

***Essentials of Business Statistics, 2e* (Jaggia)**
Chapter 1 Statistics and Data

1) A knowledge of statistics provides the necessary tools to differentiate between sound statistical conclusions and questionable conclusions drawn from incomplete data points or just misinformation.

Answer: TRUE

Explanation: To make intelligent decisions we must understand statistics—the language of data.

Difficulty: 1 Easy

Topic: The Relevance of Statistics

Learning Objective: 01-01 Describe the importance of statistics.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

2) In the broadest sense, we can define the study of statistics as the methodology of extracting non-useful information from a data set.

Answer: FALSE

Explanation: Statistics is the methodology of extracting useful information from a data set.

Difficulty: 1 Easy

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Remember

AACSB: Reflective Thinking

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3) The branch of statistical studies called *descriptive statistics* refers to the summary of important aspects of a data set in the form of charts, tables, and numerical measures.

Answer: TRUE

Explanation: Descriptive statistics refers to the summary of important aspects of a data set.

Difficulty: 1 Easy

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Remember

AACSB: Reflective Thinking

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4) The branch of statistical studies called *inferential statistics* refers to drawing conclusions about a smaller set of sample data based on a large set of data-called population.

Answer: FALSE

Explanation: Inferential statistics refers to drawing conclusions about a population by analyzing sample data.

Difficulty: 1 Easy

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Remember

AACSB: Reflective Thinking

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5) In most statistical applications, we use population parameters to estimate the corresponding unknown sample statistics.

Answer: FALSE

Explanation: Sample statistics are used to estimate the corresponding population parameter.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Understand

AACSB: Reflective Thinking

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6) Typically, it is possible to examine every member of the population.

Answer: FALSE

Explanation: Typically, it is too expensive, too time-consuming, or even impossible to examine every member of the population.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

7) Cross-sectional data refers to data collected by recording a characteristic of one subject over several time periods.

Answer: FALSE

Explanation: Cross-sectional data contain values of a characteristic of many subjects at the same point or approximately the same point in time, or without regards to differences in time.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

8) Time series data refers to data collected over several time periods focusing on certain groups of people, specific events, or objects.

Answer: TRUE

Explanation: Time series can include hourly, daily, weekly, monthly, quarterly, or annual observations.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

9) Structured data tends to include numbers, dates, and groups of words and numbers called strings.

Answer: TRUE

Explanation: Structure data generally refers to data that has a well-defined length and format. This type of data is not open to interpretation.

Difficulty: 1 Easy

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

10) Unstructured data conforms to a predefined row-column format.

Answer: FALSE

Explanation: Unstructured data does not conform to a predefined row-column format. They tend to be textual (like e-mail messages or open-ended survey responses) or have multimedia contents (like photos, audio data, or videos).

Difficulty: 3 Hard

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Apply

AACSB: Knowledge Application

Accessibility: Keyboard Navigation

11) A qualitative variable assumes meaningful numerical values.

Answer: FALSE

Explanation: A quantitative variable assumes meaningful numerical values, while values of a qualitative variable are typically labels or names used to identify the distinguishing characteristics of each observation.

Difficulty: 1 Easy

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

12) Both discrete and continuous variables may assume an uncountable number of values.

Answer: FALSE

Explanation: A discrete variable assumes a countable number of values because these values can be put in a sequence x_1, x_2, x_3 , and so on. Even if this sequence is infinite, its values can be counted as the first, the second, the third one, and so on. On the other hand, a continuous variable assumes any value within an interval, and such values cannot be counted (there are infinitely many of them).

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Apply

AACSB: Knowledge Application

Accessibility: Keyboard Navigation

13) A discrete variable cannot assume an infinite number of values.

Answer: FALSE

Explanation: A discrete variable may assume an infinite number of values, but these values are countable; that is, they can be presented as a sequence x_1, x_2, x_3 , and so on. The number of cars that cross the Golden Gate Bridge on a Saturday is a discrete variable. Theoretically, this variable assumes the values 0, 1, 2, 3, ...

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

14) A continuous variable assumes any value within an interval.

Answer: TRUE

Explanation: A continuous variable is characterized by infinitely uncountable values within an interval. Time, weight, and investment return are all examples of continuous variables.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

15) A professor's marital status (married, single), as well as his/her rank (assistant, associate, full), represents ordinal data.

Answer: FALSE

Explanation: Professor's marital status is nominal and rank is ordinal. The categories for nominal data do not have any natural ordering, while such an ordering exists for ordinal data.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

16) Compared to the nominal scale, the ordinal scale reflects a stronger level of measurement

Answer: TRUE

Explanation: With ordinal data we are able to both categorize and rank the data with respect to some characteristic or trait.

Difficulty: 1 Easy

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

17) A population is defined as all members of a specified group.

Answer: TRUE

Explanation: A large set of data—called a population—is defined as all members of a specific group (not necessarily people).

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

18) Researchers use sample results in an attempt to estimate an unknown population statistic.

Answer: FALSE

Explanation: Researchers use sample results in an attempt to estimate an unknown population parameter.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

19) The recorded body temperature of 100 patients participating in a research study is an example of time series data.

Answer: FALSE

Explanation: The recorded body temperature of 100 patients participating in a research study is an example of cross-sectional data.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

20) Body mass index (BMI) is an example of a discrete variable.

Answer: FALSE

Explanation: BMI is a continuous variable. A continuous variable assumes any value within an interval, and such values cannot be counted (there are infinitely many of them).

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

21) The mathematical operations of addition and subtraction can be performed on nominal data.

Answer: FALSE

Explanation: If we are presented with nominal data, all we can do is categorize or group the data.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

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22) An area code is an example of quantitative data.

Answer: FALSE

Explanation: An area code is an example of qualitative data. It is an observation of the person's phone number, but it is not something that is measured.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

23) The Fahrenheit scale for temperatures is an example of an interval scale.

Answer: TRUE

Explanation: The Fahrenheit scale for temperatures is an example of an interval scale, since not only can we categorize and rank the data, we are also assured the difference between temperature values are meaningful.

Difficulty: 1 Easy

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

24) All arithmetic operations can be performed on ratio-scaled data.

Answer: TRUE

Explanation: All arithmetic operations are valid on ratio-scaled data.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

25) The zero point of an interval scale reflects a complete absence of what is being measured.

Answer: FALSE

Explanation: The zero point of an interval scale does not reflect a complete absence of what is being measured; the value of zero is arbitrarily chosen. For example, no specific meaning is attached to zero degrees Fahrenheit other than to say it is 15 degrees colder than 15 degrees Fahrenheit.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

26) Nominal and interval scales are used for qualitative variables.

Answer: FALSE

Explanation: An interval scale is used for quantitative variables, but the nominal scale is used for qualitative variables.

Difficulty: 1 Easy

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

27) Which of the following variables is not an example of a quantitative variable?

- A) Number of goals scored in a soccer game
- B) Weights of the football players at the University of Michigan
- C) Time it takes a student to commute from home to campus
- D) A person's social security number

Answer: D

Explanation: A person's social security number is a qualitative variable; it is used as a label to identify a specific person.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

28) When reading published statistics (numerical facts), you should

- A) never believe what you read, because not all published statistics are accurate or unbiased.
- B) only believe those statistics that are adequately supported.
- C) always believe what you read, because they wouldn't be published if they weren't correct.
- D) only believe those statistics that are published in so-called high quality publications.

Answer: B

Explanation: Often, published statistics are presented in a way that is biased. The authors attempt to use statistics to support their position. Valid statistics are only those that are adequately supported.

Difficulty: 2 Medium

Topic: The Relevance of Statistics

Learning Objective: 01-01 Describe the importance of statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

29) Population parameters are difficult, if not impossible, to calculate due to the following main reasons

- A) cost prohibitions on data collection.
- B) the infeasibility of collecting data on the entire population.
- C) the fact that samples are difficult to draw due to the nature of the data.
- D) both cost prohibitions on data collection and the infeasibility of collecting data on the entire population.

Answer: D

Explanation: Gathering population data can be very expensive and difficult if not impossible to obtain.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Understand

AACSB: Reflective Thinking

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- 30) The teachers' union in California wants to estimate the average salary for high school teachers throughout the country. What is the teachers' union presumably planning to calculate?
- A) Sample statistic
 - B) Sample parameter
 - C) Population statistic
 - D) Population parameter

Answer: A

Explanation: High school teachers in California should be considered as a sample, and a sample statistic from California high school teachers will be calculated. The teachers' union in California should then use this sample statistic as an estimate of the average salary for high school teachers throughout the country.

Difficulty: 1 Easy

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

- 31) In inferential statistics, we calculate statistics of sample data to
- A) estimate unknown population parameters.
 - B) conduct hypotheses tests about unknown population parameters.
 - C) Both answer choices are correct.
 - D) Neither answer choice is correct.

Answer: C

Explanation: Inferential statistics is concerned with estimating unknown population parameters and testing hypotheses about them.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

- 32) Which of the following represents a population and a sample from that population?
- A) Residents of Albany, New York, and registered voters in Albany, New York
 - B) Teachers of a high school and members of the parent-teacher group
 - C) Fans at a concert who purchase T-shirts, and fans at a concert who purchase soda
 - D) Freshmen at St. Joseph's University and basketball players at St. Joseph's University

Answer: A

Explanation: The registered voters in Albany, New York are clearly a subset of the residents of Albany.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

- 33) Which of the following is an example of cross-sectional data?
- A) GDP of the United States from 1990–2010
 - B) Daily price of DuPont stock during the first quarter of 2017
 - C) Quarterly housing purchasing prices collected over the last 60 years
 - D) Results of market research testing consumer preferences for soda

Answer: D

Explanation: Cross-sectional data refers to data collected by recording a characteristic of many subjects at the same point in time, or without regard to differences in time.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

- 34) Which of the following is an example of time series data?
- A) The sale prices of townhouses sold last year
 - B) The monthly sales of cars at a dealership in 2018
 - C) Results of market research testing consumer preferences for soda
 - D) Starting salaries of recent business graduates at Penn State University

Answer: B

Explanation: Time series data refers to data collected by recording a characteristic of a subject over several time periods. Time series can include hourly, daily, weekly, monthly, quarterly, or annual observations.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

- 35) For which of the following population parameters is sampling not necessary?
- A) The average height of NBA players
 - B) The average life of light bulbs produced by a manufacturer
 - C) The average content of cereal boxes produced by a manufacturer
 - D) The percentage of the U.S. public school teachers who support Democrats

Answer: A

Explanation: For all other populations, it is very impractical, if not impossible, to collect all data. The heights are readily available for all NBA players.

Difficulty: 3 Hard

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Apply

AACSB: Knowledge Application

Accessibility: Keyboard Navigation

- 36) Which of the following is not an example of cross-sectional data?
- A) The recorded test scores of students in a class
 - B) The current price of regular gasoline in different states in the United States
 - C) The sale prices of single-family homes sold last month in California
 - D) The daily price of Delta airline stock in the third quarter of 2016

Answer: D

Explanation: Cross-sectional data refers to data collected by recording a characteristic of many subjects at the same point in time, or without regard to differences in time.

Difficulty: 1 Easy

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

- 37) Which type of data, cross-sectional versus time series, is more important to research?
- A) Neither type of data is important.
 - B) Cross-sectional data is more important than time series data.
 - C) Time series data is more important than cross-sectional data.
 - D) Time series data and cross-sectional data are equally as valuable in different types of research.

Answer: D

Explanation: Sample data are generally collected in one of two ways, as cross-sectional data or time series data, both equally important.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

38) Which of the following variables is qualitative?

- A) Height
- B) Marital status
- C) Weight
- D) Temperature

Answer: B

Explanation: Values corresponding to a qualitative variable are typically labels or names used to identify the distinguishing characteristic of each observation in a data set.

Difficulty: 1 Easy

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

39) Which of the following variables is quantitative?

- A) Social security number
- B) Number of children in a family
- C) Brand of tennis racquets
- D) The manufacturer of a car

Answer: B

Explanation: A quantitative variable assumes a countable number of meaningful values.

Difficulty: 1 Easy

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

40) San Francisco 49ers' linebacker Patrick Willis won the Defensive Rookie of the Year Award in 2007 with a total of 174 tackles. Tackles are measured on what kind of a scale? Is a variable measuring the number of tackles considered continuous or discrete?

- A) Ratio scale; discrete
- B) Interval scale; discrete
- C) Ratio scale; continuous
- D) Interval scale; continuous

Answer: A

Explanation: A discrete variable takes on individually distinct values. The ratio scale has a true zero point and we can interpret ratios of values. In this case, the linebacker would have no tackles.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

41) Which of the following variables is not continuous?

- A) Height of NBA players
- B) Time of a flight between Atlanta and Chicago
- C) Average temperature in the month of July in Orlando
- D) The number of obtained heads when a fair coin is tossed 20 times

Answer: D

Explanation: Although in practice the exact values of such variables as height, time, and temperature are approximated, they are continuous in nature. If a fair coin is tossed 20 times, the possible numbers of obtained heads are 0, 1, 2, ..., 20.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

- 42) The ordinal scale of data measurement is
- A) less sophisticated than the nominal scale.
 - B) more sophisticated than the interval scale.
 - C) more sophisticated than the nominal scale.
 - D) as equally sophisticated as the nominal scale.

Answer: C

Explanation: Compared to nominal scale, the ordinal scale reflects a stronger level of measurement. The order of the four scales is nominal, ordinal, interval, and ratio.

Difficulty: 1 Easy

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

- 43) The interval scale of data measurement is
- A) less sophisticated than the ratio scale.
 - B) more sophisticated than the ratio scale.
 - C) less sophisticated than the ordinal scale.
 - D) equally sophisticated as the ratio scale because both are appropriate for quantitative data.

Answer: A

Explanation: The ratio scale represents the strongest level of measurement. The order of the four scales is nominal, ordinal, interval, and ratio.

Difficulty: 1 Easy

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

44) A recent survey of 200 small firms (with annual revenue less than \$10 million) asked whether an increase in the minimum wage would cause the firm to decrease capital spending. Possible responses to the survey question were: "Yes," "No," or "Don't Know." This data is *best* classified as

- A) ratio scale.
- B) ordinal scale.
- C) interval scale.
- D) nominal scale.

Answer: D

Explanation: With nominal data all we can do is categorize or group the data.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

45) An analyst collects data on the weekly closing price of gold throughout a year. The scale of this data is

- A) ratio scale.
- B) ordinal scale.
- C) interval scale.
- D) nominal scale.

Answer: A

Explanation: The scale for weekly closing price of gold is ratio since all arithmetic operations can be performed on the data.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

46) An undergraduate student's status (freshman, sophomore, junior, or senior) is an example of which scale of measurement?

- A) Ratio scale
- B) Ordinal scale
- C) Interval scale
- D) Nominal scale

Answer: B

Explanation: Undergraduate students are classified into the four categories based on the number of credit hours earned. There is a natural ordering between the four categories; sophomores have more credit hours than freshmen, and so on.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

47) At the end of a semester, college students evaluate their instructors by assigning them to one of the following categories: Excellent, Good, Average, Below Average, and Poor. The measurement scale in this situation is a(n)

- A) ratio scale.
- B) ordinal scale.
- C) interval scale.
- D) nominal scale.

Answer: B

Explanation: A standard way to record the ratings is to use ordinal scale since, for example, excellent rating is higher than good rating, and so on.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

48) What is the scale of measurement of the distance between Houston and Dallas?

- A) Ratio scale
- B) Ordinal scale
- C) Interval scale
- D) Nominal scale

Answer: A

Explanation: Because zero is meaningful, the distance between two locations is an example of ratio scale.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

49) Which scales of data measurement are associated with quantitative data?

- A) Interval and ratio
- B) Ratio and nominal
- C) Ordinal and interval
- D) Nominal and ordinal

Answer: A

Explanation: Two scales are associated with quantitative data: interval scale and ratio scale.

Difficulty: 1 Easy

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

50) Which scales of data measurement are associated with qualitative data?

- A) Interval and ratio
- B) Ratio and nominal
- C) Ordinal and interval
- D) Nominal and ordinal

Answer: D

Explanation: Two scales are associated with qualitative data: nominal scale and ordinal scale.

Difficulty: 1 Easy

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

51) Data of the stock price for Google was collected at the end of the past four quarters. Which of the following types of data best describe these values?

- A) Cross-sectional
- B) Nominal
- C) Time series
- D) Ordinal

Answer: C

Explanation: Time series data refers to data collected by recording a characteristic of a subject over several time periods.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

52) Your business statistics class had a test last week. The average score for the class is an example of

- A) secondary data.
- B) qualitative data.
- C) descriptive statistics.
- D) inferential statistics.

Answer: C

Explanation: Descriptive statistics refers to summarizing a set of data.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

53) When a characteristic of interest differs among various observations, then it can be termed a
A) parameter.
B) variable.
C) data.
D) information.

Answer: B

Explanation: A variable is the general characteristic being observed on a set of people, objects, or events, where each observation varies in kind or degree.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

54) A(n) _____ variable is characterized by infinitely uncountable values and can take any value within interval.
A) discrete
B) infinite
C) continuous
D) quantitative

Answer: C

Explanation: A continuous variable can take on any value within an interval, while a discrete variable assumes a countable number of distinct values.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

55) Differences between categories are meaningless with _____ data.
A) ordinal
B) interval
C) ratio
D) continuous

Answer: A

Explanation: The differences between the ranked values are meaningless for ordinal scale data.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

56) Which of the following characteristics does the interval scale not have?

- A) Values can be categorized.
- B) Values can be ranked.
- C) There is a true zero point.
- D) The differences between values are valid.

Answer: C

Explanation: Only ratio scale data have a true zero point.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

57) Which of the following is an example of quantitative data?

- A) The ZIP code of your home address
- B) Facebook's closing stock price today
- C) Your gender
- D) Your month of birth

Answer: B

Explanation: Facebook's closing stock price is quantitative data.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

58) Which of the following is an example of qualitative data?

- A) Today's high temperature
- B) The class average of last quiz
- C) The amount of time you spent for your business statistics homework
- D) Your last name

Answer: D

Explanation: We cannot calculate summary measures if the variable is qualitative in nature such as your last name.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

59) A respondent of a survey is asked whether the Philadelphia Flyers' performance in the last game was excellent, good, fair, or poor. The person indicates that the performance was "good." This is an example of

- A) nominal data.
- B) ordinal data.
- C) interval data.
- D) ratio data.

Answer: B

Explanation: The ordinal scale data can be categorized and ranked.

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

60) Philadelphia experienced a record amount of rainfall in August. During the last week of the month, the city received additional rain from a hurricane. Because global warming is thought to cause extreme weather patterns, one conclusion that could be drawn is that these patterns are evidence of global warming. What is wrong with this conclusion?

Answer: The existence or nonexistence of climate change cannot be based on one month's worth of data. We must instead look at long-term trends.

Explanation: A knowledge of statistics provides the necessary tools to differentiate between sound statistical conclusions and questionable conclusions drawn from an insufficient number of data points.

Difficulty: 2 Medium

Topic: The Relevance of Statistics

Learning Objective: 01-01 Describe the importance of statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

61) Administrators have concluded that the SAT exam results for 2011 show a distinct change in student capabilities when compared with the year 1991. In 1991, the SAT exam included only multiple choice sections and was later redesigned. What is wrong with this conclusion?

Answer: The redesign of the exam makes any conclusions comparing 1991 to 2011 invalid.

Explanation: A knowledge of statistics provides the necessary tools to differentiate between sound statistical conclusions and questionable conclusions drawn from an insufficient number of data points, "bad" data points, incomplete data points, and insufficient number of data points.

Difficulty: 2 Medium

Topic: The Relevance of Statistics

Learning Objective: 01-01 Describe the importance of statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

62) A university is interested in tracking the success of its graduates by measuring the length of each graduate's job search before getting a position in his or her chosen field. What is the random variable of interest? Is it discrete or continuous?

Answer: The random variable is the length of time of each graduate's job search before getting a position in his or her chosen field. Clearly this is a continuous variable.

Explanation: A university is interested in tracking the success of its graduates by measuring the length of each graduate's job search before getting a position in his or her chosen field. . What is the random variable of interest? Is it discrete or continuous?

Difficulty: 2 Medium

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

63) We would like to determine whether there is a difference between the height of a college team of basketball players at the Ohio State University and the height of the overall student body. Identify the population and sample in this study.

Answer: The population in this study is Ohio State University overall student body, and the sample is the university basketball team players.

Explanation: A population consists of the complete collection of items with the characteristic we want to understand.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

64) In each of the following statements, determine whether the branch of statistics is best classified as descriptive statistics or inferential statistics.

- A. The average of a data set is equal to 35.7.
- B. The minimum value of a data set is 78, and the maximum value is 146.
- C. Because the average age in a sample is 23, it is likely that the average age in the population is about 23.
- D. Because the values in the sample are so widely dispersed, the spread of the population must be high.

Answer: Descriptive Statistics: The average of a data set is equal to 35.7 and the minimum value of a data set is 78, and the maximum value is 146. Inferential Statistics: Because the average age in a sample is 23, it is likely that the average age in the population is about 23, and because the values in the sample are so widely dispersed, the spread of the population must be high.

Explanation: Descriptive statistics refers to the summary of a data set, and inferential statistics refers to drawing conclusions about a population based on a sample.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-02 Differentiate between descriptive statistics and inferential statistics.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

65) A car company wants to know the average age of cars of their brand that are still on the road. How would you define the appropriate population? Should the car company calculate a population parameter or a sample statistic? Why?

Answer: The population of interest is all cars of the company that are still on the road. The company should calculate a representative sample and use it to calculate a sample statistic. It would be very costly to find the age of every car of their brand on the road.

Explanation: Obtaining information on the entire population is expensive.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

66) What are the primary reasons that sampling is necessary?

Answer: Gathering population data can sometimes be impossible, very time-consuming, or very expensive.

Explanation: Generally speaking, we are unable to use population data for two main reasons: It is impossible to examine every member of the population and obtaining information on the entire population is expensive and time consuming.

Difficulty: 1 Easy

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Remember

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

67) An investor wants to know today's average closing price of the stocks listed on the S&P 500 Index. Will the investor calculate a population parameter or sample statistic? Why?

Answer: The investor will calculate a population parameter. It is easy to gather all the prices for the firms on the S&P 500 Index.

Explanation: If the population under study is completely known, then all data can be used to obtain the population parameter.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

68) We would like to determine the average height of a college team of basketball players at the University of Iowa. Is it necessary to take a sample of basketball players? Explain.

Answer: It is not necessary to take a sample of basketball players at the University of Iowa because it is a small population and very easy to get the heights of the entire basketball team.

Explanation: If the population under study is small, we can use the entire population to obtain the desired parameter.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

69) We would like to determine the average height of the overall student body at Michigan State University. Does it seem necessary to take a sample from the overall student body?

Answer: Yes, it is necessary to take a sample from the overall student body at Michigan State University because it would be very difficult and expensive to collect the heights of so many students.

Explanation: Obtaining information on the entire population is expensive, impractical, and time consuming.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

70) Researchers are interested in completing a study examining trends in the sale of foods in the U.S. They have decided to examine the quantity of organic vegetables sold by supermarkets. Will researchers be able to gather population data?

Answer: No, gathering population data of foods in the U.S. is expensive, impractical, and time consuming.

Explanation: Obtaining information on the entire population is expensive, impractical, and time consuming.

Difficulty: 2 Medium

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Understand

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

71) Every 10 years, a census is taken in the U.S. by the Census Bureau. Despite the intent of gathering data on the population of the United States, issues exist that make true population data impossible to gather. Identify at least two issues in collecting these data.

Answer: Homeless population not surveyed, people providing intentionally false responses, illegal immigrants not wanting to be counted, no enforcement on returning completed survey, new homes being missed or demolished homes being counted, etc.

Explanation: Obtaining information on the entire population is expensive, impractical, and time consuming.

Difficulty: 3 Hard

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Apply

AACSB: Knowledge Application

Accessibility: Keyboard Navigation

72) Social networking sites support themselves in large part by selling advertising space. The hit rate on these ads is a critical measure when trying to solicit advertising. The hit rate is used as a measure of success for ads. Would you recommend a social networking site use sampling to evaluate its existing ads?

Answer: Yes, because obtaining information on the entire population is expensive, impractical, and time consuming, and it is impossible to examine every member of the population.

Explanation: We use sample data rather than population data to draw a conclusion about a population.

Difficulty: 3 Hard

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Apply

AACSB: Knowledge Application

Accessibility: Keyboard Navigation

73) A study of teen smoking is planned. Researchers are interested in collecting cross-sectional data, which allow them to draw conclusions about the likelihood, frequency, and longevity of teen smoking. You have been asked to design this study and will collect no more than five pieces of data. What information will you collect?

Answer: Researchers may collect useful information about teen smoking such as the age at which teens started smoking, frequency of smoking per day, amount of money spent on smoking, gender of teen smokers, and whether the parents are smokers or not.

Explanation: Cross-sectional data refer to data collected by recording characteristics at the same point in time.

Difficulty: 3 Hard

Topic: What Is Statistics?

Learning Objective: 01-03 Explain various data types.

Bloom's: Apply

AACSB: Knowledge Application

Accessibility: Keyboard Navigation

74) A study of teen smoking is planned. Researchers are interested in collecting data, which allow them to draw conclusions about the likelihood, frequency, and longevity of teen smoking. The questions asked include:

- A. What is your gender?
- B. What is your age?
- C. Do you smoke (yes or no)?
- D. How many cigarettes per day do you smoke?
- E. For how long have you smoked (in years)?

What is the measurement scale for each variable?

Answer: The variables in A and C are nominal since all we can do is categorize the data, whereas the variables in B, D, and E are ratio variables since all arithmetic operations are valid and there a true zero point.

Explanation: If we are presented with nominal data, all we can do is categorize or group the data. The values in the data set differ merely by name or label. With ordinal data, we are able to both categorize and rank the data with respect to some characteristic or trait. With data on an interval scale, not only can we categorize and rank the data, but we are also assured that the differences between scale values are meaningful. Ratio-scaled data have all the characteristics of interval-scaled data as well as a meaningful zero point, which allows us to interpret the ratios of values.

Difficulty: 3 Hard

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Apply

AACSB: Knowledge Application

Accessibility: Keyboard Navigation

75) The following data represent a sample of property sales in Cape May County during the year 2018. Identify the qualitative and quantitative variables. What are the categories for Town and Class? Identify the measurement scales for all variables.

Town	Class	Date	Price	Assessment
Avalon	Residential	12/28/2018	\$ 500,000	\$ 288,600
Avalon	Residential	04/14/2018	\$ 500,000	\$ 325,900
Wildwood	Commercial	05/01/2018	\$ 500,000	\$ 250,000
Avalon	Residential	05/22/2018	\$ 500,000	\$ 332,500
North Wildwood	Commercial	06/02/2018	\$ 500,000	\$ 607,700
Avalon	Residential	09/16/2018	\$ 518,000	\$ 269,900
North Wildwood	Residential	04/07/2018	\$ 520,000	\$ 373,100
Avalon	Commercial	01/15/2018	\$ 520,000	\$ 414,600
Avalon	Residential	01/15/2018	\$ 525,000	\$ 373,500
Wildwood	Residential	06/14/2018	\$ 525,000	\$ 379,600

Answer: Town, class and date are qualitative variables, whereas price and assessment value are quantitative variables. The town categories are Avalon, Wildwood, and North Wildwood, while the class categories are Commercial and Residential. Town and class are nominal, date is ordinal, while price and assessment value are ratio.

Explanation: A variable whose values are described verbally is qualitative, while a variable that assumes meaningful numerical values is quantitative. The categories for qualitative nominal data do not have any natural ordering, while such an ordering is visible for qualitative ordinal data. A quantitative data with a ratio scale of measurement has a meaningful zero point, and hence all ratio values are naturally interpretable.

Difficulty: 3 Hard

Topic: Variables and Scales of Measurement

Learning Objective: 01-04 Describe variables and types of measurement scales.

Bloom's: Apply

AACSB: Knowledge Application

Accessibility: Keyboard Navigation