Essential Statistics in Business and Economics 3rd edition Doane Test Bank

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Essential Statistics in Business and Economics, 3e **(Doane)**
Chapter 2 Data Collection

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

Answer: TRUE
Explanation: Categories are nominal data but may sometimes also be ranked (e.g., sophomore, junior, senior).
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

2) Numerical data can be either discrete or continuous.

Answer: TRUE
Explanation: Numerical data can be counts (e.g., cars owned) or continuous measures (e.g., height).
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: Categories are nominal data (nonnumerical), sometimes called qualitative data.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: FALSE
Explanation: Integers are numerical data.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: Integers are discrete numerical data.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: FALSE
Explanation: Weight is measured on a continuous scale.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: FALSE
Explanation: "Number of" is ratio data because a zero exists.
Difficulty: 1 Easy
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Apply
AACSB: Analytical Thinking
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8) Nominal data refer to data that can be ordered in a natural way.

Answer: FALSE
Explanation: Nominal (categorical) data would be called ordinal only if categories can be ranked.
Difficulty: 1 Easy
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: FALSE
Explanation: The "number of" anything is discrete.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: FALSE
Explanation: Some statistical operations are restricted unless you have ratio or interval data.
Difficulty: 1 Easy
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Understand
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11) Your weight recorded at your annual physical would *not* be ratio data, because you cannot have zero weight.

Answer: FALSE
Explanation: Zero is only a reference point, not necessarily an observable data value.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: Categorical and nominal are equivalent terms.
Difficulty: 1 Easy
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: For temperature, scale distances are meaningful (20 to 25 is the same as 50 to 55 degrees), and 0 degrees Fahrenheit does not mean the absence of heat, so it is not a ratio measurement.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: True zero exists as a reference point, whether or not it is observed.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
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15) The *Statistical Abstract of the United States* is a huge annual compendium of data for the United States, and it is available online free of charge.

Answer: FALSE
Explanation: In 2012 the U.S. Census Bureau ceased publishing this free compendium of data, but students can buy it for $199 from a private publisher.
Difficulty: 1 Easy
Topic: 02.05 Data Sources
Learning Objective: 02-08 Find everyday print or electronic data sources.
Bloom's: Remember
AACSB: Technology
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: You can always go back to a lower level of measurement (but not vice versa).
Difficulty: 1 Easy
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: FALSE
Explanation: No true zero point exists on a Likert scale.
Difficulty: 1 Easy
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: Likert scales are used in all kinds of surveys.
Difficulty: 1 Easy
Topic: 02.02 Level of Measurement
Learning Objective: 02-05 Recognize a Likert scale and know how to use it.
Bloom's: Remember
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19) Ordinal data are data that can be ranked based on some natural characteristic of the items.

Answer: TRUE
Explanation: For example, the eras Jurassic, Paleozoic, and Mesozoic can be ranked in time.
Difficulty: 1 Easy
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: The true zero is a reference that need not be observable.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: FALSE
Explanation: A census may flounder on cost and time, while samples can be quick and accurate.
Difficulty: 2 Medium
Topic: 02.03 Sampling Concepts
Learning Objective: 02-06 Use the correct terminology for samples and populations.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

22) Judgment sampling and convenience sampling are nonrandom sampling techniques.

Answer: TRUE
Explanation: To be random, every item must have the same chance of being chosen.
Difficulty: 1 Easy
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
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23) A problem with judgment sampling is that the sample may not reflect the population.

Answer: TRUE
Explanation: While better than mere convenience, judgment may still have flaws.
Difficulty: 1 Easy
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: A census may flounder on cost and time, while samples can be quick and accurate.
Difficulty: 1 Easy
Topic: 02.03 Sampling Concepts
Learning Objective: 02-06 Use the correct terminology for samples and populations.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: FALSE
Explanation: Sampling error is unavoidable, though it can be reduced by careful sampling.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: Only some portion of the population may be targeted (e.g., independent voters).
Difficulty: 2 Medium
Topic: 02.03 Sampling Concepts
Learning Objective: 02-06 Use the correct terminology for samples and populations.
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27) By taking a systematic sample, in which we select every 50th shopper arriving at a specific store, we are approximating a random sample of shoppers.

Answer: TRUE
Explanation: There is no bias if this method is implemented correctly.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

28) A worker collecting data from every other shopper who leaves a store on Monday during the noon hour is taking a random sample of customer opinion.

Answer: FALSE
Explanation: Not unless the target population is customers who shopped during the noon hour on Monday (these customers may not be typical of all customers). Also, this is a systematic (not simple) random sample.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

29) Creating a list of people by taking the third name listed on every 10th page of the phone book is an example of convenience sampling.

Answer: FALSE
Explanation: This resembles two-stage cluster sampling combined with systematic sampling.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
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30) Internet surveys posted on popular websites have no bias since anyone can reply.

Answer: FALSE
Explanation: Self-selection bias exists (respondents may be atypical).
Difficulty: 2 Medium
Topic: 02.06 Surveys
Learning Objective: 02-09 Describe basic elements of survey types, survey designs, and response scales.
Bloom's: Understand
AACSB: Technology
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: Data collected and recorded over time would be a time series.
Difficulty: 2 Medium
Topic: 02.01 Variables and Data
Learning Objective: 02-03 Explain the difference between time series and cross-sectional data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: An example would be sampling voters randomly within random zip codes.
Difficulty: 1 Easy
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
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33) An advantage of a systematic sample is that no list of enumerated data items is required.

Answer: TRUE
Explanation: Systematic sampling works with a list (like random sampling) but also without one.
Difficulty: 1 Easy
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: Phone surveys are cheaper, but suffer from these weaknesses.
Difficulty: 1 Easy
Topic: 02.06 Surveys
Learning Objective: 02-09 Describe basic elements of survey types, survey designs, and response scales.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: FALSE
Explanation: Mail surveys have low response rates and invite self-selection bias.
Difficulty: 1 Easy
Topic: 02.06 Surveys
Learning Objective: 02-09 Describe basic elements of survey types, survey designs, and response scales.
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36) A problem with convenience sampling is that the target population is not well-defined.

Answer: TRUE
Explanation: Convenience sampling is quick but not random, and the target population is unclear.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: TRUE
Explanation: Data for individuals would be a cross section (not a time series).
Difficulty: 2 Medium
Topic: 02.01 Variables and Data
Learning Objective: 02-03 Explain the difference between time series and cross-sectional data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: FALSE
Explanation: The "number of" anything is ratio data because a true zero reference point exists.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
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39) Internet surveys posted on popular websites suffer from nonresponse bias.

Answer: TRUE
Explanation: Nonresponse or self-selection bias is rampant in such surveys.
Difficulty: 2 Medium
Topic: 02.06 Surveys
Learning Objective: 02-09 Describe basic elements of survey types, survey designs, and response scales.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

40) Different variables are usually shown as *columns* of a multivariate data set.

Answer: TRUE
Explanation: It is customary to use a *column* for each variable, while each row is an *observation*.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-01 Use basic terminology for describing data and samples.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

41) Each *row* in a multivariate data matrix is an observation (e.g., an individual response).

Answer: TRUE
Explanation: It is customary to use a *column* for each variable, while each row is an *observation*.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-01 Use basic terminology for describing data and samples.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

42) A bivariate data set has only two observations on a variable.

Answer: FALSE
Explanation: Bivariate refers to the number of *variables*, not the number of *observations*.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-01 Use basic terminology for describing data and samples.
Bloom's: Remember
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43) Running times for 3,000 runners in a 5k race would be a multivariate data set.

Answer: FALSE
Explanation: Regardless of the number of *observations*, we have only one *variable* (running time).
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-01 Use basic terminology for describing data and samples.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

44) Running times for 500 runners in a 5k race would be a univariate data set.

Answer: TRUE
Explanation: Regardless of the number of *observations*, we have only one *variable* (running time).
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-01 Use basic terminology for describing data and samples.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

45) A list of the salaries, ages, and years of experience for 50 CEOs is a multivariate data set.

Answer: TRUE
Explanation: We would have a data matrix with 50 rows and 3 columns.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-01 Use basic terminology for describing data and samples.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

46) The daily closing price of Apple stock over the past month would be a time series.

Answer: TRUE
Explanation: Data collected over time is a time series.
Difficulty: 2 Medium
Topic: 02.01 Variables and Data
Learning Objective: 02-03 Explain the difference between time series and cross-sectional data.
Bloom's: Apply
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47) The number of words on 50 randomly chosen textbook pages would be cross-sectional data.

Answer: TRUE
Explanation: Data were not collected over time, so we have cross-sectional data.
Difficulty: 2 Medium
Topic: 02.01 Variables and Data
Learning Objective: 02-03 Explain the difference between time series and cross-sectional data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

48) A Likert scale with an even number of scale points between "Strongly Agree" and "Strongly Disagree" is intended to prevent "neutral" choices.

Answer: TRUE
Explanation: An even number of scale points (e.g., 4) forces the respondent to "lean" toward one end of the scale or the other.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-05 Recognize a Likert scale and know how to use it.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

49) Private statistical databases (e.g., CRSP) are usually free.

Answer: FALSE
Explanation: Private research databases generally require a subscription (often expensive).
Difficulty: 1 Easy
Topic: 02.05 Data Sources
Learning Objective: 02-08 Find everyday print or electronic data sources.
Bloom's: Remember
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50) 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

Answer: B
Explanation: Ranks are clear, but interval would require assumed equal scale distances (doubtful).
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Evaluate
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

51) 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)

Answer: D
Explanation: A Likert scale has no true zero. The other examples do.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

52) 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

Answer: D
Explanation: Fuel economy is numerical. The others are categorical.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Apply
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53) Measurements from a sample are called
A) statistics.
B) inferences.
C) parameters.
D) variables.

Answer: A
Explanation: A measurement calculated from a sample is a statistic.
Difficulty: 1 Easy
Topic: 02.04 Sampling Methods
Learning Objective: 02-06 Use the correct terminology for samples and populations.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

54) Quantitative variables use which two levels of measurement?
A) Ordinal and ratio
B) Interval and ordinal
C) Nominal and ordinal
D) Interval and ratio

Answer: D
Explanation: Numerical (quantitative) data can be interval or ratio.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

55) Temperature in degrees Fahrenheit is an example of a(n) _____ variable.
A) nominal
B) ordinal
C) interval
D) ratio

Answer: C
Explanation: No true zero exists in temperature measurements except on the Kelvin scale.
Difficulty: 1 Easy
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Apply
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56) 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.

Answer: D
Explanation: Generalizing from a sample to a population is an inference.
Difficulty: 1 Easy
Topic: 02.03 Sampling Concepts
Learning Objective: 02-06 Use the correct terminology for samples and populations.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

57) Your telephone area code is an example of a(n) _____ variable.
A) nominal
B) ordinal
C) interval
D) ratio

Answer: A
Explanation: Area codes are not ranked, so they are merely nominal (i.e., categorical).
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

58) 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 eBay purchase

Answer: A
Explanation: Ratings on a Likert scale have no meaningful zero.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
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59) Automobile exhaust emission of CO_2 (milligrams per mile) is _____ data.
A) nominal
B) ordinal
C) interval
D) ratio

Answer: D
Explanation: Meaningful zero emissions are possible (e.g., electric car) so ratio.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

60) Your rating of the food served at a local restaurant using a three-point scale of 0 = gross, 1 = decent, 2 = yummy is _____ data.
A) nominal
B) ordinal
C) interval
D) ratio

Answer: B
Explanation: Only rankings are implied (not equal scale distances).
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

61) The number of passengers "bumped" on a particular airline flight is _____ data.
A) nominal
B) ordinal
C) interval
D) ratio

Answer: D
Explanation: A true zero point exists (no passengers might be bumped).
Difficulty: 1 Easy
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
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62) 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

Answer: C
Explanation: Counting things yields integer (discrete) data.
Difficulty: 2 Medium
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

63) 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.

Answer: C
Explanation: The "number of" anything is a discrete *numerical* variable.
Difficulty: 2 Medium
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

64) 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.

Answer: B
Explanation: A true zero exists as a reference point (even if not observed), so ratios have meaning.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-04 Recognize levels of measurement in data and ways of coding data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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65) 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.

Answer: C
Explanation: Review the characteristics of each sampling method.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

66) 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.

Answer: A
Explanation: Marketers use Likert scales and try to make scales with meaningful intervals.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-05 Recognize a Likert scale and know how to use it.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

67) 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.

Answer: B
Explanation: Sampling involves error, though it can be minimized by proper methodology.
Difficulty: 2 Medium
Topic: 02.03 Sampling Concepts
Learning Objective: 02-06 Use the correct terminology for samples and populations.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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68) 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 nonresponse bias.

Answer: B
Explanation: Selection bias occurs when respondents are atypical.
Difficulty: 2 Medium
Topic: 02.06 Surveys
Learning Objective: 02-09 Describe basic elements of survey types, survey designs, and response scales.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

69) 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 the population is conveniently located.
C) time is short and the sampling budget is limited.
D) the population is readily accessible and sampling is nondestructive.

Answer: C
Explanation: Judgment sampling can save time and may be better than mere convenience.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Understand
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70) 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.

Answer: D
Explanation: Convenience samples are quick, with a possible trade-off of accuracy.
Difficulty: 1 Easy
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

71) 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) Judgment sample.
D) Stratified sample.

Answer: D
Explanation: From the cockpit, pilots can't assess external noise levels, so a radio survey of pilots is not useful. Measurements must be taken from the ground. No list is available for the unpredictable mix of departing flights, so we cannot use a simple random sample. A judgment sample would not provide an objective basis for assessing fines. A reasonable option would be for ground observers to record the aircraft size, type, and carrier (airline) for each departing flight for a week and use this information to construct a stratified sample.
Difficulty: 3 Hard
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Evaluate
AACSB: Analytical Thinking
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72) 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

Answer: D
Explanation: It may be quick but no judgment is involved and may not be representative of all students.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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

Answer: B
Explanation: This is a classic systematic sample from an accessible but unlisted population.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Apply
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74) 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

Answer: D
Explanation: Random numbers are cheap (e.g., Excel's =RANDBETWEEN function).
Difficulty: 2 Medium
Topic: 02.03 Sampling Concepts
Learning Objective: 02-06 Use the correct terminology for samples and populations.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

75) Comparing a census of a large population to a sample drawn from it, we expect that the
A) sample is usually a more practical method of obtaining the desired information.
B) accuracy of the observations in the census is surely higher than in the sample.
C) sample must be a large fraction of the population to be accurate.

Answer: A
Explanation: Census is often impractical, while samples can be extremely accurate.
Difficulty: 2 Medium
Topic: 02.03 Sampling Concepts
Learning Objective: 02-06 Use the correct terminology for samples and populations.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

76) 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.

Answer: C
Explanation: Identifiable strata such as gender, ethnicity, or region can be used.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
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77) 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.

Answer: A
Explanation: Each item must have the same chance of being picked if the sample is random.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

78) 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.

Answer: D
Explanation: Convenience samples are often used because they are quick (but maybe not accurate).
Difficulty: 1 Easy
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
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79) To measure satisfaction with its cell phone service, AT&T takes a stratified sample of its customers by age, gender, and location. Which is an advantage of this type of sampling, as opposed to other sampling methods?
A) It is less intrusive on customers' privacy.
B) It does not require random numbers.
C) It gives faster results.
D) It can give more accurate results.

Answer: D
Explanation: Stratified sampling can yield more complete and accurate information.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Analyze
AACSB: Diversity
Accessibility: Keyboard Navigation

80) 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

Answer: D
Explanation: She may bias the estimate because only accounting students were surveyed.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Apply
AACSB: Analytical Thinking
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81) A binary variable (also called a dichotomous variable or dummy variable) has
A) only two possible values.
B) continuous scale values.
C) rounded data values.
D) ordinal or interval values.

Answer: A
Explanation: Binary variables are used in every field of business to code qualitative (nominal) data.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

82) 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.

Answer: B
Explanation: Identifiable strata call for stratified sampling if you can afford the extra time and cost.
Difficulty: 3 Hard
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Apply
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83) A manager chose two people from her 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

Answer: C
Explanation: Expert judgment may be better than just pointing a finger (we hope).
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

84) 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.

Answer: C
Explanation: Sampling *error* cannot be eliminated, but sampling *bias* can be avoided.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Understand
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85) 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.

Answer: A
Explanation: Strata based on location can be targeted through cluster sampling.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

86) 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.

Answer: C
Explanation: On average, we would expect each number to occur around five times.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Apply
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87) A problem with nonrandom 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.

Answer: B
Explanation: Only random sampling gives every item the same chance to be picked.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

88) 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.

Answer: C
Explanation: Two-stage cluster sampling is being used (a special form of stratification).
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Apply
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89) Which of the following is a *correct* statement?
A) Choosing the third person listed on every fifth 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.

Answer: B
Explanation: Review the sampling methods and their characteristics.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Analyze
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

90) Which of the following is *false*?
A) Sampling error is the difference between the true parameter and the sample estimate.
B) Sampling error is a result of unavoidable random variation in a sample.
C) A sampling frame is chosen from the target population in a statistical study.
D) The target population must first be defined by a full list or data file of all individuals.

Answer: D
Explanation: Review the terminology of sampling.
Difficulty: 2 Medium
Topic: 02.03 Sampling Concepts
Learning Objective: 02-06 Use the correct terminology for samples and populations.
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91) 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.

Answer: B
Explanation: In sampling without replacement the items chosen are not independent. Statistics formulas usually assume replacement to ensure unbiased estimates.
Difficulty: 1 Easy
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

92) 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

Answer: D
Explanation: Quick and easy may trump true random sampling for a busy journalist.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Apply
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93) 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 nonrandom but can probe issues more deeply.
D) Surveys posted on popular websites suffer from selection bias.

Answer: B
Explanation: Coverage error is when you miss some segment of the target population.
Difficulty: 2 Medium
Topic: 02.06 Surveys
Learning Objective: 02-09 Describe basic elements of survey types, survey designs, and response scales.
Bloom's: Understand
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

94) 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

Answer: B
Explanation: If $x_1, x_2, \ldots, x_n$ do not refer to n time periods, it isn't a time series.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-03 Explain the difference between time series and cross-sectional data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

95) 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.

Answer: C
Explanation: We usually put observations in *rows* on a spreadsheet, while each *column* is a variable.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-01 Use basic terminology for describing data and samples.
Bloom's: Remember
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96) 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.

Answer: C
Explanation: When you have more than two variables, it is multivariate data.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-01 Use basic terminology for describing data and samples.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

97) The Centers for Disease Control and Prevention (CDC) wants to estimate the average extra hospital stay that occurs when heart surgery patients experience postoperative atrial fibrillation. They divide the United States into nine 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

Answer: C
Explanation: Identifiable strata were sampled, but also random sampling within strata and regional clusters was used.
Difficulty: 3 Hard
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Evaluate
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98) Which statement is correct?
A) Selecting every fifth 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.

Answer: A
Explanation: Done carefully, systematic sampling is close to random when there is no list.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Evaluate
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

99) Which is a categorical variable?
A) The brand of jeans you usually wear
B) The price you paid for your last pair of jeans
C) The distance to the store where you purchased your last pair of jeans
D) The number of pairs of jeans that you own

Answer: A
Explanation: Categories have only names (e.g., Calvin Klein).
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

100) Which is a discrete variable?
A) The time it takes to put on a pair of jeans
B) The price you paid for your last pair of jeans
C) The distance to the store where you purchased your last pair of jeans
D) The number of pairs of jeans that you own

Answer: D
Explanation: The "number of" anything is discrete numerical data.
Difficulty: 1 Easy
Topic: 02.01 Variables and Data
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Remember
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101) A section of the population we have targeted for analysis is
A) a statistic.
B) a frame.
C) a sample.
D) a coven.

Answer: B
Explanation: We must define the segment we want to look at (e.g., independent voters).
Difficulty: 1 Easy
Topic: 02.03 Sampling Concepts
Learning Objective: 02-06 Use the correct terminology for samples and populations.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

102) Which is *not* a time series variable?
A) Closing checkbook balances of 30 students on December 31 of this year
B) Net earnings reported by Xena Corp. for the last 10 quarters
C) Dollar/euro exchange rates at 12 noon GMT for the last 30 days
D) Movie attendance at a certain theater for each Saturday last year

Answer: A
Explanation: If $x_1, x_2, \ldots, x_n$ do not refer to n time periods, it is not a time series.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-03 Explain the difference between time series and cross-sectional data.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

103) A good Likert scale may *not* have
A) unequal distances between scale points.
B) an odd number of scale points.
C) a verbal label on each scale point.
D) verbal anchors at its end points.

Answer: A
Explanation: Surveys try to create scales with meaningful intervals.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-02 Explain the difference between numerical and categorical data.
Bloom's: Remember
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104) A Likert scale with an odd number of scale points between "Strongly Agree" and "Strongly Disagree"
A) cannot have equal scale distances.
B) cannot have a neutral middle point.
C) must have a verbal label on each scale point.
D) is often used in marketing surveys.

Answer: D
Explanation: Likert scales should have arguably equal intervals. A middle neutral response is possible with an odd number of scale points (e.g., 5 or 7).
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-05 Recognize a Likert scale and know how to use it.
Bloom's: Apply
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

105) A Likert scale with an even number of scale points between "Strongly Agree" and "Strongly Disagree"
A) cannot have equal scale distances.
B) is intended to prevent "neutral" choices.
C) must have a verbal label on each scale point.
D) is rarely used in surveys.

Answer: B
Explanation: Likert scales should have arguably equal intervals. An even number of scale points (e.g., 4) forces the respondent to "lean" toward one end of the scale or the other.
Difficulty: 2 Medium
Topic: 02.02 Level of Measurement
Learning Objective: 02-05 Recognize a Likert scale and know how to use it.
Bloom's: Apply
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106) Which statement is correct?
A) Analysts rarely consult business periodicals (e.g., Bloomberg Businessweek).
B) Web searches (e.g., Google) often yield unverifiable data.
C) Government data sources (e.g., www.bls.gov) are often costly.
D) Private statistical databases (e.g., CRSP) are usually free.

Answer: B
Explanation: Periodicals are often up-to-date and readily available data sources. Web data may be unreliable, and searches may be directed toward obtaining payment for data. Private research databases generally require a subscription, while government data sources generally are free.
Difficulty: 1 Easy
Topic: 02.05 Data Sources
Learning Objective: 02-08 Find everyday print or electronic data sources.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

107) Which statement is correct?
A) Analysts avoid business periodicals (e.g., Bloomberg Businessweek).
B) Web searches (e.g., Google) yield reliable and easily verified data.
C) Government data sources (e.g., www.bls.gov) usually are free.
D) Private statistical databases (e.g., CRSP) usually are free.

Answer: C
Explanation: Periodicals are often up-to-date and readily available data sources. Web data may be unreliable, and searches may be directed toward obtaining payment for data. Private research databases generally require a subscription, while government data sources generally are free.
Difficulty: 1 Easy
Topic: 02.05 Data Sources
Learning Objective: 02-08 Find everyday print or electronic data sources.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

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108) A *valid* survey is one that
A) measures what the researcher wants to measure.
B) has been approved by top management.
C) is administered by a professional statistician.
D) has a large number of questions.

Answer: A
Explanation: There is no need for a large number of questions, although the survey must be tested to be sure it measures what the researcher wants to know.
Difficulty: 1 Easy
Topic: 02.06 Surveys
Learning Objective: 02-09 Describe basic elements of survey types, survey designs, and response scales.
Bloom's: Remember
AACSB: Analytical Thinking
Accessibility: Keyboard Navigation

109) A *reliable* survey is one that
A) is administered by trusted employees.
B) has been approved by quality engineers.
C) gives consistent measurements.
D) has many easy questions.

Answer: A
Explanation: Over time and across groups of similar respondents, a reliable survey should give consistent results (within expected ranges of statistical variation).
Difficulty: 1 Easy
Topic: 02.06 Surveys
Learning Objective: 02-09 Describe basic elements of survey types, survey designs, and response scales.
Bloom's: Remember
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110) Which survey method would you recommend to survey opinions of airline passengers about the cleanliness of the restrooms in the Detroit airport? Why not the others?

Answer: 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 nonresponse 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.
Explanation: Restroom users are usually in a hurry and do not wish to talk to anyone while entering or leaving the facility, so direct observation or handout surveys would not work. A questionnaire could be e-mailed or mailed to a sample of frequent flyers. No telephone surveys, because people would distrust the call. A web survey would have nonresponse bias.
Difficulty: 3 Hard
Topic: 02.06 Surveys
Learning Objective: 02-09 Describe basic elements of survey types, survey designs, and response scales.
Bloom's: Evaluate
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

111) 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.

Answer: 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 20th page starting at page 17) or a variation 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.
Explanation: Pages are numbered, so a simple random sample would be easy, or a systematic sample (e.g., every 20th page starting at page 17). Case could be made for cluster or stratified samples (e.g., by chapter or topic).
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Evaluate
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

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112) 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?

Answer: 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.
Explanation: No observation of drivers (too dangerous). Tests using a simulator would permit data to be collected automatically and would permit stratified sampling by driver characteristics (e.g., age group, gender, cell phone type).
Difficulty: 3 Hard
Topic: 02.06 Surveys
Learning Objective: 02-09 Describe basic elements of survey types, survey designs, and response scales.
Bloom's: Evaluate
AACSB: Reflective Thinking
Accessibility: Keyboard Navigation

113) 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?

Answer: 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 manage interpersonal issues that may arise.
Explanation: Data collected in a focus group are richer in qualitative details and may contain information that would be missed in a survey. A trained moderator can help keep the group on track and manage interpersonal issues that may arise.
Difficulty: 2 Medium
Topic: 02.04 Sampling Methods
Learning Objective: 02-07 Explain the common sampling methods and how to implement them.
Bloom's: Evaluate
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