomplish this, she takes a random sample of 400 families from the county and uses the data gathered from them to estimate the average income for families of the entire county. This process is an example of \_\_\_.

a) nonparametric statistics

b) nominal data

c) descriptive statistics

d) inferential statistics

e) census

Answer: d

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

43. The Cascades Inc. has a plant in Barrie, Ontario. Management wants to determine the average number of sick days taken per worker in this plant in 2013. To do this, the management gathers records on all the workers in the plant and averages the number of sick days taken in 2013 by each worker. This process is using \_\_\_.

a) nonparametric statistics

b) nominal data

c) descriptive statistics

d) inferential statistics

e) a census

Answer: e

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

44. The Magnolia Swimming Pool Company wants to determine the average number of years it takes before a major repair is required on one of the pools that the company constructs. The president of the company asks Rick Johnson, a company accountant, to randomly contact fifty families that built Magnolia pools in the past ten years and determine how long it was in each case until a major repair. The information will then be used to estimate the average number of years until a major repair for all pools sold by Magnolia. The average based on the data gathered from the fifty families can best be described as a \_\_\_.

a) parameter

b) sample

c) population

d) statistic

e) frame

Answer: d

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

45. The Chamber of Commerce wants to assess its membership's opinions of the North American Free Trade Agreement. One-hundred of the 2,000 members are randomly selected and contacted by telephone. Seventy-five reported an overall favourable opinion, and twenty-five reported an overall unfavourable opinion. The proportion, 0.75, is a \_\_\_.

a) parameter

b) statistic

c) population

d) sample

e) frame

Answer: b

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

46. What proportion of Calgary’s registered voters favour trade restrictions with China? In an effort to determine this, a research team calls every registered voter in Calgary and contacts them. The proportion determined from the data gathered is a \_\_\_.

a) parameter

b) sample

c) population

d) statistic

e) frame

Answer: a

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

47. A researcher wants to know what the average variation is in altimeters of small, privately owned airplanes. The task of determining this is expensive and time-consuming, if even possible, given the large number of such airplanes. The researcher decides to use government records to randomly locate the owners of ten such planes and then get permission to test the altimeters. When the researcher is done, he will use the data gathered from the group of ten to reach conclusions about all small, privately owned airplanes. This process can best be described as \_\_\_.

a) data statistics

b) research statistics

c) descriptive statistics

d) inferential statistics

e) nonparametric statistics

Answer: d

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

48. A researcher wants to know what the average variation is in altimeters of small, privately owned airplanes. The task of determining this is expensive and time-consuming, if even possible, given the large number of such airplanes. The researcher decides to use government records to randomly locate the owners of ten such planes and then get permission to test the altimeters. When the researcher is done, he will use the data gathered from the group of ten to reach conclusions about all small, privately owned airplanes. The average variation computed using the data gathered on the group of ten airplanes is best described as a \_\_\_.

a) measurement

b) data

c) statistic

d) parameter

e) census

Answer: c

Difficulty: Medium

Learning Objective: Define important statistical terms, including population, sample, and parameter, as they relate to descriptive and inferential statistics.

Section Reference: 1.2 Basic Statistical Concepts

49. The lowest level of data measurement is \_\_\_.

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) minimal level

Answer: c

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

50. Which of the following operations is meaningful for processing nominal data?

a) addition

b) multiplication

c) ranking

d) counting

e) division

Answer: d

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

51. Which scale of measurement has these two properties: linear distance is meaningful and the location of origin (or zero point) is arbitrary?

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) minimal level

Answer: a

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

52. Which scale of measurement has these two properties: linear distance is meaningful and the location of origin (or zero point) is absolute (or natural)?

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) relative level

Answer: d

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

53. Sue Taylor, Director of Global Industrial Sales, is concerned by a deteriorating sales trend. Specifically, the number of industrial customers is stable at 1,500, but they are purchasing less each year. She orders her staff to search for causes of the downward trend by surveying all 1,500 industrial customers. One question on the survey asked the customers: “Which of the following best describes your primary business: a. manufacturing, b. wholesaler, c. retail, d. service.” The measurement level for this question is \_\_\_.

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) relative level

Answer: c

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

54. A question in a survey of microcomputer users asked: “Which operating system do you use most often: a. Apple OS 7, b. MS Windows Vista, c. MS Windows XP, d. UNIX.” The measurement level for this question is \_\_\_.

a) nominal level

b) ordinal level

c) interval level

d) ratio level

e) relative level

Answer: a

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

55. Which of the following operations is meaningful for processing ordinal data, but is meaningless for processing nominal data?

a) addition

b) multiplication

c) ranking

d) counting

e) division

Answer: c

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

56. Sue Taylor, Director of Global Industrial Sales, is concerned by a deteriorating sales trend. Specifically, the number of industrial customers is stable at 1,500, but they are purchasing less each year. She orders her staff to search for causes of the downward trend by surveying all 1,500 industrial customers. One question on the survey asked the customers: “How many people does your company employ? The measurement level for this question is \_\_\_.

a) interval level

b) ordinal level

c) nominal level

d) relative level

e) ratio level

Answer: e

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

57. A consumer has been asked to rank five cars based upon their desirability. This level of measurement is \_\_\_.

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) relative level

Answer: b

Difficulty: Easy

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

58. Morningstar Mutual Funds analyzes the risk and performance of mutual funds. Each mutual fund is assigned an overall rating of one to five stars. One star is the lowest rating, and five stars is the highest rating. This level of measurement is \_\_\_.

a) ordinal level

b) interval level

c) nominal level

d) ratio level

e) relative level

Answer: a

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

59. A level of data measurement that has an absolute zero is called \_\_\_.

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) relative level

Answer: d

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

60. A person has decided to code a particular set of sales data. A value of 0 is assigned if the sales occurred on a weekday, and a value of 1 means it happened on a weekend. This is an example of \_\_\_.

a) interval level data

b) ordinal level data

c) nominal level data

d) ratio level data

e) relative level data

Answer: c

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

61. Members of the accounting department's clerical staff were asked to rate their supervisor's leadership style as either (1) authoritarian or (2) participatory. This is an example of \_\_\_.

a) interval level data

b) ordinal level data

c) nominal level data

d) ratio level data

e) relative level data

Answer: c

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

62. A market research analyst has asked consumers to rate the appearance of a new package on a scale of 1 to 5. A 1 means that the appearance is awful while a 5 means that it is excellent. The level of this data is usually considered \_\_\_.

a) interval level data

b) ordinal level data

c) nominal level data

d) ratio level data

e) relative level data

Answer: b

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

63. The social insurance number of employees would be an example of what level of data measurement?

a) interval level data

b) ordinal level data

c) nominal level data

d) ratio level data

e) relative level data

Answer: c

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

64. Sales of a restaurant (in dollars) are an example of what level of data measurement?

a) interval level data

b) ordinal level data

c) nominal level data

d) ratio level data

e) relative level data

Answer: d

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

65. Grades on a test range from 0 to 100. This level of data is \_\_\_.

a) interval level data

b) ordinal level data

c) nominal level data

d) ratio level data

e) relative level data

Answer: d

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

66. If it were *not* for the existence of an "absolute zero," ratio data would be considered the same as \_\_\_.

a) interval level data

b) ordinal level data

c) nominal level data

d) ratio level data

e) relative level data

Answer: a

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

67. Law School Admission Test (LSAT) scores are an example of what type of measurement scale?

a) interval level data

b) ordinal level data

c) nominal level data

d) ratio level data

e) relative level data

Answer: a

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

68. Which types of data are normally used in parametric statistics?

a) interval or ratio level data

b) ordinal or nominal level data

c) nominal or ratio level data

d) ratio or ordinal level data

e) relative or ratio level data

Answer: a

Difficulty: Hard

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

69. Which types of data are normally used with nonparametric statistics?

a) interval or ratio level data

b) ordinal or nominal level data

c) nominal or ratio level data

d) ratio or ordinal level data

e) relative or ratio level data

Answer: b

Difficulty: Hard

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

70. How much inventory do Christmas tree sales lots keep? A researcher goes from location to location around the city counting the number of trees in each lot. These numbers most likely represent what level of data?

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) relative level

Answer: d

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

71. During the Valentine season, different offices in a company are encouraged to decorate their doors. A committee then goes around and ranks the doors according to how well the doors are decorated. The best door gets a ranking of “1”; the second best gets a ranking of “2”, etc. The numbers of these rankings represent which level of data?

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) relative level

Answer: b

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

72. A large manufacturing company in Sarnia produces valves for the chemical industry. According to specifications, one particular valve is supposed to have a five-inch opening on the side. Quality control inspectors take random samples of these valves just after the hole is bored. They measure the size of the hole in an effort to determine if the machine is out-of-adjustment. The measurement of the diameter of the hole represents which level of data?

a) interval level

b) ordinal level

c) nominal level

d) central level

e) ratio level

Answer: e

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

73. A marketing demographic survey is undertaken to determine the market potential for a new product. One of the questions asked is: What type of residence do you live in? Respondents are offered several possible answers including: house, apartment, or condominium. In order to computerize the survey answers, the responses are coded as a 1 if the answer is "house", a 2 if the answer is an "apartment", and a 3 if the answer is a "condominium". These numbers, 1, 2, and 3, are examples of which level of data?

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) relative level

Answer: c

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

74. A marketing survey is conducted to ascertain the potentiality of several new products. A series of focus groups is used to conduct this survey. At the end of one of the sessions, the group members are asked to rank the remaining eight products in order of desirability. A one indicates the most favoured product and an eight is awarded to the least desirable. These numbers are examples of which level of data?

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) relative level

Answer: b

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

75. A business is attempting to find the best small town in Canada in which to relocate. As part of the investigation, the elevations of all small towns in Canada are researched. Some towns are located high in the Rockies with elevations over 2,000 metres. There are even some towns located in the Maritimes with elevations below sea level. These elevations can best be described as which level of data?

a) interval level

b) ordinal level

c) nominal level

d) ratio level

e) relative level

Answer: a

Difficulty: Medium

Learning Objective: Explain the difference between variables, measurement, and data.

Section Reference: 1.3 Variables and Data

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