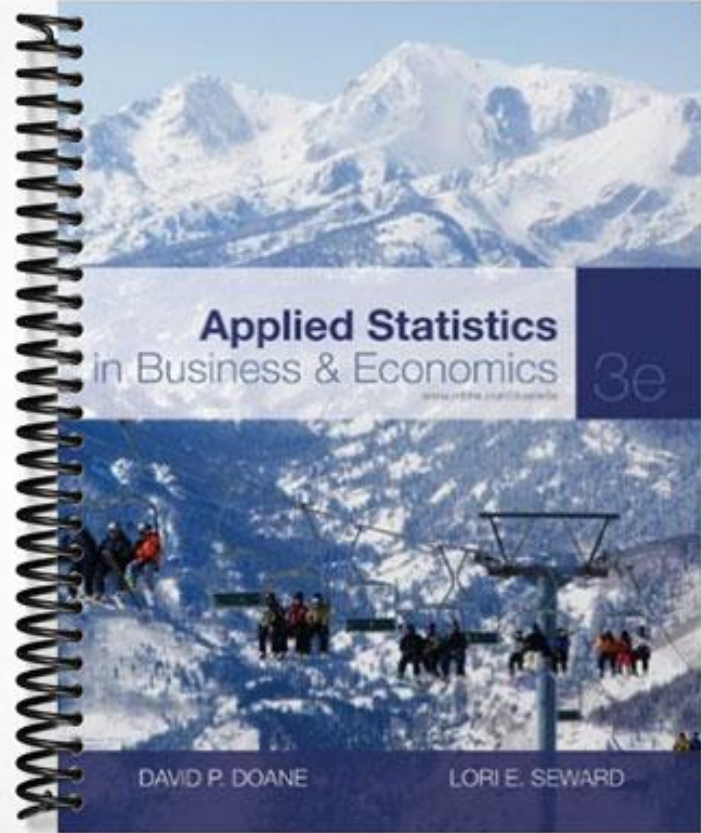


**TEST BANK**



**Applied Statistics**  
in Business & Economics

3e

DAVID P. DOANE

LORI E. SEWARD

## **Chapter 02 Data Collection**

### **True / False Questions**

1. Categorical data have values that are described by words rather than numbers.

True False

2. Numerical data can be either discrete or continuous.

True False

3. Categorical data are also referred to as nominal or qualitative data.

True False

4. The number of checks processed at a bank in a day is an example of categorical data.

True False

5. The number of planes per day that land at an airport is an example of discrete data.

True False

6. The weight of a bag of dog food is an example of discrete data.

True False

7. In last year's annual report, Thompson Distributors indicated that it had 12 regional warehouses. This is an example of ordinal level data.

True False

8. Nominal data refer to data that can be ordered in a natural way.

True False

9. This year, Oxnard University produced 2 football All-Americans. This is an example of continuous data.

True False

10. The type of statistical test that we can perform is independent of the level of measurement of the variable of interest.

True False

11. Your weight recorded at your annual physical would be *not* be ratio data because you cannot have zero weight.

True False

12. The level of measurement for categorical data is nominal.

True False

13. Temperature measured in degrees Fahrenheit is an example of interval data.

True False

14. The closing price of a stock is an example of ratio data.

True False

15. The *Statistical Abstract of the United States* is a huge annual compendium of data for the U.S. and it is available online free of charge.

True False

16. Ordinal data can be treated as if it were nominal data but not vice-versa.

True False

17. Responses on a 7-point Likert scale are usually treated as ratio data.

True False

18. Likert scales are especially important in opinion polls and marketing surveys.

True False

19. Ordinal data are data that can be ranked based on some natural characteristic of the items.

True False

20. Ratio data are distinguished from interval data by the presence of a zero reference point.

True False

21. It is better to attempt a census of a large population instead of relying on a sample.

True False

22. Judgment sampling and convenience sampling are non-random sampling techniques.

True False

23. A problem with judgment sampling is that the sample may not reflect the population.

True False

24. When the population is large, a sample estimate is usually preferable to a census.

True False

25. Sampling error is avoidable by choosing the sample scientifically.

True False

26. A sampling frame is used to identify the target population in a statistical study.

True False

27. By taking a systematic sample, in which we select every 50<sup>th</sup> shopper arriving at a specific store, we are approximating a random sample of shoppers.

True False

28. A worker collecting data from every other shopper who leaves a store is taking a simple random sample of customer opinion.

True False

29. Creating a list of people by taking the third name listed on every tenth page of the phone book is an example of convenience sampling.

True False

30. Internet surveys posted on popular websites have no bias since anyone can reply.

True False

31. Analysis of month-by-month changes in stock market prices during the most recent recession would require the use of time series data.

True False

32. A cluster sample is a type of stratified sample that is based on geographical location.

True False

33. An advantage of a systematic sample is that no list of enumerated data items is required.  
True False

34. Telephone surveys often have a low response rate and fail to reach the desired population.  
True False

35. Mail surveys are attractive because of their high response rates.  
True False

36. A problem with convenience sampling is that the target population is not well defined.  
True False

37. If you randomly sample 50 students about their favorite places to eat, the data collected would be referred to as cross-sectional data.  
True False

38. The number of FedEx shipping centers in each of 50 cities would be ordinal level data.  
True False

39. Internet surveys posted on popular websites such as MSN.com suffer from non-response bias.  
True False

**Multiple Choice Questions**

40. An investment firm rates bonds for AardCo Inc. as "B+" while bonds of Deva Corp. are rated "AA." Which level of measurement would be appropriate for such data?

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

41. Which variable is *least* likely to be regarded as ratio data?

- A. Length of time required for a randomly-chosen vehicle to cross a toll bridge (minutes).
- B. Weight of a randomly-chosen student (pounds).
- C. Number of fatalities in a randomly-chosen traffic disaster (persons).
- D. Student's evaluation of a professor's teaching (Likert scale).

42. Which of the following is numerical data?

- A. Your gender.
- B. The brand of cell phone you own.
- C. Whether you have an American Express card.
- D. The fuel economy (MPG) of your car.

43. Measurements from a sample are called

- A. statistics.
- B. inferences.
- C. parameters.
- D. variables.

44. Quantitative variables use which two levels of measurement?

- A. Ordinal and ratio.
- B. Interval and ordinal.
- C. Nominal and ordinal.
- D. Interval and ratio.

45. Temperature in degrees Fahrenheit is an example of a(n) \_\_\_\_\_ variable.
- A. nominal
  - B. ordinal
  - C. interval
  - D. ratio
46. Using a sample to make generalizations about an aspect of a population is called
- A. data mining.
  - B. descriptive statistics.
  - C. random sampling.
  - D. statistical inference.
47. Your telephone area code is an example of a(n) \_\_\_\_\_ variable.
- A. nominal
  - B. ordinal
  - C. interval
  - D. ratio
48. Which is *least* likely to be regarded as a ratio variable?
- A. A critic's rating of a restaurant on a 1 to 4 scale.
  - B. Automobile exhaust emission of nitrogen dioxide (milligrams per mile).
  - C. Number of customer complaints per day at a cable TV company office.
  - D. Cost of an e-Bay purchase.
49. Automobile exhaust emission of CO<sub>2</sub> (milligrams per mile) is \_\_\_\_\_ data.
- A. nominal
  - B. ordinal
  - C. interval
  - D. ratio



50. Your rating of the food served at a local restaurant using a 3-point scale of 0 = gross, 1 = decent, 2 = yummy is \_\_\_\_\_ data.

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

51. The number of passengers "bumped" on a particular airline flight is \_\_\_\_\_ data.

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

52. Which should *not* be regarded as a continuous random variable?

- A. Tonnage carried by a randomly-chosen oil tanker at sea.
- B. Wind velocity at 7 o'clock this morning.
- C. Number of personal fouls by the Miami Heat in a game.
- D. Length of time to play a Wimbledon tennis match.

53. Which of the following is *not* true?

- A. Categorical data have values that are described by words rather than numbers.
- B. Categorical data are also referred to as nominal or qualitative data.
- C. The number of checks processed at a bank in a day is categorical data.
- D. Numerical data can be either discrete or continuous.

54. Which of the following is true?

- A. The type of charge card used by a customer (Visa, MasterCard, AmEx) is ordinal data.
- B. The duration (minutes) of a flight from Boston to Minneapolis is ratio data.
- C. The number of Nobel prize-winning faculty at Oxnard University is continuous data.
- D. The number of regional warehouses owned by Jankord Industries is ordinal data.

55. Which statement is *correct*?

- A. Judgment sampling is preferred to systematic sampling.
- B. Sampling without replacement introduces bias in our estimates of parameters.
- C. Cluster sampling is useful when strata characteristics are unknown.
- D. Focus groups usually work best without a moderator.

56. A Likert scale

- A. yields interval data if scale distances are equal.
- B. must have an odd number of scale points.
- C. must have a verbal label on each scale point.
- D. is rarely used in marketing surveys.

57. Which is most nearly correct regarding sampling error?

- A. It can be eliminated by increasing the sample size.
- B. It cannot be eliminated by any statistical sampling method.
- C. It can be eliminated by using Excel's = RANDBETWEEN function.
- D. It can be eliminated by utilizing systematic random sampling.

58. Which statement is *false*?

- A. Random dialing phone surveys have low response and are poorly targeted.
- B. Selection bias means that many respondents dislike the interviewer.
- C. Simple random sampling requires a list of the population.
- D. Web surveys are economical but suffer from non-response bias.

59. Judgment sampling is sometimes preferred over random sampling, for example when

- A. the desired sample size is much larger than the population.
- B. the sampling budget is large and population is conveniently located.
- C. time is short and the sampling budget is limited.
- D. the population is readily accessible and sampling is non-destructive.

60. An advantage of convenience samples is that

- A. the required sample size is easier to calculate.
- B. sampling error can be reduced.
- C. computation of statistics is easier.
- D. they are often quicker and cheaper.

61. Before deciding whether to assess heavy fines against noisy airlines, which sampling method would the Federal Aviation Administration *probably* use to measure the peak noise from departing jets as measured by a ground-level observer at a point one mile from the end of the departure runway?

- A. Radio survey of pilots.
- B. Simple random sample.
- C. Cluster sample.
- D. Systematic sample.

62. Professor Hardtack chose a sample of 7 students from his statistics class of 35 students by picking every student who was wearing red that day. Which kind of sample is this?

- A. Simple random sample.
- B. Judgment sample.
- C. Systematic sample.
- D. Convenience sample.

63. Thirty work orders are selected from a filing cabinet containing 500 work order folders by choosing every 15<sup>th</sup> folder. Which sampling method is this?

- A. Simple random sample.
- B. Systematic sample.
- C. Stratified sample.
- D. Cluster sample.

64. Which of the following is *not* a likely reason for sampling?

- A. The destructive nature of certain tests.
- B. The physical impossibility of checking all the items in the population.
- C. Prohibitive cost of studying the entire population.
- D. The expense of obtaining random numbers.

65. Comparing a census of a large population to a sample drawn from it, we expect that

- A. the sample is usually a more practical method of obtaining the desired information.
- B. the accuracy of the observations in the census is surely higher than in the sample.
- C. the sample must be a large fraction of the population to be accurate.

66. A stratified sample is sometimes recommended when

- A. the sample size is very large.
- B. the population is small compared to the sample.
- C. distinguishable strata can be identified in the populations.
- D. the population is spread out geographically.

67. A *random sample* is one in which the

- A. probability that an item is selected for the sample is the same for all population items.
- B. population items are selected haphazardly by experienced workers.
- C. items to be selected from the population are specified based on expert judgment.
- D. probability of selecting a population item depends on the item's data value.

68. An advantage of convenience samples over random samples is that

- A. they are easy to analyze.
- B. it is easier to determine the sample size needed.
- C. it is easier to calculate the sampling errors involved.
- D. data collection cost is reduced.

69. To measure satisfaction with its cell phone service, AT&T takes a stratified sample of its customers by age, gender, and location. Which is *not* an advantage of this type of sampling, as opposed to attempting a census of all AT&T customers?

- A. It is less intrusive.
- B. It is more expensive.
- C. It gives faster results.
- D. It can give accurate results.

70. An accounting professor wishing to know how many MBA students would take a summer elective in international accounting did a survey of the class she was teaching. Which kind of sample is this?

- A. Simple random sample.
- B. Cluster sample.
- C. Systematic sample.
- D. Convenience sample.

71. A binary variable has

- A. only two possible values.
- B. continuous scale values.
- C. rounded data values.
- D. ordinal or interval values.

72. A population has groups that have a small amount of variation within them, but large variation among or between the groups themselves. The proper sampling technique is

- A. simple random.
- B. stratified.
- C. cluster.
- D. judgment.

73. A manager chose two people from his team of eight to give an oral presentation because she felt they were representative of the whole team's views. What sampling technique did she use in choosing these two people?

- A. Convenience.
- B. Simple random.
- C. Judgment.
- D. Cluster.

74. Sampling bias can best be reduced by

- A. using appropriate data coding.
- B. having a computer tabulate the results.
- C. utilizing random sampling.
- D. taking a judgment sample.

75. A sampling technique used when groups are defined by their geographical location is

- A. cluster sampling.
- B. convenience sampling.
- C. judgment sampling.
- D. random sampling.

76. If we choose 500 random numbers using Excel's function = RANDBETWEEN (1, 99) we would *most likely* find that

- A. numbers near the mean (50) would tend to occur more frequently.
- B. numbers near 1 and 99 would tend to occur less frequently.
- C. some numbers would occur more than once.
- D. the numbers would have a clear pattern.

77. A problem with non-random sampling is that

- A. larger samples need to be taken to reduce the sampling error inherent in this approach.
- B. not every item in the population has the same chance of being selected, as it should.
- C. it is usually more expensive than random sampling.
- D. it generally provides lower response rates than random sampling.

78. From its 32 regions, the FAA selects 6 regions, and then randomly audits 25 departing commercial flights in each region for compliance with legal fuel and weight requirements. This is an example of

- A. simple random sampling.
- B. stratified random sampling.
- C. cluster sampling.
- D. judgment sampling.

79. Which of the following is a *correct* statement?

- A. Choosing the 3<sup>rd</sup> person listed on every 5<sup>th</sup> page of the phone book is stratified sampling.
- B. An advantage of a systematic sample is that no list of enumerated data items is required.
- C. Convenience sampling is used to study shoppers in convenience stores.
- D. Judgment sampling is an example of true random sampling.

80. Which of the following is *false*?

- A. Sampling error is the difference between the true parameter and a random number in Excel.
- B. Sampling error is a result of unavoidable random variation in a sample.
- C. A sampling frame is used to help identify the target population in a statistical study.
- D. The target population must first be defined by a full list or data file of individuals.

81. When we are choosing a random sample and we do not place chosen units back into the population, we are

- A. sampling with replacement.
- B. sampling without replacement.
- C. using a systematic sample.
- D. using a voluntary sample.

82. Which method is likely to be used by a journalism student who is casually surveying opinions of students about the university's cafeteria food for an article that she is writing?

- A. Simple random sample.
- B. Systematic random sample.
- C. Cluster sample.
- D. Convenience sample.

83. Which of the following is *false*?

- A. Mail surveys are cheap but have low response rates.
- B. Coverage error is when respondents give untruthful answers.
- C. Focus groups are non-random but can probe issues more deeply.
- D. Surveys posted on popular websites suffer from selection bias.

84. Which is a time series variable?

- A. VISA balances of 30 students on December 31 of this year.
- B. Net earnings reported by Xena Corp for the last 10 quarters.
- C. Dollar exchange rates yesterday against 10 other world currencies.
- D. Titles of the top 10 movies in total revenue last week.

85. An *observation* in a data set would refer to

- A. only a variable whose value is recorded by visual inspection.
- B. a data item whose value is numerical (as opposed to categorical).
- C. a single row that contains one or more observed variables.
- D. the values of all the variables in the entire data set.

86. A *multivariate* data set contains

- A. more than two observations.
- B. more than two categorical variables.
- C. more than two variables.
- D. more than two levels of measurement.

87. The Center for Disease Control (CDC) wants to estimate the average extra hospital stay that occurs when heart surgery patients experience postoperative atrial fibrillation. They divide the U.S. into 9 regions. In each region, hospitals are selected at random within each hospital size group (small, medium, large). In each hospital, heart surgery patients are sampled according to known percentages by age group (under 50, 50 to 64, 65 and over) and gender (male, female). This procedure combines which sampling methods?

- A. Systematic, simple random, and convenience.
- B. Convenience, systematic, and judgment.
- C. Cluster, stratified, and simple random.
- D. Judgment, systematic, and simple random.

88. Which statement is correct?

- A. Selecting every 5<sup>th</sup> shopper arriving at a store will approximate a random sample of shoppers.
- B. Selecting only shoppers who drive SUVs is a stratified sampling method.
- C. A census is preferable to a sample for most business problems.
- D. Stratified samples are usually cheaper than other methods.



**Short Answer Questions**

89. Which survey method would you recommend to survey opinions of airline passengers about the cleanliness of the restrooms in the new Detroit airport? Why not the others?

90. What kind of sampling method would you suggest in order to tabulate the number of formulas on a typical page of the Doane-Seward textbook? Defend your choice.

91. How would you design a study to see whether drivers using hands-free cell phones are distracted enough to slow their reactions to emergency situations? How would you collect data?

92. Explain the concept of a focus group. In what ways does a focus group resemble a survey? Why is a moderator desirable? What else is required to make a successful focus group?

## Chapter 02 Data Collection **Answer Key**

### **True / False Questions**

1. Categorical data have values that are described by words rather than numbers.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

2. Numerical data can be either discrete or continuous.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

3. Categorical data are also referred to as nominal or qualitative data.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

4. The number of checks processed at a bank in a day is an example of categorical data.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Easy*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

5. The number of planes per day that land at an airport is an example of discrete data.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Easy*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

6. The weight of a bag of dog food is an example of discrete data.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Easy*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

7. In last year's annual report, Thompson Distributors indicated that it had 12 regional warehouses. This is an example of ordinal level data.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Easy*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

8. Nominal data refer to data that can be ordered in a natural way.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

9. This year, Oxnard University produced 2 football All-Americans. This is an example of continuous data.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Easy*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

10. The type of statistical test that we can perform is independent of the level of measurement of the variable of interest.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

11. Your weight recorded at your annual physical would be *not* be ratio data because you cannot have zero weight.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

12. The level of measurement for categorical data is nominal.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

13. Temperature measured in degrees Fahrenheit is an example of interval data.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

14. The closing price of a stock is an example of ratio data.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

15. The *Statistical Abstract of the United States* is a huge annual compendium of data for the U.S. and it is available online free of charge.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Find everyday print or electronic data sources.*

*Topic: Statistical terminology - general*

16. Ordinal data can be treated as if it were nominal data but not vice-versa.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

17. Responses on a 7-point Likert scale are usually treated as ratio data.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Recognize a Likert scale and know how to use it.*

*Topic: Data types and measurement levels*

18. Likert scales are especially important in opinion polls and marketing surveys.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Recognize a Likert scale and know how to use it.*

*Topic: Data types and measurement levels*

19. Ordinal data are data that can be ranked based on some natural characteristic of the items.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

20. Ratio data are distinguished from interval data by the presence of a zero reference point.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

21. It is better to attempt a census of a large population instead of relying on a sample.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objectives: Use the correct terminology for samples and populations.*

*Topic: Sampling methods and their uses*

22. Judgment sampling and convenience sampling are non-random sampling techniques.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

23. A problem with judgment sampling is that the sample may not reflect the population.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

24. When the population is large, a sample estimate is usually preferable to a census.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Use the correct terminology for samples and populations.*

*Topic: Sampling methods and their uses*

25. Sampling error is avoidable by choosing the sample scientifically.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objectives: Use the correct terminology for samples and populations.*

*Topic: Sampling methods and their uses*

26. A sampling frame is used to identify the target population in a statistical study.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Use the correct terminology for samples and populations.*

*Topic: Sampling methods and their uses*

27. By taking a systematic sample, in which we select every 50<sup>th</sup> shopper arriving at a specific store, we are approximating a random sample of shoppers.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*



28. A worker collecting data from every other shopper who leaves a store is taking a simple random sample of customer opinion.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

29. Creating a list of people by taking the third name listed on every tenth page of the phone book is an example of convenience sampling.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

30. Internet surveys posted on popular websites have no bias since anyone can reply.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Describe basic elements of survey design; survey types; and sources of error.*

*Topic: Survey principles and data collection*

31. Analysis of month-by-month changes in stock market prices during the most recent recession would require the use of time series data.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the difference between time series and cross-sectional data.*

*Topic: Data types and measurement levels*

32. A cluster sample is a type of stratified sample that is based on geographical location.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

33. An advantage of a systematic sample is that no list of enumerated data items is required.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

34. Telephone surveys often have a low response rate and fail to reach the desired population.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Describe basic elements of survey design; survey types; and sources of error.*

*Topic: Survey principles and data collection*

35. Mail surveys are attractive because of their high response rates.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Describe basic elements of survey design; survey types; and sources of error.*

*Topic: Survey principles and data collection*

36. A problem with convenience sampling is that the target population is not well defined.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

37. If you randomly sample 50 students about their favorite places to eat, the data collected would be referred to as cross-sectional data.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the difference between time series and cross-sectional data.*

*Topic: Data types and measurement levels*

38. The number of FedEx shipping centers in each of 50 cities would be ordinal level data.

**FALSE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

39. Internet surveys posted on popular websites such as MSN.com suffer from non-response bias.

**TRUE**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Describe basic elements of survey design; survey types; and sources of error.*

*Topic: Survey principles and data collection*

**Multiple Choice Questions**

40. An investment firm rates bonds for AardCo Inc. as "B+" while bonds of Deva Corp. are rated "AA." Which level of measurement would be appropriate for such data?

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

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

41. Which variable is *least* likely to be regarded as ratio data?

- A. Length of time required for a randomly-chosen vehicle to cross a toll bridge (minutes).
- B. Weight of a randomly-chosen student (pounds).
- C. Number of fatalities in a randomly-chosen traffic disaster (persons).
- D. Student's evaluation of a professor's teaching (Likert scale).**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

42. Which of the following is numerical data?

- A. Your gender.
- B. The brand of cell phone you own.
- C. Whether you have an American Express card.
- D. The fuel economy (MPG) of your car.**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Easy*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

43. Measurements from a sample are called

- A.** statistics.
- B. inferences.
- C. parameters.
- D. variables.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Use basic terminology for describing data and samples.*

*Topic: Statistical terminology - general*

44. Quantitative variables use which two levels of measurement?

- A. Ordinal and ratio.
- B. Interval and ordinal.
- C. Nominal and ordinal.
- D.** Interval and ratio.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

45. Temperature in degrees Fahrenheit is an example of a(n) \_\_\_\_\_ variable.

- A. nominal
- B. ordinal
- C.** interval
- D. ratio

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

Chapter 02 - Data Collection

46. Using a sample to make generalizations about an aspect of a population is called
- A. data mining.
  - B. descriptive statistics.
  - C. random sampling.
  - D. statistical inference.**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Use basic terminology for describing data and samples.*

*Topic: Statistical terminology - general*

47. Your telephone area code is an example of a(n) \_\_\_\_\_ variable.
- A. nominal**
  - B. ordinal
  - C. interval
  - D. ratio

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

48. Which is *least* likely to be regarded as a ratio variable?
- A. A critic's rating of a restaurant on a 1 to 4 scale.**
  - B. Automobile exhaust emission of nitrogen dioxide (milligrams per mile).
  - C. Number of customer complaints per day at a cable TV company office.
  - D. Cost of an e-Bay purchase.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

49. Automobile exhaust emission of CO<sub>2</sub> (milligrams per mile) is \_\_\_\_\_ data.

- A. nominal
- B. ordinal
- C. interval
- D.** ratio

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

50. Your rating of the food served at a local restaurant using a 3-point scale of 0 = gross, 1 = decent, 2 = yummy is \_\_\_\_\_ data.

- A. nominal
- B.** ordinal
- C. interval
- D. ratio

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

51. The number of passengers "bumped" on a particular airline flight is \_\_\_\_\_ data.

- A. nominal
- B. ordinal
- C. interval
- D.** ratio

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Easy*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*

52. Which should *not* be regarded as a continuous random variable?

- A. Tonnage carried by a randomly-chosen oil tanker at sea.
- B. Wind velocity at 7 o'clock this morning.
- C.** Number of personal fouls by the Miami Heat in a game.
- D. Length of time to play a Wimbledon tennis match.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

53. Which of the following is *not* true?

- A. Categorical data have values that are described by words rather than numbers.
- B. Categorical data are also referred to as nominal or qualitative data.
- C.** The number of checks processed at a bank in a day is categorical data.
- D. Numerical data can be either discrete or continuous.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

54. Which of the following is true?

- A. The type of charge card used by a customer (Visa, MasterCard, AmEx) is ordinal data.
- B.** The duration (minutes) of a flight from Boston to Minneapolis is ratio data.
- C. The number of Nobel prize-winning faculty at Oxnard University is continuous data.
- D. The number of regional warehouses owned by Jankord Industries is ordinal data.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Recognize levels of measurement in data and ways of coding data.*

*Topic: Data types and measurement levels*



55. Which statement is *correct*?

- A. Judgment sampling is preferred to systematic sampling.
- B. Sampling without replacement introduces bias in our estimates of parameters.
- C.** Cluster sampling is useful when strata characteristics are unknown.
- D. Focus groups usually work best without a moderator.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

56. A Likert scale

- A.** yields interval data if scale distances are equal.
- B. must have an odd number of scale points.
- C. must have a verbal label on each scale point.
- D. is rarely used in marketing surveys.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Recognize a Likert scale and know how to use it.*

*Topic: Data types and measurement levels*

57. Which is most nearly correct regarding sampling error?

- A. It can be eliminated by increasing the sample size.
- B.** It cannot be eliminated by any statistical sampling method.
- C. It can be eliminated by using Excel's = RANDBETWEEN function.
- D. It can be eliminated by utilizing systematic random sampling.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Use the correct terminology for samples and populations.*

*Topic: Sampling methods and their uses*

58. Which statement is *false*?

- A. Random dialing phone surveys have low response and are poorly targeted.
- B.** Selection bias means that many respondents dislike the interviewer.
- C. Simple random sampling requires a list of the population.
- D. Web surveys are economical but suffer from non-response bias.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Describe basic elements of survey design; survey types; and sources of error.*

*Topic: Survey principles and data collection*

59. Judgment sampling is sometimes preferred over random sampling, for example when

- A. the desired sample size is much larger than the population.
- B. the sampling budget is large and population is conveniently located.
- C.** time is short and the sampling budget is limited.
- D. the population is readily accessible and sampling is non-destructive.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

60. An advantage of convenience samples is that

- A. the required sample size is easier to calculate.
- B. sampling error can be reduced.
- C. computation of statistics is easier.
- D.** they are often quicker and cheaper.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

61. Before deciding whether to assess heavy fines against noisy airlines, which sampling method would the Federal Aviation Administration *probably* use to measure the peak noise from departing jets as measured by a ground-level observer at a point one mile from the end of the departure runway?
- A. Radio survey of pilots.
  - B. Simple random sample.
  - C. Cluster sample.
  - D.** Systematic sample.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Hard*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

62. Professor Hardtack chose a sample of 7 students from his statistics class of 35 students by picking every student who was wearing red that day. Which kind of sample is this?
- A. Simple random sample.
  - B. Judgment sample.
  - C. Systematic sample.
  - D.** Convenience sample.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

63. Thirty work orders are selected from a filing cabinet containing 500 work order folders by choosing every 15<sup>th</sup> folder. Which sampling method is this?
- A. Simple random sample.
  - B.** Systematic sample.
  - C. Stratified sample.
  - D. Cluster sample.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

64. Which of the following is *not* a likely reason for sampling?

- A. The destructive nature of certain tests.
- B. The physical impossibility of checking all the items in the population.
- C. Prohibitive cost of studying the entire population.
- D.** The expense of obtaining random numbers.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Use the correct terminology for samples and populations.*

*Topic: Sampling methods and their uses*

65. Comparing a census of a large population to a sample drawn from it, we expect that

- A.** the sample is usually a more practical method of obtaining the desired information.
- B. the accuracy of the observations in the census is surely higher than in the sample.
- C. the sample must be a large fraction of the population to be accurate.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Use the correct terminology for samples and populations.*

*Topic: Sampling methods and their uses*

66. A stratified sample is sometimes recommended when

- A. the sample size is very large.
- B. the population is small compared to the sample.
- C.** distinguishable strata can be identified in the populations.
- D. the population is spread out geographically.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

67. A *random sample* is one in which the
- A.** probability that an item is selected for the sample is the same for all population items.
  - B. population items are selected haphazardly by experienced workers.
  - C. items to be selected from the population are specified based on expert judgment.
  - D. probability of selecting a population item depends on the item's data value.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

68. An advantage of convenience samples over random samples is that
- A. they are easy to analyze.
  - B. it is easier to determine the sample size needed.
  - C. it is easier to calculate the sampling errors involved.
  - D.** data collection cost is reduced.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

69. To measure satisfaction with its cell phone service, AT&T takes a stratified sample of its customers by age, gender, and location. Which is *not* an advantage of this type of sampling, as opposed to attempting a census of all AT&T customers?
- A. It is less intrusive.
  - B.** It is more expensive.
  - C. It gives faster results.
  - D. It can give accurate results.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

70. An accounting professor wishing to know how many MBA students would take a summer elective in international accounting did a survey of the class she was teaching. Which kind of sample is this?

- A. Simple random sample.
- B. Cluster sample.
- C. Systematic sample.
- D. Convenience sample.**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

71. A binary variable has
- A. only two possible values.**
  - B. continuous scale values.
  - C. rounded data values.
  - D. ordinal or interval values.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the distinction between numerical and categorical data.*

*Topic: Data types and measurement levels*

72. A population has groups that have a small amount of variation within them, but large variation among or between the groups themselves. The proper sampling technique is

- A. simple random.
- B. stratified.**
- C. cluster.
- D. judgment.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Hard*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

73. A manager chose two people from his team of eight to give an oral presentation because she felt they were representative of the whole team's views. What sampling technique did she use in choosing these two people?

- A. Convenience.
- B. Simple random.
- C. Judgment.**
- D. Cluster.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

74. Sampling bias can best be reduced by

- A. using appropriate data coding.
- B. having a computer tabulate the results.
- C. utilizing random sampling.**
- D. taking a judgment sample.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

75. A sampling technique used when groups are defined by their geographical location is

- A. cluster sampling.**
- B. convenience sampling.
- C. judgment sampling.
- D. random sampling.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

76. If we choose 500 random numbers using Excel's function = RANDBETWEEN (1, 99) we would *most likely* find that

- A. numbers near the mean (50) would tend to occur more frequently.
- B. numbers near 1 and 99 would tend to occur less frequently.
- C.** some numbers would occur more than once.
- D. the numbers would have a clear pattern.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

77. A problem with non-random sampling is that

- A. larger samples need to be taken to reduce the sampling error inherent in this approach.
- B.** not every item in the population has the same chance of being selected, as it should.
- C. it is usually more expensive than random sampling.
- D. it generally provides lower response rates than random sampling.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

78. From its 32 regions, the FAA selects 6 regions, and then randomly audits 25 departing commercial flights in each region for compliance with legal fuel and weight requirements.

This is an example of

- A. simple random sampling.
- B. stratified random sampling.
- C.** cluster sampling.
- D. judgment sampling.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*



79. Which of the following is a *correct* statement?

- A. Choosing the 3<sup>rd</sup> person listed on every 5<sup>th</sup> page of the phone book is stratified sampling.
- B.** An advantage of a systematic sample is that no list of enumerated data items is required.
- C. Convenience sampling is a used to study shoppers in convenience stores.
- D. Judgment sampling is an example of true random sampling.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

80. Which of the following is *false*?

- A. Sampling error is the difference between the true parameter and a random number in Excel.
- B. Sampling error is a result of unavoidable random variation in a sample.
- C. A sampling frame is used to help identify the target population in a statistical study.
- D.** The target population must first be defined by a full list or data file of individuals.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objectives: Use the correct terminology for samples and populations.*

*Topic: Sampling methods and their uses*

81. When we are choosing a random sample and we do not place chosen units back into the population, we are

- A. sampling with replacement.
- B.** sampling without replacement.
- C. using a systematic sample.
- D. using a voluntary sample.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

82. Which method is likely to be used by a journalism student who is casually surveying opinions of students about the university's cafeteria food for an article that she is writing?
- A. Simple random sample.
  - B. Systematic random sample.
  - C. Cluster sample.
  - D. Convenience sample.**

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

83. Which of the following is *false*?
- A. Mail surveys are cheap but have low response rates.
  - B. Coverage error is when respondents give untruthful answers.**
  - C. Focus groups are non-random but can probe issues more deeply.
  - D. Surveys posted on popular websites suffer from selection bias.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Medium*

*Learning Objective: Describe basic elements of survey design; survey types; and sources of error.*

*Topic: Survey principles and data collection*

84. Which is a time series variable?
- A. VISA balances of 30 students on December 31 of this year.
  - B. Net earnings reported by Xena Corp for the last 10 quarters.**
  - C. Dollar exchange rates yesterday against 10 other world currencies.
  - D. Titles of the top 10 movies in total revenue last week.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Application & analysis*

*Difficulty: Medium*

*Learning Objective: Explain the difference between time series and cross-sectional data.*

*Topic: Data types and measurement levels*

85. An *observation* in a data set would refer to
- A. only a variable whose value is recorded by visual inspection.
  - B. a data item whose value is numerical (as opposed to categorical).
  - C.** a single row that contains one or more observed variables.
  - D. the values of all the variables in the entire data set.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Use basic terminology for describing data and samples.*

*Topic: Statistical terminology - general*

86. A *multivariate* data set contains
- A. more than two observations.
  - B. more than two categorical variables.
  - C.** more than two variables.
  - D. more than two levels of measurement.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Knowledge & understanding*

*Difficulty: Easy*

*Learning Objective: Use basic terminology for describing data and samples.*

*Topic: Statistical terminology - general*

87. The Center for Disease Control (CDC) wants to estimate the average extra hospital stay that occurs when heart surgery patients experience postoperative atrial fibrillation. They divide the U.S. into 9 regions. In each region, hospitals are selected at random within each hospital size group (small, medium, large). In each hospital, heart surgery patients are sampled according to known percentages by age group (under 50, 50 to 64, 65 and over) and gender (male, female). This procedure combines which sampling methods?
- A. Systematic, simple random, and convenience.
  - B. Convenience, systematic, and judgment.
  - C.** Cluster, stratified, and simple random.
  - D. Judgment, systematic, and simple random.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Synthesis & evaluation*

*Difficulty: Hard*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

88. Which statement is correct?

- A.** Selecting every 5<sup>th</sup> shopper arriving at a store will approximate a random sample of shoppers.
- B. Selecting only shoppers who drive SUVs is a stratified sampling method.
- C. A census is preferable to a sample for most business problems.
- D. Stratified samples are usually cheaper than other methods.

*AACSB: Analytical skills*

*Bloom's Taxonomy: Synthesis & evaluation*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

### Short Answer Questions

89. Which survey method would you recommend to survey opinions of airline passengers about the cleanliness of the restrooms in the new Detroit airport? Why not the others?

This is a difficult sampling problem. Restroom users are usually in a hurry, and do not wish to talk to anyone while entering or leaving the facility. Thus, direct observation or handout surveys would not work. Perhaps a questionnaire could be e-mailed or mailed to a sample of frequent flyers who departed or arrived at this airport in a recent month, if a major airline were willing to cooperate. This assumes that frequent flyers are a reasonable target population. You would probably not use a telephone survey because people would distrust the call. A web survey would have non-response bias (i.e., respondents would probably be those with a gripe). Students may digress into sampling methods (random, systematic, cluster, stratified) instead of survey types. Ingenious students may propose other novel methods of sampling opinions.

*AACSB: Reflective thinking*

*Bloom's Taxonomy: Synthesis & evaluation*

*Difficulty: Hard*

*Learning Objective: Describe basic elements of survey design; survey types; and sources of error.*

*Topic: Sampling methods and their uses*

90. What kind of sampling method would you suggest in order to tabulate the number of formulas on a typical page of the Doane-Seward textbook? Defend your choice.

Since the pages are numbered, a simple random sample would be quite easy. Have Excel print  $n$  random integers between 001 and 773 (or whatever the length of the book is). You would want to exclude the table of contents, appendixes, indexes, and so on). Another good choice would be a systematic sample (e.g., every 20<sup>th</sup> page starting at page 17) or a variation on such as every page divisible by 20. These methods would be unbiased. Possible cases could be made for cluster or stratified samples (e.g., by chapter or topical area) but these might offer little gain.

*AACSB: Reflective thinking*

*Bloom's Taxonomy: Synthesis & evaluation*

*Difficulty: Medium*

*Learning Objective: Explain the common sampling methods and how to implement them.*

*Topic: Sampling methods and their uses*

91. How would you design a study to see whether drivers using hands-free cell phones are distracted enough to slow their reactions to emergency situations? How would you collect data?

Don't use direct observation of drivers (too dangerous). Tests using a simulator would permit data to be collected automatically on reaction times to emergencies. This would permit stratified sampling by driver characteristics (e.g., age group, gender, cell phone type). Many answers are possible. The emphasis should be on how carefully the student has thought about the question. Beware of simplistic answers or impossible data collection schemes.

*AACSB: Reflective thinking*

*Bloom's Taxonomy: Synthesis & evaluation*

*Difficulty: Hard*

*Learning Objective: Describe basic elements of survey design; survey types; and sources of error.*

*Topic: Survey principles and data collection*

92. Explain the concept of a focus group. In what ways does a focus group resemble a survey? Why is a moderator desirable? What else is required to make a successful focus group?

Data collected in a focus group are richer in qualitative details, and may contain information that would be missed in a survey. Yet a focus group is like a survey in that it seeks to extract useful information and patterns from individuals. Participants are not chosen completely at random, but rather are selected to represent different backgrounds and diverse viewpoints of interest to the researchers. A well-trained moderator can help keep the group on track and to manage interpersonal issues that may arise.

*AACSB: Reflective thinking*

*Bloom's Taxonomy: Synthesis & evaluation*

*Difficulty: Medium*

*Learning Objective: Describe basic elements of survey design; survey types; and sources of error.*

*Topic: Survey principles and data collection*