

TRUE/FALSE

1. A *variable* is a characteristic that changes or varies over time, and/or for different individuals or objects under consideration. An *experimental unit* is the individual or object on which a variable is measured.

ANS: T PTS: 1

2. Bar and pie charts are graphical techniques for qualitative data. The former focus the attention on the *frequency* of the occurrences of the categories, and the later emphasize the *percentage* of occurrences of each category.

ANS: T PTS: 1

3. In a sample of 1000 students in a university, 125 of them or 12.5% are biology majors. The 12.5% is an example of statistical inference.

ANS: F PTS: 1

4. Individual observations within each class may be found in a frequency distribution.

ANS: F PTS: 1

5. Twenty-five percent of a sample of 200 professional tennis players indicated that their parents did not play tennis. This is an example of descriptive statistics as opposed to inferential statistics.

ANS: T PTS: 1

6. A local cable system using a sample of 1000 subscribers estimates that fifty percent of its subscribers watch premium channel at least five times per week. This is an example of inferential statistics as opposed to descriptive statistics.

ANS: T PTS: 1

7. Statistical inference is the process of making an estimate, prediction, or decision about a population based on sample data.

ANS: T PTS: 1

8. In the term "frequency distribution," frequency refers to the number of data values or measurements falling within each class.

ANS: T PTS: 1

9. A branch of the statistics discipline that is used to develop and utilize techniques for effectively presenting numerical information is called *inferential statistics*.

ANS: F PTS: 1

10. A branch of the statistics discipline that is used to develop and utilize techniques for properly making inferences about population characteristics from information contained in a sample drawn from this population is called *inferential statistics*.

ANS: T PTS: 1

11. Persons or objects that have characteristics of interest to statisticians are called *variables*.

ANS: F PTS: 1

12. A qualitative variable about which observations can be made in only two categories is a *bivariate data set*.

ANS: F PTS: 1

13. A variable that is normally described in words rather than numerically is a *qualitative variable*.

ANS: T PTS: 1

14. A *discrete quantitative variable* is one that can assume values only at specific points on an interval of values, with inevitable gaps between them.

ANS: T PTS: 1

15. A *continuous quantitative variable* is one that can assume values at all points on an interval of values, with no gaps between possible values.

ANS: T PTS: 1

16. Persons or objects on which an experiment is performed are called *experimental units*.

ANS: T PTS: 1

17. Groupings of data, created to enhance an understanding of them, usually by making the groups collectively exhaustive and mutually exclusive are called classes or categories.

ANS: T PTS: 1

18. A tabular summary of categorical data set showing the number of observations that fall into each of several collectively exhaustive and mutually exclusive classes is called a bar chart.

ANS: F PTS: 1

19. A relative frequency distribution is a tabular summary of a data set showing the proportions of all observations that fall into each of several collectively exhaustive and mutually exclusive classes.

ANS: T PTS: 1

MULTIPLE CHOICE

1. Descriptive statistics deals with methods of:

- a. organizing data
- b. summarizing data
- c. presenting data in a convenient and informative way
- d. all of these
- e. only organizing and summarizing data

ANS: A PTS: 1

2. The relative frequency of a class is computed by:

- a. dividing the frequency of the class by the number of classes
- b. dividing the frequency of the class by the class width
- c. dividing the frequency of the class by the total number of observations in the data set
- d. subtracting the lower limit of the class from the upper limit and multiplying the difference by the number of classes
- e. adding the lower limit of the class to the upper limit and multiplying the sum by the number of classes

ANS: C PTS: 1

3. Which of the following is not the goal of descriptive statistics?

- a. summarizing data
- b. displaying aspects of the collected data
- c. reporting numerical findings
- d. estimating characteristics of the population based on a sample
- e. none of these

ANS: D PTS: 1

4. You asked ten of your classmates about their weight. On the basis of this information, you stated that the average weight of all students in your university or college is 158 pounds. This is an example of:

- a. descriptive statistics
- b. statistical inference
- c. sample
- d. population
- e. sample and population

ANS: B PTS: 1

5. The best type of chart for comparing two sets of qualitative data is:

- a. a line chart

- b. a pie chart
- c. a histogram
- d. a bar chart
- e. all of these

ANS: D PTS: 1

6. The sum of the frequencies for all classes will always equal:

- a. the number of classes
- b. the class width
- c. the total number of observations in the data set
- d. one
- e. the average

ANS: C PTS: 1

7. The two graphical techniques we usually use to present qualitative data are:

- a. bar chart and histogram
- b. histogram and pie chart
- c. bar chart and pie chart
- d. line chart and stem and leaf plot
- e. bar chart and line chart

ANS: C PTS: 1

8. Which of the following statements is true?

- a. Univariate data result when a single variable is measured on a single experimental unit.
- b. Bivariate data result when less than two variables are measured on a single experimental unit.
- c. Multivariate data result when more than two variables are measured.
- d. Both univariate data result when a single variable is measured on a single experimental unit and multivariate data result when more than two variables are measured are true.
- e. Both bivariate data result when less than two variables are measured on a single experimental unit and multivariate data result when more than two variables are measured are true.

ANS: D PTS: 1

9. Characteristics possessed by experimental units are called:

- a. data sets
- b. descriptive statistics
- c. internal data
- d. variables

ANS: D PTS: 1

10. A politician who is running for the office of governor of a state with 7 million registered voters commissions a survey. In the survey, 55% of the 10,000 registered voters interviewed say they plan to vote for her. The population of interest is the:
- a. 7 million registered voters in the state
 - b. 10,000 registered voters interviewed
 - c. 55 %, or 5,500 voters interviewed who plan to vote for her
 - d. 45%, or 4,500 voters interviewed who plan not to vote for her
 - e. 55% of the 7 million registered voters in the state

ANS: A PTS: 1

11. Which of the following statements is correct?
- a. Univariate data result when a single variable is measured on a single experimental unit.
 - b. Bivariate data result when two variables are measured on a single experimental unit.
 - c. Multivariate data result when more than two variables are measured.
 - d. All of these statements are true.
 - e. None of these statements is true.

ANS: D PTS: 1

12. The set of all possible observations about a specified characteristic of interest is:
- a. a frame
 - b. a multinomial data set
 - c. an observational study
 - d. a population
 - e. all of these

ANS: D PTS: 1

13. A single observation about a specified characteristic of interest is:
- a. a datum
 - b. an elementary unit
 - c. a sample
 - d. a univariate data set
 - e. a population

ANS: A PTS: 1

14. A listing of data in order of ascending or descending magnitude is called:
- a. a frequency distribution
 - b. a relative frequency distribution
 - c. a relative frequency histogram
 - d. none of these
 - e. all of these

ANS: D PTS: 1

15. Which of the following statements is false?

- a. When constructing a frequency distribution for categorical data, it will always be necessary to develop class boundaries.
- b. It is often a good idea to convert frequency distributions to relative frequency distributions when you compare two distributions with different amount of data.
- c. A pie is the familiar circular graph that shows how the measurements are distributed among the categories of a qualitative variable.
- d. None of these.
- e. All of these.

ANS: A PTS: 1

16. A market share of 78.5 percent would be represented in a pie chart by a slice with a central angle of:

- a. 78.5 degrees
- b. 39.3 degrees
- c. 282.6 degrees
- d. 141.3 degrees
- e. 157 degrees

ANS: C PTS: 1

17. Which of the following statements is true?

- a. In constructing a pie chart for a categorical variable, one sector of the pie is assigned to each category of the variable.
- b. A bar chart for a categorical variable shows the same distribution of measurements in categories as the pie chart, but with the height of each bar measuring how often a particular category was observed.
- c. The categories for a qualitative variable should be chosen so that a measurement will belong to one and only one category, and each measurement has a category to which it can be assigned.
- d. In constructing a pie chart for a categorical variable, one sector of the pie is assigned to each category of the variable and a bar chart for a categorical variable shows the same distribution of measurements in categories as the pie chart, but with the height of each bar measuring how often a particular category was observed.
- e. All of these.

ANS: E PTS: 1

PROBLEM

1. A hospital administration would like to know the average length that a patient stays in the hospital. It would be almost impossible to look through all of the past records and average the lengths of stay. Instead, a sample of 1000 patients over the last year was randomly chosen and their lengths of stay were averaged. Describe the population and sample in this problem.

Population: _____

Sample: _____

ANS:

The lengths of stay of all the patients that the hospital has ever had; The lengths of stay of the 1000 patients sampled

PTS: 1

2. A highway department would like to repair a certain highway during the slowest part of a day to help minimize traffic congestion. Because it would be impossible to monitor the traffic flow on every day, they monitor how many vehicles pass on this highway during one particular day. Based on these results the department decides when to repair the highway. Describe the population and sample in this problem.

Population: _____

Sample: _____

ANS:

All the traffic flow on all days on that highway; The cars that passed on that highway on the particular day they recorded

PTS: 1

3. The freshness and overall quality of milk depend upon the type of packaging used. The manager of a dairy company is considering changing the packaging from cartons to plastic. The quality control team of this dairy company packaged milk in 100 containers of each type of material. After a specific amount of time, the team tested the milk for freshness and overall quality. Identify the population and sample in this problem.

Population: _____

Sample: _____

ANS:

All of the milk packaged at this particular dairy company; The 100 selected containers of each type of packaging

PTS: 1

4. Identify each of the following variables as either quantitative or qualitative.

a. The brands of ice cream that you purchase.

b. The daily high temperature for the last four weeks.

c. The amount of sugar consumed by Americans in one year.

d. The species of fish in the zoo.

e. The lengths of time children wait for the school bus.

f. Your favorite professional football team.

ANS:

qualitative; quantitative; quantitative; qualitative; quantitative; qualitative

PTS: 1

5. Identify each of the following variables as either quantitative or qualitative.

a. Rating of the effectiveness of a new cold remedy (Not effective, effective).

b. Amount of time spent assembling a five-shelf bookcase.

c. Number of children in a beginning swimming class.

d. University where a student is enrolled.

e. Color preference for a nursery.

f. Rating the U.S. foreign policy in the Middle East (fair, biased).

ANS:

qualitative; quantitative; quantitative; qualitative; qualitative; qualitative

PTS: 1

6. Identify each of the following quantitative variables as discrete or continuous.

a. Average monthly temperature for a particular city.

b. Number of employees of a statistical consulting firm that own laptop computers.

c. Flight time between two cities.

d. Number of puppies enrolled in an obedience class.

e. Number of persons on a flight from Chicago to Los Angeles.

f. Amount of gas purchased at a gas station.

ANS:

continuous; discrete; continuous; discrete; discrete; continuous

PTS: 1

7. Classify the following variables as *qualitative* or *quantitative*. If quantitative, further classify as *discrete* or *continuous*.

a. The colors of cars at an auction.

b. The amount of money spent building a new school.

c. The genders of U.S. Senators.

d. The styles of houses (one-story, two-story, split level, etc.).

e. The letter grades of students in a statistics exam (A, B, C, D, F).

f. The number of credit cards owned by customers.

ANS:

qualitative; quantitative,discrete; qualitative; qualitative; qualitative; quantitative, discrete

PTS: 1

8. Classify the following variables as *qualitative* or *quantitative*. If quantitative, further classify as *discrete* or *continuous*.

a. The colors of cars at an auction.

b. The amount of money spent building a new school.

c. The genders of U.S. Senators.

d. The styles of houses (one-story, two-story, split level, etc.).

e. The letter grades of students in a statistics exam (A, B, C, D, F).

f. The number of credit cards owned by customers.

ANS:

qualitative; quantitative, discrete; qualitative; qualitative; qualitative; quantitative, discrete

PTS: 1

ESSAY

1. Describe the difference between a *population* and a *sample*, and provide two examples for each.

ANS:

A population is the collection of all measurements of interest to the investigator in a particular study. A sample is a subset of measurements selected from the population of interest.

PTS: 1

2. Describe the difference between *descriptive statistics* and *inferential statistics*, and give an example for each.

ANS:

Descriptive statistics consists of procedures used to summarize and describe the important characteristics of a set of measurements. Inferential statistics consists of procedures used to make inferences about population characteristics from information contained in a sample drawn from this population.

PTS: 1