Chapter 1: A Preview of Business Statistics

TRUE/FALSE

1. True or False
   Regardless of your eventual career destination, whether it is accounting or marketing, finance or human resource management, you will find statistics relevant to your field.

   ANS: T PTS: 1 OBJ: Section 1.1

2. True or False
   Business statistics can be described as the collection, summarization, analysis,and reporting of numerical findings relative to a business decision or situation.

   ANS: T PTS: 1 OBJ: Section 1.1

3. True or False
   The sole purpose of the U.S. Census Bureau is to simply count how many people live in the United States.

   ANS: F PTS: 1 OBJ: Section 1.2

4. True or False
   ATP singles rankings for tennis players rank Rafael Nadal as 2 and Roger Federer as 1. This is an example of an interval scale.

   ANS: F PTS: 1 OBJ: Section 1.4

5. True or False
   Quantitative variables usually represent membership in groups or categories.

   ANS: F PTS: 1 OBJ: Section 1.4

6. True or False
   In inferential statistics, we simply summarize and describe the data we've collected.

   ANS: F PTS: 1 OBJ: Section 1.3

7. True or False
   The population is sometimes referred to as the universe and is the entire set of people or objects of interest.

   ANS: T PTS: 1 OBJ: Section 1.3

8. True or False
   Prior to making decisions, companies often collect information through a series of steps called the *research process.*

   ANS: T PTS: 1 OBJ: Section 1.5

9. True or False

Improperly used, statistics can become an effective weapon with which to persuade or manipulate others into beliefs or behaviors that we would like them to adopt.

ANS: T PTS: 1 OBJ: Section 1.6

10. True or False
Unlike many other pursuits, improper actions in business statistics can sometimes work in your favor.

ANS: T PTS: 1 OBJ: Section 1.6

11. True or False
In the nominal measurement scale numbers represent "greater than" or "less than" measurements, such as rankings or preferences.

ANS: F PTS: 1 OBJ: Section 1.4

12. True or False
Stating that Wal-Mart's sales increased 6.2% this quarter when compared to last quarter is an example of descriptive statistics.

ANS: T PTS: 1 OBJ: Section 1.3

13. True or False
The sample statistic is a characteristic of the sample that the population parameter attempts to estimate.

ANS: F PTS: 1 OBJ: Section 1.7

14. True or False
Six classmates told you their scores on the last statistics exam. Based on this information, you conclude that the average exam score for the entire class was 82. This is an example of descriptive statistics.

ANS: F PTS: 1 OBJ: Section 1.3

MULTIPLE CHOICE

1. Which of the following statements involve descriptive statistics as opposed to inferential statistics?
   a. The Alcohol, Tobacco and Firearms Department reported that Houston had 1,791 registered gun dealers in 1997.
   b. Based on a survey of 400 magazine readers, the magazine reports that 45% of its readers prefer double column articles.
   c. The FAA samples 500 traffic controllers in order to estimate the percent retiring due to job stress related illness.
   d. Based on a sample of 300 professional tennis players, a tennis magazine reported that 25% of the parents of all professional tennis players did not play tennis.
   e. The admission's office in a southern university samples 200 college students in business in order to estimate the percentage of business majors who prefer accounting to economics.

   ANS: A PTS: 1 OBJ: Section 1.3

2. Which of the following statements involve inferential statistics as opposed to descriptive statistics?
   a. A total of 4,785 people voted for Mike Johnson in a local election.
   b. The FAA reported there were 200 near misses among airplanes last year.

c. A class of fifty statistics students earned an average grade of 75.5.
d. The city business office reported 40 building permits for new single-family housing units.
e. Based on a sample of 500 subscribers, a local cable system estimates that forty percent of its subscribers watch a premium channel at least once per day.

ANS: E PTS: 1 OBJ: Section 1.3

3. Which of the following sample statistics is a measure of spread (dispersion)?
a. Sample mean
b. Sample standard deviation
c. Sample median
d. Sample proportion
e. Sample mode

ANS: B PTS: 1 OBJ: Section 1.3

4. A summary measure that is computed using the entire population is called:
a. a parameter
b. a statistic
c. a sample
d. inferential statistics

ANS: A PTS: 1 OBJ: Section 1.3

5. The difference between the highest and lowest values in the sample is known as the sample:
a. mean
b. median
c. range
d. proportion

ANS: C PTS: 1 OBJ: Section 1.3

6. A summary measure that is computed from a sample to describe a characteristic of the population is called:
a. a parameter
b. a statistic
c. a population
d. inferential statistics

ANS: B PTS: 1 OBJ: Section 1.3

7. When data are collected in a statistical study for only a portion or subset of all elements of interest we are using a:
a. sample
b. parameter
c. statistic
d. population

ANS: A PTS: 1 OBJ: Section 1.3

8. 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

ANS: D PTS: 1 OBJ: Section 1.3

9. Which of the following is most likely a continuous quantitative variable?
   a. The number of gallons of paint purchased.
   b. The number of quarts of milk purchased.
   c. The population of Egypt.
   d. The number of miles of interstate highways.
   e. The number of times you sharpen your pencil working statistics problems.

   ANS: D PTS: 1 OBJ: Section 1.4

10. The statistic that describes the midpoint of the data which has just as many values above it as below it is known as the sample:
    a. mean
    b. median
    c. mode
    d. range
    e. standard deviation

    ANS: B PTS: 1 OBJ: Section 1.3

11. Daily ambient temperatures in degrees Fahrenheit are being recorded for a global warming study. This scale of measurement for this data would be:
    a. nominal
    b. ordinal
    c. interval
    d. ratio

    ANS: C PTS: 1 OBJ: Section 1.4

12. An automobile insurance agent believes that company *A* is more reliable than company *B*. Which scale of measurement does this information represent?
    a. Nominal
    b. Ordinal
    c. Interval
    d. Ratio

    ANS: B PTS: 1 OBJ: Section 1.4

13. A customer service survey asks respondents for their birthdates, which are used to calculate their ages. Which scale of measurement does age represent?
    a. nominal
    b. ordinal
    c. interval
    d. ratio

    ANS: D PTS: 1 OBJ: Section 1.4

14. Which of the following statements is false?
    a. Statistics can be divided into two branches: descriptive and inferential.
    b. The mean, median and mode, are measures of typicalness or central tendency.
    c. The range and standard deviation are measures of spread or dispersion or variability.
    d. A discrete quantitative variable can take on a value at any point along an interval.
    e. The four scales of measurement are important in determining appropriate methods for data description and analysis.

ANS: D PTS: 1 OBJ: Section 1.7

15. A survey that asks the respondent to indicate the number of cats in the household is an example of which type of variable?
    a. discrete qualitative
    b. continuous qualitative
    c. discrete quantitative
    d. continuous quantitative

    ANS: C PTS: 1 OBJ: Section 1.4

COMPLETION

1. When a sample is so large as to include all members of the population, it is referred to as a completed _____.

   ANS: census

   PTS: 1 OBJ: Section 1.3

2. The temperature of the room in which you are taking this test is a _____ quantitative variable.

   ANS: continuous

   PTS: 1 OBJ: Section 1.4

3. The distinguishing feature of discrete variables is that _____ exist between the possible values.

   ANS: gaps

   PTS: 1 OBJ: Section 1.4

4. Prior to making decisions, companies often collect information through a series of steps called the _____.

   ANS: research process

   PTS: 1 OBJ: Section 1.5

MATCHING

Match the terms with the definitions. (Note: there are more definitions than terms)

a. a characteristic of the population
b. indicates that a person or object belongs in a category
c. the entire set of people or objects of interest
d. the arithmetic average of the data
e. a measurement scale with an absolute zero
f. a measured characteristic of a sample
g. helps us determine how much of something is possessed
h. a subset of people or objects that exist within the entire set

1. population
2. sample
3. parameter
4. statistic
5. quantitative variable
6. qualitative variable

1. ANS: C PTS: 1 OBJ: Section 1.3
2. ANS: H PTS: 1 OBJ: Section 1.3
3. ANS: A PTS: 1 OBJ: Section 1.3
4. ANS: F PTS: 1 OBJ: Section 1.3
5. ANS: G PTS: 1 OBJ: Section 1.4
6. ANS: B PTS: 1 OBJ: Section 1.4

SHORT ANSWER

1. A recent *Wall Street Journal* poll asked a group of American voters to rate economic conditions in the United States. 22% of the respondents rated economic conditions as "favorable." Identify the population, sample, sample statistic, and population parameter in this survey.

   Population: _____

   Sample: _____

   Sample statistic: _____

   Population parameter: _____.

   ANS:
   All eligible voters in the U.S.; Voters selected to participate in the survey.; 22%; The percentage of all voters who would rate economic conditions as favorable.

   PTS: 1 OBJ: Section 1.3

ESSAY

1. As a business person, in what ways may you find yourself involved with statistics?

   ANS:
   You may find yourself involved with statistics in at least one of the following ways: (a) as a practitioner collecting, analyzing, and presenting findings based on statistical data, or (b) as a consumer of statistical claims and findings offered by others, some of whom may be either incompetent or unethical.

   PTS: 1 OBJ: Section 1.1

2. What is business statistics?

   ANS:
   Business statistics can be described as the collection, summarization, analysis, and reporting of numerical findings relevant to a business decision or situation.

PTS: 1 OBJ: Section 1.1

3. What was the primary use of statistics in ancient times?

   ANS:
   In ancient times, statistics was mainly employed for counting people or possessions to facilitate taxation.

   PTS: 1 OBJ: Section 1.2

4. In what ways can statistics be useful in today's business environment?

   ANS:
   Statistics can be used to describe information, to analyze data, to reach conclusions, and to make decisions in all facets of business today.

   PTS: 1 OBJ: Section 1.2

5. List the steps included in the research process.

   ANS:
   a. Defining the problem in specific terms that can be answered by research b. Deciding on the type of data required c. Determining through what means the data will be obtained d. Planning for the collection of data and, if necessary, selection of a sample e. Collecting and analyzing the data f. Drawing conclusions and reporting the findings g. Following through with decisions that take the findings into consideration

   PTS: 1 OBJ: Section 1.5

6. The authors of the text claim that a company might actually benefit when one of its employees uses statistics incorrectly. How can this be?

   ANS:
   The company may manipulate the data to show what it wants to show, for example, by distorting the scale on a graph to make a large deficit appear very small. Another example is to use a sample that is not a good representative of the population of interest.

   PTS: 1 OBJ: Section 1.6

7. Car dealers sometimes provide surveys so that customers can evaluate their purchasing experience at the establishment. What kinds of decisions might be made on the basis of this information?

   ANS:
   The car dealers might be able to make decisions on the quality of service, if there are enough salesmen, and the cleanliness of the show room.

   PTS: 1 OBJ: Section 1.5

8. What kinds of statistical data play a role in a life insurance firm's decision on the annual premium you will pay for your policy?

   ANS:

The amount of money paid out in premiums and the number of policies purchased in the previous year would play a role in how much you pay for your policy. Data such as your age, and whether you are a smoker could also play a role.

PTS: 1 OBJ: Section 1.7

9. A store's inventory of party supplies consists of 600 red balloons, 200 white balloons, and 200 blue balloons. Your boss asks you to choose a representative sample of 75 balloons for a window display. How many red balloons should you place in the display? Explain your answer.

ANS:
45; A sample is representative if its members tend to have the same characteristics as the population from which they were selected. In this case, we would want our sample to contain a similar percentage of red balloons as the store's inventory.

PTS: 1 OBJ: Section 1.3

10. A businesswoman who is running for the vacant City Commission seat with 20,000 registered voters conducts a survey. In the survey, 56% of the 500 registered voters interviewed say they planned to vote for her.
A) What is the population of interest?
B) What is the sample?
C) Is the 56% a parameter or a statistic?

ANS:
The 20,000 registered voters.; The 500 registered voters interviewed.; Statistic

PTS: 1 OBJ: Section 1.3

11. Identify each of the following studies as either descriptive statistics or inferential statistics:
A) Examine the heights of a sample of 50 NBA basketball players to see if the average height of all NBA basketball players is 75 inches.
B) Post the average midterm score for the statistics class.
C) Estimate the percentage of the US population that will vote for George W. Bush in the 2004 presidential election.
D) Select a random sample of 250 babies born in 2002 and estimate the birth weight of all babies born during the same year.
E) Examine the weights of a sample of 20 candy bars to see if their average weight is 6 ounces.

ANS:
Inferential; Descriptive; Inferential; Inferential; Descriptive

PTS: 1 OBJ: Section 1.3

12. A manufacturer of children toys claims that less than 5% of his products are defective. When 500 toys were drawn from a large production run, 7% were found to be defective.
A) What is the population of interest?
B) What is the sample?
C) What is the parameter?
D) What is the statistic?
E) Does the value 5% refer to the parameter or the statistic?
F) Is the value 7% a parameter or a statistic?

G) Explain briefly how the statistic can be used to make inferences about the parameter to test the claim.

ANS:
All toys in the production run; 500 toys; Proportion of the production run that is defective; Proportion of sample toys that are defective; Parameter; Statistic; Because the sample proportion is more than 5%, we may conclude that the claim is false.

PTS: 1 OBJ: Section 1.3

13. For each of the following indicate whether the variable of interest would be qualitative or quantitative.
A) Whether you are a US citizen
B) Your marital status
C) Number of cars in a parking lot
D) Amount of time you spend per week on your homework
E) Lily's travel time from her apartment to the student union at Central Michigan University
F) Heidi's favorite brand of tennis balls

ANS:
Qualitative; Qualitative; Quantitative; Quantitative; Quantitative; Qualitative

PTS: 1 OBJ: Section 1.4

14. Before leaving a particular restaurant, customers are asked to respond to the questions listed below. For each question, determine whether the possible responses are discrete or continuous variables.
A) What is the approximate distance of the restaurant from your residence?
B) How many minutes did you wait until your server greeted you?
C) How many times a month do you typically dine out?
D) How many people were in your dinner party tonight?

ANS:
Continuous; Continuous; Discrete; Discrete

PTS: 1 OBJ: Section 1.4

15. A research firm observes that men are twice as likely as women to hunt. Does this information represent descriptive statistics or inferential statistics? Why?

ANS:
Inferential; This information would represent inferential statistics, since a sample is used to make generalizations about the population.

PTS: 1 OBJ: Section 1.3