***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.

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

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.

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.

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

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

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

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

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

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

11) A qualitative variable assumes meaningful numerical values.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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.

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.

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

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.

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

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

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

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

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

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.

38) Which of the following variables is qualitative?

A) Height

B) Marital status

C) Weight

D) Temperature

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

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

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

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.

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.

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.

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.

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

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.

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

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

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

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

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.

53) When a characteristic of interest differs among various observations, then it can be termed a

A) parameter.

B) variable.

C) data.

D) information.

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

55) Differences between categories are meaningless with\_\_\_\_\_ data.

A) ordinal

B) interval

C) ratio

D) continuous

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.

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

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

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.

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?

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?

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?

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.

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.

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?

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

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?

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.

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?

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?

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.

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?

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?

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?

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 |  | |