

Chapter 01

An Introduction to Business Statistics

True / False Questions

1. A population is a set of existing units.

True False

2. If we examine some of the population measurements, we are conducting a census of the population.

True False

3. A random sample is selected so that every element in the population has the same chance of being included in the sample.

True False

4. An example of a quantitative variable is the manufacturer of a car.

True False

5. An example of a qualitative variable is the mileage of a car.

True False

6. Statistical inference is the science of using a sample of measurements to make generalizations about the important aspects of a population of measurements.

True False

7. Time series data are data collected at the same time period.

True False

8. Cross-sectional data are data collected at the same point in time.

True False

9. Daily temperature in a local community collected over a 30-day time period is an example of cross-sectional data.
- True False
10. The number of sick days taken by employees in 2008 for the top 10 technology companies is an example of time series data.
- True False
11. The number of sick days per month taken by employees for the last 10 years at Apex Co. is an example of time series data.
- True False
12. A quantitative variable can also be referred to as a categorical variable.
- True False
13. In a data set of information on college business students, an example of an element is their cumulative GPA.
- True False
14. In an observational study, the variable of interest is called a response variable.
- True False
15. In an experimental study, the aim is to manipulate or set the value of the response variable.
- True False
16. The science of describing the important aspects of a set of measures is called statistical inference.
- True False
17. It is possible to use a random sample from one population to make statistical inferences about another related population.
- True False
18. Processes produce outputs over time.
- True False

19. Selecting many different samples and running many different tests can eventually produce a result that makes a desired conclusion be true.

True False

20. Using a nonrandom sample procedure in order to support a desired conclusion is an example of an unethical statistical procedure.

True False

21. Primary data are data collected by an individual.

True False

22. Secondary data are data taken from an existing source.

True False

Multiple Choice Questions

23. Data that are collected by an individual through personally planned experimentation or observation are _____.

- A. Secondary data
- B. Quantitative data
- C. Primary data
- D. Variables

24. A ratio variable has the following characteristic:

- A. Meaningful order
- B. Inherently defined zero value
- C. Categorical in nature
- D. Predictable

25. Which of the following is a quantitative variable?

- A. The manufacturer of a cell phone
- B. A person's gender
- C. Mileage of a car
- D. Whether a person is a college graduate
- E. Whether a person has a charge account

26. Which of the following is a categorical variable?

- A. Air temperature
- B. Bank account balance
- C. Daily sales in a store
- D. Whether a person has a traffic violation
- E. Value of company stock

27. Measurements from a population are called:

- A. Elements.
- B. Observations.
- C. Variables.
- D. Processes.

28. The two types of quantitative variables are:

- A. Ordinal and ratio
- B. Interval and ordinal
- C. Nominative and ordinal
- D. Interval and ratio
- E. Nominative and interval

29. Temperature (in degrees Fahrenheit) is an example of a(n) _____ variable.

- A. Nominative
- B. Ordinal
- C. Interval
- D. Ratio

30. Jersey numbers of soccer players is an example of a(n) _____ variable.
- A. Nominative
 - B. Ordinal
 - C. Interval
 - D. Ratio
31. The weight of a chemical compound used in an experiment that is obtained using a well-adjusted scale represents a(n) _____ level of measurement.
- A. Nominative
 - B. Ordinal
 - C. Interval
 - D. Ratio
32. An identification of police officers by rank would represent a(n) _____ level of measurement.
- A. Nominative
 - B. Ordinal
 - C. Interval
 - D. Ratio
33. _____ is a necessary component of a runs plot.
- A. Observation over time
 - B. Qualitative variable
 - C. Random sampling of the data
 - D. Cross-sectional data
34. _____ is the science of using a sample to make generalizations about the important aspects of a population.
- A. Time series analysis
 - B. Descriptive statistics
 - C. Random sample
 - D. Statistical inference

35. College entrance exam scores, such as SAT scores, are an example of a(n) _____ variable.

- A. Ordinal
- B. Ratio
- C. Nominative
- D. Interval

36. The number of miles a truck is driven before it is overhauled is an example of a(n) _____ variable.

- A. Nominative
- B. Ordinal
- C. Interval
- D. Ratio

37. A(n) _____ variable is a qualitative variable such that there is no meaningful ordering or ranking of the categories.

- A. Ratio
- B. Ordinal
- C. Nominative
- D. Interval

38. A person's telephone area code is an example of a(n) _____ variable.

- A. Nominative
- B. Ordinal
- C. Interval
- D. Ratio

39. Any characteristic of a population unit is a(n):

- A. Measurement
- B. Sample
- C. Observation
- D. Variable

40. Examining all population measurements is called a _____.

- A. Census
- B. Frame
- C. Sample
- D. Variable

41. Any characteristic of an element is called a _____.

- A. Set
- B. Process
- C. Variable
- D. Census

42. The process of assigning a value of a variable to each element in a data set is called _____.

- A. Sampling
- B. Measurement
- C. Experimental analysis
- D. Observational analysis

43. A _____ is a display of individual measurements versus time.

- A. Runs plot
- B. Statistical analysis
- C. Random sample
- D. Measurement

44. Statistical _____ refers to using a sample of measurements and making generalizations about the important aspects of a population.

- A. Sampling
- B. Process
- C. Analysis
- D. Inference

45. A _____ is a subset of the units in a population.

- A. Census
- B. Process
- C. Sample
- D. Variable

46. A _____ variable can have values that are numbers on the real number line.

- A. Qualitative
- B. Quantitative
- C. Categorical
- D. Nominative

47. A sequence of operations that takes inputs and turns them into outputs is a _____.

- A. Process
- B. Statistical inference
- C. Runs plot
- D. Random sampling

48. A(n) _____ variable can have values that indicate into which of several categories of a population it belongs.

- A. Qualitative
- B. Quantitative
- C. Ratio
- D. Interval

49. A set of all elements we wish to study is called a _____.

- A. Sample
- B. Process
- C. Census
- D. Population

50. _____ refers to describing the important aspects of a set of measurements.

- A. Cross-sectional analysis
- B. Runs plot
- C. Descriptive statistics
- D. Time series analysis

51. The change in the daily price of a stock is what type of variable?

- A. Qualitative
- B. Ordinal
- C. Random
- D. Quantitative

52. Data collected for a particular study are referred to as a data _____.

- A. Variable
- B. Measurement
- C. Set
- D. Element

53. A data set provides information about some group of individual _____.

- A. Variables
- B. Elements
- C. Statistics
- D. Measurements

54. When the data being studied are gathered from a published source, this is referred to as a(n) _____.

- A. Existing data source
- B. Observational data source
- C. Experimental data source
- D. Cross-sectional data source

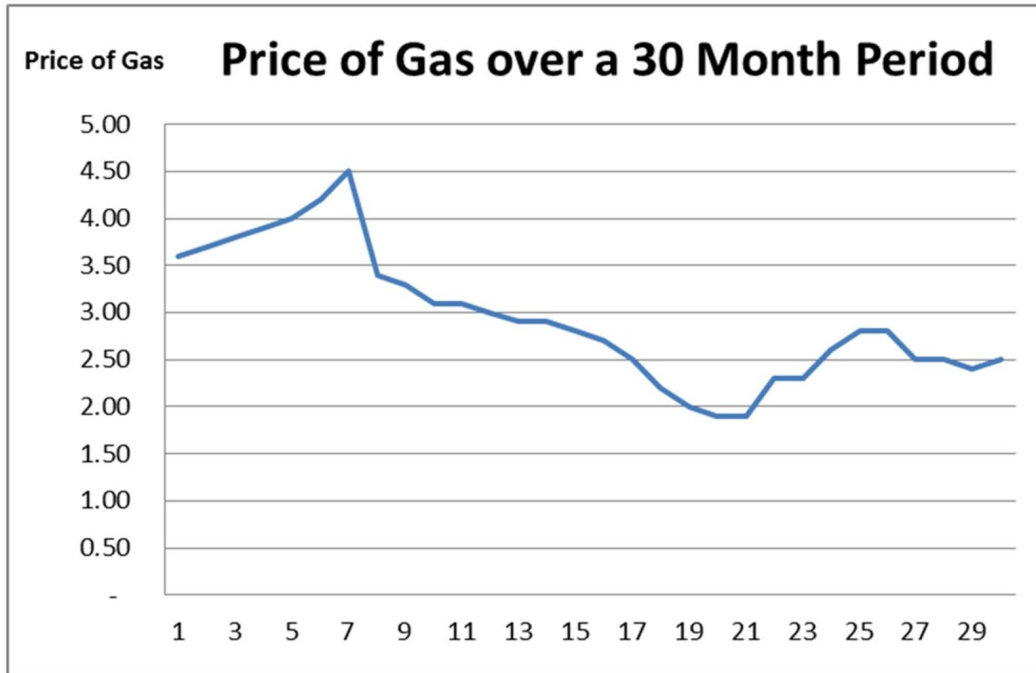
55. One method of determining whether a sample being studied can be used to make statistical inferences about the population is to:
- A. Run a descriptive statistical analysis
 - B. Calculate a proportion
 - C. Create a cross-sectional data analysis
 - D. Produce a runs plot
56. Which of the following is NOT an example of unethical statistical practices?
- A. Inappropriate interpretation of statistical results
 - B. Using graphs to make statistical inferences
 - C. Improper sampling
 - D. Descriptive measures that mislead the user
 - E. None of these
57. If we collect data on the number of wins each team in the NFL had during the 2011-12 season, we have _____ data.
- A. Cross-sectional
 - B. Time series
58. If we collect data on the number of wins the Dallas Cowboys earned each of the past 10 years, we have _____ data.
- A. Cross-sectional
 - B. Time series

Short Answer Questions

59. A study is being conducted on the effect of gas price on the number of miles driven in a given month. Residents in two cities, one on the East Coast and one on the West Coast are randomly selected and asked to complete a questionnaire on the type of car they drive, the number of miles they live from work, the number of children under 18 in their household, their monthly income, and the number of miles they have driven over the past 30 days. List the response variable(s).
60. A study is being conducted on the effect of gas price on the number of miles driven in a given month. Residents in two cities, one on the East Coast and one on the West Coast are randomly selected and asked to complete a questionnaire on the type of car they drive, the number of miles they live from work, the number of children under 18 in their household, their monthly income, and the number of miles they have driven over the past 30 days. Is this an experimental or observational study?

61. A study is being conducted on the effect of gas price on the number of miles driven in a given month. Residents in two cities, one on the East Coast and one on the West Coast are randomly selected and asked to complete a questionnaire on the type of car they drive, the number of miles they live from work, the number of children under 18 in their household, their monthly income, and the number of miles they have driven over the past 30 days. List the factor(s).

62. Looking at the runs plot of gasoline prices over the past 30 months, describe what it tells us about the price of gas during these 30 months.



63. Using the following data table of the average hours per week spent on Internet activities by 15- to 18-year-olds for the years 1999-2008, construct the runs plot and interpret.

Year	Avg Hrs
1999	13.5
2000	15.0
2001	16.5
2002	17.7
2003	18.2
2004	19.3
2005	19.5
2006	19.9
2007	20.1
2008	20.4

Chapter 01 An Introduction to Business Statistics **Answer Key**

True / False Questions

1. A population is a set of existing units.

TRUE

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 1 Easy
Learning Objective: 01-06 Describe the difference between a population and a sample.
Topic: Populations and Samples*

2. If we examine some of the population measurements, we are conducting a census of the population.

FALSE

A census is defined as examining all of the population measurements.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-06 Describe the difference between a population and a sample.
Topic: Populations and Samples*

3. A random sample is selected so that every element in the population has the same chance of being included in the sample.

TRUE

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 1 Easy
Learning Objective: 01-08 Explain the importance of random sampling.
Topic: Three Case Studies That Illustrate Sampling and Statistical Inference*

4. An example of a quantitative variable is the manufacturer of a car.

FALSE

This is an example of a qualitative or categorical variable.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 1 Easy
Learning Objective: 01-02 Describe the difference between a quantitative variable and a qualitative variable.
Topic: Data

5. An example of a qualitative variable is the mileage of a car.

FALSE

This is an example of a quantitative variable.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 1 Easy
Learning Objective: 01-02 Describe the difference between a quantitative variable and a qualitative variable.
Topic: Data

6. Statistical inference is the science of using a sample of measurements to make generalizations about the important aspects of a population of measurements.

TRUE

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 2 Medium
Learning Objective: 01-07 Distinguish between descriptive statistics and statistical inference.
Topic: Three Case Studies That Illustrate Sampling and Statistical Inference

7. Time series data are data collected at the same time period.

FALSE

Time series data are collected over different time periods.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 1 Easy
Learning Objective: 01-03 Describe the difference between cross-sectional data and time series data.
Topic: Data

8. Cross-sectional data are data collected at the same point in time.

TRUE

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 1 Easy
Learning Objective: 01-03 Describe the difference between cross-sectional data and time series data.
Topic: Data*

9. Daily temperature in a local community collected over a 30-day time period is an example of cross-sectional data.

FALSE

Cross-sectional data are collected at the same point in time. This is an example of time series data.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 1 Easy
Learning Objective: 01-03 Describe the difference between cross-sectional data and time series data.
Topic: Data*

10. The number of sick days taken by employees in 2008 for the top 10 technology companies is an example of time series data.

FALSE

This is an example of cross-sectional data. Time series data are collected at different time periods.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 1 Easy
Learning Objective: 01-03 Describe the difference between cross-sectional data and time series data.
Topic: Data*

11. The number of sick days per month taken by employees for the last 10 years at Apex Co. is an example of time series data.

TRUE

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand*

12. A quantitative variable can also be referred to as a categorical variable.

FALSE

Qualitative variables are also known as categorical variables.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 1 Easy
Learning Objective: 01-02 Describe the difference between a quantitative variable and a qualitative variable.
Topic: Data

13. In a data set of information on college business students, an example of an element is their cumulative GPA.

FALSE

The element is college business students. The cumulative GPA is an example of a variable, which is a characteristic of the element college business students.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-01 Define a variable.
Topic: Data

14. In an observational study, the variable of interest is called a response variable.

TRUE

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 1 Easy
Learning Objective: 01-05 Identify the different types of data sources: existing data sources; experimental studies; and observational studies.
Topic: Data Sources

15. In an experimental study, the aim is to manipulate or set the value of the response variable.

FALSE

In experimental studies, the aim is to manipulate the factor, which is related to the response variable.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-05 Identify the different types of data sources: existing data sources; experimental studies; and observational studies.
Topic: Data Sources*

16. The science of describing the important aspects of a set of measures is called statistical inference.

FALSE

This is the definition of descriptive statistics. Statistical inference is the science of using a sample of measurements to make generalizations about the population of measurements.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-07 Distinguish between descriptive statistics and statistical inference.
Topic: Three Case Studies That Illustrate Sampling and Statistical Inference*

17. It is possible to use a random sample from one population to make statistical inferences about another related population.

TRUE

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-08 Explain the importance of random sampling.
Topic: Three Case Studies That Illustrate Sampling and Statistical Inference*

18. Processes produce outputs over time.

TRUE

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 1 Easy
Learning Objective: 01-08 Explain the importance of random sampling.*

19. Selecting many different samples and running many different tests can eventually produce a result that makes a desired conclusion be true.

FALSE

Using different samples and tests to produce a desired conclusion does not make the conclusion true.

AACSB: Ethics

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Learning Objective: 01-08 Explain the importance of random sampling.

Topic: Three Case Studies That Illustrate Sampling and Statistical Inference

20. Using a nonrandom sample procedure in order to support a desired conclusion is an example of an unethical statistical procedure.

TRUE

AACSB: Ethics

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Learning Objective: 01-08 Explain the importance of random sampling.

Topic: Three Case Studies That Illustrate Sampling and Statistical Inference

21. Primary data are data collected by an individual.

TRUE

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 1 Easy

Learning Objective: 01-05 Identify the different types of data sources: existing data sources; experimental studies; and observational studies.

Topic: Data Sources

22. Secondary data are data taken from an existing source.

TRUE

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 1 Easy

Learning Objective: 01-05 Identify the different types of data sources: existing data sources; experimental studies; and observational studies.

Topic: Data Sources

Multiple Choice Questions

23. Data that are collected by an individual through personally planned experimentation or observation are _____.

A. Secondary data
B. Quantitative data
C. Primary data
D. Variables

By definition, primary data are collected by an individual while secondary data are from an existing source.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 1 Easy
Learning Objective: 01-05 Identify the different types of data sources: existing data sources; experimental studies; and observational studies.
Topic: Data Sources

24. A ratio variable has the following characteristic:

A. Meaningful order
B. Inherently defined zero value
C. Categorical in nature
D. Predictable

By definition, ratio variables are quantitative and have an absolute zero value.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 1 Easy
Learning Objective: 01-09 Identify the ratio; interval; ordinal; and nominative scales of measurement.
Topic: Ratio, Interval, Ordinal, and Nominative Scales of Measurement

25. Which of the following is a quantitative variable?

- A. The manufacturer of a cell phone
- B. A person's gender
- C. Mileage of a car**
- D. Whether a person is a college graduate
- E. Whether a person has a charge account

A quantitative variable is measurable and noncategorical.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 1 Easy
Learning Objective: 01-02 Describe the difference between a quantitative variable and a qualitative variable.
Topic: Data

26. Which of the following is a categorical variable?

- A. Air temperature
- B. Bank account balance
- C. Daily sales in a store
- D. Whether a person has a traffic violation**
- E. Value of company stock

A categorical variable is qualitative, not measured.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-02 Describe the difference between a quantitative variable and a qualitative variable.
Topic: Data

27. Measurements from a population are called:

- A. Elements.
- B. Observations.**
- C. Variables.
- D. Processes.

By definition, elements and variables are the same; processes are not measurements.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-06 Describe the difference between a population and a sample.
Topic: Populations and Samples

28. The two types of quantitative variables are:

- A. Ordinal and ratio
- B. Interval and ordinal
- C. Nominative and ordinal
- D. Interval and ratio**
- E. Nominative and interval

Nominative and ordinal are types of qualitative variables.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-09 Identify the ratio; interval; ordinal; and nominative scales of measurement.
Topic: Ratio, Interval, Ordinal, and Nominative Scales of Measurement

29. Temperature (in degrees Fahrenheit) is an example of a(n) _____ variable.

- A. Nominative
- B. Ordinal
- C. Interval**
- D. Ratio

Temperature is quantitative (excludes nominative and ordinal) and the ratio of two temperatures is not meaningful.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium*

*Learning Objective: 01-09 Identify the ratio; interval; ordinal; and nominative scales of measurement.
Topic: Ratio, Interval, Ordinal, and Nominative Scales of Measurement*

30. Jersey numbers of soccer players is an example of a(n) _____ variable.

- A. Nominative**
- B. Ordinal
- C. Interval
- D. Ratio

Interval and ratio are quantitative variables; jersey numbers have no logical order.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium*

*Learning Objective: 01-09 Identify the ratio; interval; ordinal; and nominative scales of measurement.
Topic: Ratio, Interval, Ordinal, and Nominative Scales of Measurement*

31. The weight of a chemical compound used in an experiment that is obtained using a well-adjusted scale represents a(n) _____ level of measurement.

A. Nominative
B. Ordinal
C. Interval
D. Ratio

Nominative and ordinal are qualitative variables; weight creates logical ratios: 60 lbs is twice as heavy as 30 lbs.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium*

*Learning Objective: 01-09 Identify the ratio; interval; ordinal; and nominative scales of measurement.
Topic: Ratio, Interval, Ordinal, and Nominative Scales of Measurement*

32. An identification of police officers by rank would represent a(n) _____ level of measurement.

A. Nominative
B. Ordinal
C. Interval
D. Ratio

Interval and ratio are quantitative variables, nominative is only a naming category, and police rank has order.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium*

*Learning Objective: 01-09 Identify the ratio; interval; ordinal; and nominative scales of measurement.
Topic: Ratio, Interval, Ordinal, and Nominative Scales of Measurement*

33. _____ is a necessary component of a runs plot.

- A.** Observation over time
- B. Qualitative variable
- C. Random sampling of the data
- D. Cross-sectional data

A runs plot is a graphical display of time series data.

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Learning Objective: 01-04 Construct and interpret a time series (runs) plot.

Topic: Data

34. _____ is the science of using a sample to make generalizations about the important aspects of a population.

- A. Time series analysis
- B. Descriptive statistics
- C. Random sample
- D.** Statistical inference

By definition, a time series is a study of data over time; descriptive statistics is the study of the measurements of population variables; a random sample is a data set.

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Learning Objective: 01-07 Distinguish between descriptive statistics and statistical inference.

Topic: Three Case Studies That Illustrate Sampling and Statistical Inference

35. College entrance exam scores, such as SAT scores, are an example of a(n) _____ variable.

A. Ordinal
B. Ratio
C. Nominative
D. Interval

Nominative and ordinal are qualitative variables; exam scores have no meaningful ratio and no inherently defined zero value.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 3 Hard*

*Learning Objective: 01-09 Identify the ratio; interval; ordinal; and nominative scales of measurement.
Topic: Ratio, Interval, Ordinal, and Nominative Scales of Measurement*

36. The number of miles a truck is driven before it is overhauled is an example of a(n) _____ variable.

A. Nominative
B. Ordinal
C. Interval
D. Ratio

Nominative and ordinal are qualitative variables; miles driven can have a meaningful ratio.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium*

*Learning Objective: 01-09 Identify the ratio; interval; ordinal; and nominative scales of measurement.
Topic: Ratio, Interval, Ordinal, and Nominative Scales of Measurement*

37. A(n) _____ variable is a qualitative variable such that there is no meaningful ordering or ranking of the categories.

A. Ratio
B. Ordinal
C. Nominative
D. Interval

Ratio and interval are quantitative variables; ordinal implies order or rank.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 1 Easy*

*Learning Objective: 01-09 Identify the ratio; interval; ordinal; and nominative scales of measurement.
Topic: Ratio, Interval, Ordinal, and Nominative Scales of Measurement*

38. A person's telephone area code is an example of a(n) _____ variable.

A. Nominative
B. Ordinal
C. Interval
D. Ratio

This is a qualitative variable without order; therefore, a nominative variable.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium*

*Learning Objective: 01-09 Identify the ratio; interval; ordinal; and nominative scales of measurement.
Topic: Ratio, Interval, Ordinal, and Nominative Scales of Measurement*

39. Any characteristic of a population unit is a(n):

- A. Measurement
- B. Sample
- C. Observation
- D. Variable**

Measurement and observation are methods attached to a variable; a sample is a subset of the units in a population.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 2 Medium
Learning Objective: 01-01 Define a variable.
Topic: Data

40. Examining all population measurements is called a _____.

- A. Census**
- B. Frame
- C. Sample
- D. Variable

By definition, a census looks at the entire population.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 2 Medium
Learning Objective: 01-06 Describe the difference between a population and a sample.
Topic: Populations and Samples

41. Any characteristic of an element is called a _____.

- A. Set
- B. Process
- C. Variable**
- D. Census

A process is a sequence of operations; a census looks at the entire population; set is related to population.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 1 Easy
Learning Objective: 01-01 Define a variable.
Topic: Data

42. The process of assigning a value of a variable to each element in a data set is called _____.

- A. Sampling
- B. Measurement**
- C. Experimental analysis
- D. Observational analysis

By definition, sampling is taking a portion of the population to measure; experimental and observational analyses are methods of obtaining data.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-01 Define a variable.
Topic: Data

43. A _____ is a display of individual measurements versus time.

- A.** Runs plot
- B. Statistical analysis
- C. Random sample
- D. Measurement

A runs plot is a graphical display of data over time.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 1 Easy
Learning Objective: 01-04 Construct and interpret a time series (runs) plot.
Topic: Data

44. Statistical _____ refers to using a sample of measurements and making generalizations about the important aspects of a population.

- A. Sampling
- B. Process
- C. Analysis
- D.** Inference

By definition, inference is taking a sample of data and its measurements and relating those measurements to the population as a whole.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-07 Distinguish between descriptive statistics and statistical inference.
Topic: Three Case Studies That Illustrate Sampling and Statistical Inference

45. A _____ is a subset of the units in a population.

- A. Census
- B. Process
- C. Sample**
- D. Variable

By definition, a census looks at an entire population; a variable is a characteristic of an element within the population; a process is a sequence of operations that produces elements of a population.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Difficulty: 1 Easy
Learning Objective: 01-06 Describe the difference between a population and a sample.
Topic: Populations and Samples

46. A _____ variable can have values that are numbers on the real number line.

- A. Qualitative
- B. Quantitative**
- C. Categorical
- D. Nominative

Qualitative, categorical, and nominative have similar definitions.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-02 Describe the difference between a quantitative variable and a qualitative variable.
Topic: Data

47. A sequence of operations that takes inputs and turns them into outputs is a _____.

- A.** Process
- B. Statistical inference
- C. Runs plot
- D. Random sampling

By definition, a runs plot is a graphical display; random sampling is a method of selecting a portion of a population; statistical inference is the science of using a sample of measurements to infer about the entire population.

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

Blooms: Remember

Difficulty: 1 Easy

Learning Objective: 01-04 Construct and interpret a time series (runs) plot.

Topic: Data

48. A(n) _____ variable can have values that indicate into which of several categories of a population it belongs.

- A.** Qualitative
- B. Quantitative
- C. Ratio
- D. Interval

Quantitative, ratio, and interval all have similar definitions.

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Learning Objective: 01-02 Describe the difference between a quantitative variable and a qualitative variable.

Topic: Data

49. A set of all elements we wish to study is called a _____.

- A. Sample
- B. Process
- C. Census
- D. Population**

By definition, a census is the examination of all population measurements; a process is a sequence of operations; a sample is a subset of a population.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium*

*Learning Objective: 01-06 Describe the difference between a population and a sample.
Topic: Populations and Samples*

50. _____ refers to describing the important aspects of a set of measurements.

- A. Cross-sectional analysis
- B. Runs plot
- C. Descriptive statistics**
- D. Time series analysis

A runs plot and time series analysis both look at data over time; cross-sectional analysis looks at data collected at the same point in time.

*AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium*

*Learning Objective: 01-07 Distinguish between descriptive statistics and statistical inference.
Topic: Three Case Studies That Illustrate Sampling and Statistical Inference*

51. The change in the daily price of a stock is what type of variable?

- A. Qualitative
- B. Ordinal
- C. Random
- D. Quantitative**

Qualitative and ordinal have similar definitions; random variables are all characteristics of a population element.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium

Learning Objective: 01-02 Describe the difference between a quantitative variable and a qualitative variable.
Topic: Data

52. Data collected for a particular study are referred to as a data _____.

- A. Variable
- B. Measurement
- C. Set**
- D. Element

By definition, a variable is a characteristic of an element; a measurement assigns a value to a variable; an element is one unit of a population.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-01 Define a variable.
Topic: Data

53. A data set provides information about some group of individual _____.

- A. Variables
- B. Elements**
- C. Statistics
- D. Measurements

By definition, measurements assign values to a variable of an element; statistics is the science of describing aspects of a set of measurements; variables are characteristics of elements in a population.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-01 Define a variable.
Topic: Data

54. When the data being studied are gathered from a published source, this is referred to as a(n) _____.

- A. Existing data source**
- B. Observational data source
- C. Experimental data source
- D. Cross-sectional data source

By definition, an experimental data source is a collection of data where one is able to manipulate values; an observational data source is a collection of data where one is unable to control factors. Cross-sectional is a method of analyzing data, not the collection of data.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-05 Identify the different types of data sources: existing data sources; experimental studies; and observational studies.
Topic: Data Sources

55. One method of determining whether a sample being studied can be used to make statistical inferences about the population is to:

- A. Run a descriptive statistical analysis
- B. Calculate a proportion
- C. Create a cross-sectional data analysis
- D. Produce a runs plot**

Runs plot are a way of looking at processes over time, which can then be utilized to make inferences about a population. Simply looking at descriptive statistics (of which, proportion and cross-sectional analysis are methods or procedures) is not sufficient to make inferences.

AACSB: Reflective Thinking

Accessibility: Keyboard Navigation

Blooms: Apply

Difficulty: 3 Hard

Learning Objective: 01-08 Explain the importance of random sampling.

Topic: Three Case Studies That Illustrate Sampling and Statistical Inference

56. Which of the following is NOT an example of unethical statistical practices?

- A. Inappropriate interpretation of statistical results
- B. Using graphs to make statistical inferences**
- C. Improper sampling
- D. Descriptive measures that mislead the user
- E. None of these

It is unethical to use methods or procedures designed to mislead the audience that is viewing the findings.

AACSB: Ethics

Accessibility: Keyboard Navigation

Blooms: Understand

Difficulty: 2 Medium

Learning Objective: 01-08 Explain the importance of random sampling.

Topic: Three Case Studies That Illustrate Sampling and Statistical Inference

57. If we collect data on the number of wins each team in the NFL had during the 2011-12 season, we have _____ data.

- A. Cross-sectional
B. Time series

A time series is a collection of data taken over time, while a cross-section is a collection of data taken at the same point in time.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-03 Describe the difference between cross-sectional data and time series data.
Topic: Data

58. If we collect data on the number of wins the Dallas Cowboys earned each of the past 10 years, we have _____ data.

- A. Cross-sectional
B. Time series

A time series is a collection of data taken over time, while a cross-section is a collection of data taken at the same point in time.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Difficulty: 2 Medium
Learning Objective: 01-03 Describe the difference between cross-sectional data and time series data.
Topic: Data

Short Answer Questions

59. A study is being conducted on the effect of gas price on the number of miles driven in a given month. Residents in two cities, one on the East Coast and one on the West Coast are randomly selected and asked to complete a questionnaire on the type of car they drive, the number of miles they live from work, the number of children under 18 in their household, their monthly income, and the number of miles they have driven over the past 30 days. List the response variable(s).

The response variable in this study is the number of miles driven over the past 30 days.

Feedback: Response variables are defined as the variable of interest in a study.

AACSB: Reflective Thinking

Blooms: Apply

Blooms: Understand

Difficulty: 2 Medium

Learning Objective: 01-05 Identify the different types of data sources: existing data sources; experimental studies; and observational studies.

Topic: Data Sources

60. A study is being conducted on the effect of gas price on the number of miles driven in a given month. Residents in two cities, one on the East Coast and one on the West Coast are randomly selected and asked to complete a questionnaire on the type of car they drive, the number of miles they live from work, the number of children under 18 in their household, their monthly income, and the number of miles they have driven over the past 30 days. Is this an experimental or observational study?

Observational study

Feedback: An observational study occurs when analysts are unable to control the factors of interest. An experimental study occurs when values of factors that are related to the variable of interest can be set or manipulated.

AACSB: Reflective Thinking

Blooms: Apply

Blooms: Understand

Difficulty: 2 Medium

Learning Objective: 01-05 Identify the different types of data sources: existing data sources; experimental studies; and observational studies.

Topic: Data Sources

61. A study is being conducted on the effect of gas price on the number of miles driven in a given month. Residents in two cities, one on the East Coast and one on the West Coast are randomly selected and asked to complete a questionnaire on the type of car they drive, the number of miles they live from work, the number of children under 18 in their household, their monthly income, and the number of miles they have driven over the past 30 days. List the factor(s).

Factors in this study are location of residence, type of car, number of miles from work, number of children under 18, and monthly income.

Feedback: Factors are related to the variable of interest.

AACSB: Reflective Thinking

Blooms: Apply

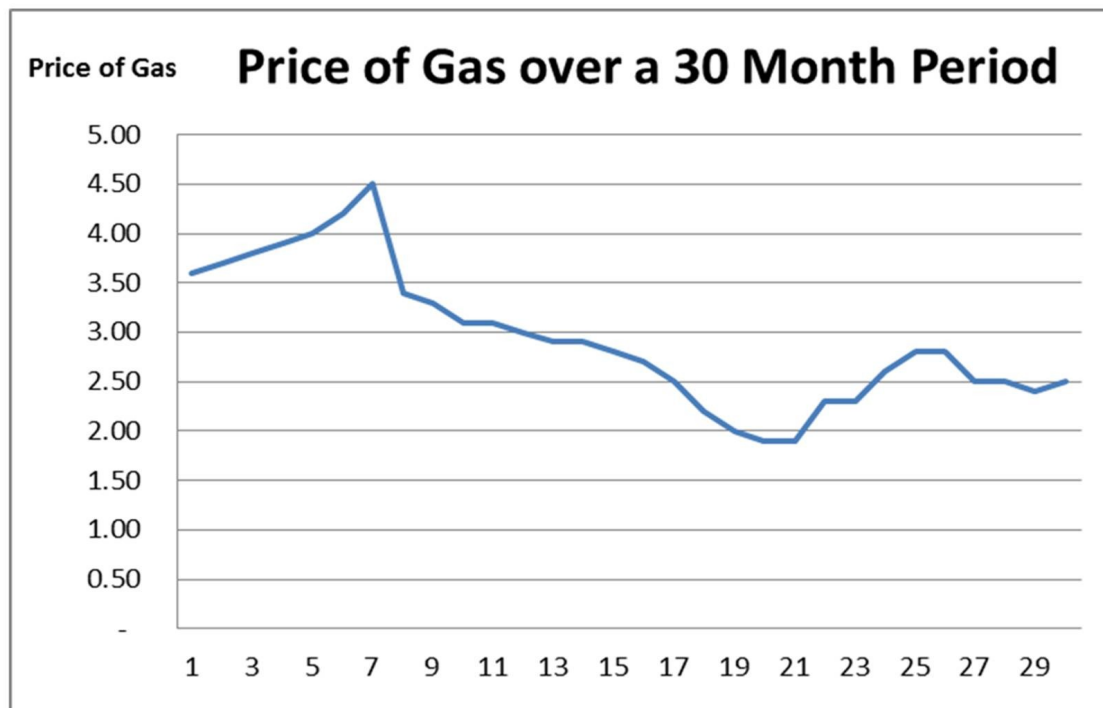
Blooms: Understand

Difficulty: 2 Medium

Learning Objective: 01-05 Identify the different types of data sources: existing data sources; experimental studies; and observational studies.

Topic: Data Sources

62. Looking at the runs plot of gasoline prices over the past 30 months, describe what it tells us about the price of gas during these 30 months.



The price of gas peaked in the 7th month. The lowest price is observed around 20-21 months from the start of the data collection. At the end of the 30 months, gas price is beginning to show stability.

Feedback: Observing the rise and fall of a time series or runs plot.

AACSB: Reflective Thinking

Blooms: Apply

Blooms: Understand

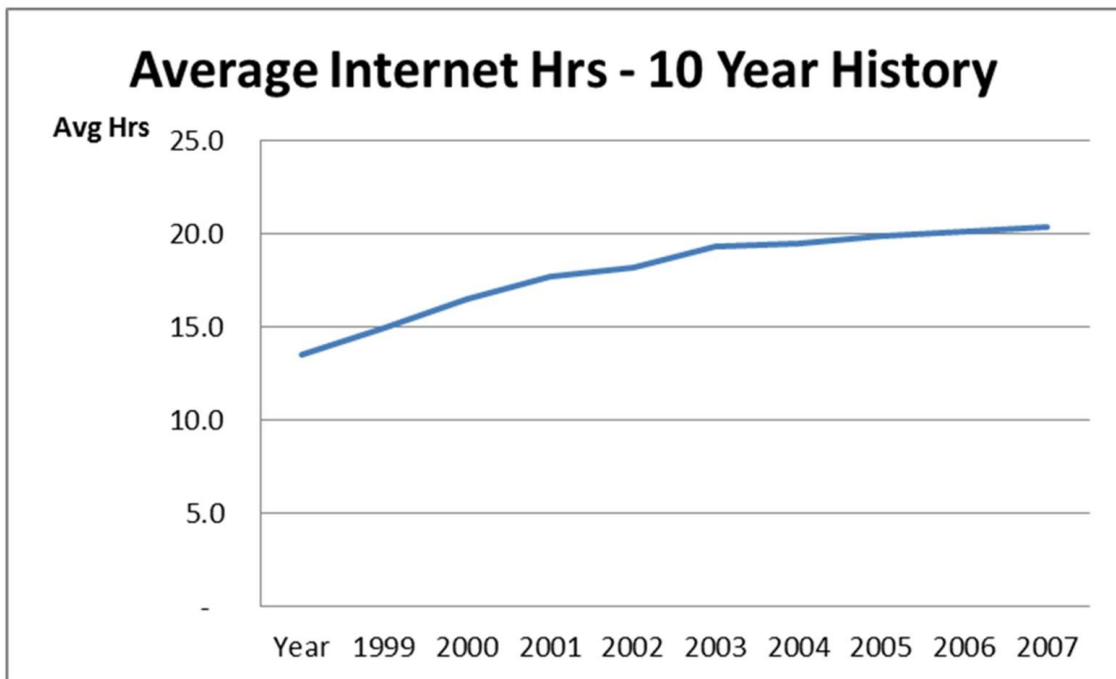
Difficulty: 2 Medium

Learning Objective: 01-04 Construct and interpret a time series (runs) plot.

Topic: Data

63. Using the following data table of the average hours per week spent on Internet activities by 15- to 18-year-olds for the years 1999-2008, construct the runs plot and interpret.

Year	Avg Hrs
1999	13.5
2000	15.0
2001	16.5
2002	17.7
2003	18.2
2004	19.3
2005	19.5
2006	19.9
2007	20.1
2008	20.4



Hours spent on the Internet have increased over the 10 years but show a slight leveling off in the last 3 years.

Feedback: Displaying the average hours spent on Internet activities graphically results in a time series or runs plot. An increase over time in the amount of time can be observed through either the graph or data.

AACSB: Reflective Thinking

Blooms: Apply

Blooms: Understand

Difficulty: 2 Medium

Learning Objective: 01-04 Construct and interpret a time series (runs) plot.

Topic: Data