Introductory Business Statistics 2nd edition Holmes Test Bank

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Introductory Business Statistics 2e

ISBN 9781711472591 | Chapter 1: Sampling and Data

Total Questions: 100

Multiple Choice

Q1.

Which statement best defines statistics as presented in the chapter?

A) The science of collecting, analyzing, interpreting, and presenting data ✓ Correct
B) The process of proving that every sample exactly matches its population
C) The study of only numerical data gathered in experiments
D) The use of formulas to eliminate uncertainty from decisions

Rationale: Statistics is defined as the science concerned with the collection, analysis, interpretation, and presentation of data.

Q2.

Organizing and summarizing data by graphs and numerical measures is called:

A) inferential statistics
B) descriptive statistics ✓ Correct
C) experimental design
D) probability sampling

Rationale: Descriptive statistics refers to organizing and summarizing data using graphs and numerical summaries.

Q3.

Using sample data and probability to draw conclusions about a population is called:

A) descriptive statistics
B) categorical analysis
C) inferential statistics ✓ Correct
D) frequency tabulation

Rationale: Inferential statistics uses probability and sample data to draw conclusions about a population.

Q4.

Probability is best described as:

A) a method for classifying variables as categorical or numerical
B) a mathematical tool used to study randomness and the likelihood of events ✓ Correct
C) a graph used to compare percentages across categories
D) a number that summarizes a sample characteristic

Rationale: Probability studies randomness and quantifies the chance that an event will occur.

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Q5.

In statistics, a population is:

A) every outcome actually observed in a study
B) a subset selected for measurement
C) the entire collection of persons, objects, or measurements under study ✓ Correct
D) the numerical summary computed from a sample

Rationale: A population includes all individuals, objects, or measurements whose properties are being studied.

Q6.

A sample is:

A) the complete set of all possible observations
B) a subset of the population selected for study ✓ Correct
C) a numerical characteristic of a population
D) a method for assigning treatments in an experiment

Rationale: A sample is the portion of the population that is actually studied.

Q7.

A parameter is:

A) a numerical characteristic of a population ✓ Correct
B) a graph of relative frequencies
C) a numerical characteristic of a sample
D) a variable measured on an ordinal scale

Rationale: A parameter describes a population numerically, such as a population mean or proportion.

Q8.

A statistic is:

A) a numerical characteristic of a population
B) a numerical characteristic computed from a sample ✓ Correct
C) the process of collecting data from volunteers
D) the difference between two treatments

Rationale: A statistic is a number calculated from sample data and used to estimate a population parameter.

Q9.

Which notation is most commonly used in the chapter for a variable or random variable?

A) lowercase letters such as a and b
B) Roman numerals
C) capital letters such as X and Y ✓ Correct
D) Greek letters only

Rationale: Variables or random variables are usually denoted by capital letters such as X and Y.

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Q10.

Data are best defined as:

A) the labels assigned to population groups only
B) the actual observed values of a variable ✓ Correct
C) the formulas used to summarize a sample
D) the causes of variation in an experiment

Rationale: Data are the actual values observed for a variable and may be numerical or categorical.

Q11.

A single observed value is called a:

A) parameter
B) frequency
C) datum ✓ Correct
D) stratum

Rationale: Datum is the singular form referring to one observed value.

Q12.

Which pair of words is commonly used interchangeably in practice, according to the chapter note?

A) sample and population
B) mean and average ✓ Correct
C) frequency and proportion
D) variable and datum

Rationale: The chapter notes that mean and average are often used interchangeably in common usage.

Q13.

Qualitative data are also commonly called:

A) interval data
B) continuous data
C) categorical data ✓ Correct
D) ratio data

Rationale: Qualitative data are also referred to as categorical data because they classify observations into categories.

Q14.

Which of the following is an example of qualitative data?

A) pulse rate
B) weight in pounds
C) blood type ✓ Correct
D) distance traveled

Rationale: Blood type is a category label rather than a numerical measurement.

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Q15.

Quantitative data are always:

A) categories
B) ordered ranks
C) numbers ✓ Correct
D) survey opinions

Rationale: Quantitative data are numerical values resulting from counting or measuring.

Q16.

Data that result from counting are classified as:

A) quantitative continuous
B) quantitative discrete ✓ Correct
C) qualitative nominal
D) qualitative ordinal

Rationale: Counting produces discrete quantitative data because only certain numerical values are possible.

Q17.

Data that may include fractions, decimals, or irrational numbers are classified as:

A) quantitative continuous ✓ Correct
B) quantitative discrete
C) qualitative categorical
D) nominal only

Rationale: Continuous data arise from measurement and can include decimals or other non-count values.

Q18.

Which of the following is a quantitative discrete variable?

A) time to complete a phone call
B) weight of a backpack
C) number of books carried ✓ Correct
D) temperature in Celsius

Rationale: The number of books is obtained by counting and therefore is discrete quantitative data.

Q19.

Which of the following is a quantitative continuous variable?

A) number of machines in a gym
B) type of calculator used
C) color of a backpack
D) area of a lawn in square feet ✓ Correct

Rationale: Area is measured and can take a continuum of values, so it is quantitative continuous data.

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Q20.

Which graph is specifically described as using wedges in a circle proportional to category percentages?

A) histogram
B) Pareto chart
C) pie chart ✓ Correct
D) scatterplot

Rationale: A pie chart represents categories as wedges sized according to their proportions or percentages.

Q21.

A Pareto chart is a bar graph in which the bars are arranged:

A) alphabetically by category name
B) from smallest to largest by category size
C) from largest to smallest by category size ✓ Correct
D) in random order to reduce bias

Rationale: A Pareto chart orders bars from the largest category to the smallest.

Q22.

When category percentages add to more than 100% because individuals can belong to multiple categories, which display is appropriate?

A) pie chart only
B) bar graph ✓ Correct
C) stem-and-leaf plot
D) box plot

Rationale: A bar graph is appropriate because pie charts require category percentages to sum to 100%.

Q23.

Which statement best describes simple random sampling?

A) Each sample of the same size has an equal chance of being selected ✓ Correct
B) The researcher chooses the easiest individuals to reach
C) The population is divided into clusters and all clusters are included
D) Every nth person is chosen without a random starting point

Rationale: In a simple random sample, any group of n individuals is equally likely to be chosen.

Q24.

In stratified sampling, the population is first divided into:

A) intervals
B) clusters called treatments
C) groups called strata ✓ Correct
D) ordered ranks called frequencies

Rationale: Stratified sampling begins by dividing the population into strata and then sampling from each stratum.

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Q25.

In cluster sampling, the researcher:

A) selects every kth individual from a list

B) divides the population into groups and includes all members from selected groups ✓ Correct

C) takes a proportionate number from each subgroup

D) interviews only volunteers

Rationale: Cluster sampling involves randomly selecting clusters and including all individuals within the chosen clusters.

Q26.

Systematic sampling is best described as:

A) choosing a random start and then selecting every nth individual from a list ✓ Correct

B) selecting only respondents who return a mailed survey

C) numbering all categories and choosing one category only

D) taking equal numbers from each subgroup without randomness

Rationale: Systematic sampling uses a random starting point and then selects every nth member from the ordered list.

Q27.

Convenience sampling is a:

A) random method that guarantees representativeness

B) nonrandom method based on readily available individuals ✓ Correct

C) method requiring equal numbers from all strata

D) type of double-blind assignment

Rationale: Convenience sampling uses easily accessible individuals and is nonrandom.

Q28.

Sampling bias occurs when:

A) the sample size is larger than the population

B) all members of the population have an equal chance of selection

C) some members of the population are less likely to be selected than others ✓ Correct

D) the relative frequencies sum to exactly one

Rationale: Sampling bias arises when selection chances are unequal across members of the population.

Q29.

Sampling error refers to:

A) human mistakes such as faulty data entry

B) natural variation resulting from using a sample to represent a population ✓ Correct

C) the use of a placebo in an experiment

D) the inability to rank nominal data

Rationale: Sampling error is the natural variability that occurs because a sample, rather than the whole population, is observed.

Q30.

Which statement about sample size and sampling error is correct?

A) Larger samples generally increase sampling error
B) Sampling error disappears completely in random samples
C) Larger samples generally reduce sampling error ✓ Correct
D) Sampling error occurs only in convenience samples

Rationale: As a general rule, larger samples more closely represent the population and therefore reduce sampling error.

Q31.

A defective counting device is an example of:

A) sampling error
B) nonsampling error ✓ Correct
C) stratified bias
D) random assignment

Rationale: A defective counting device affects reliability but is not caused by the act of sampling, so it is a nonsampling error.

Q32.

True random sampling is theoretically done:

A) without replacement only
B) with replacement ✓ Correct
C) by convenience methods
D) by assigning all units to one cluster

Rationale: The chapter states that true random sampling is done with replacement, although practice often differs.

Q33.

In practice, surveys are usually conducted:

A) with replacement because duplicates are preferred
B) without replacement because a member is typically chosen only once ✓ Correct
C) only through self-selected response
D) only with cluster sampling

Rationale: Most practical surveys sample without replacement so the same member is not selected repeatedly.

Q34.

Which of the following is identified as a common problem in critical evaluation of studies?

A) Using a representative sample
B) Random assignment of treatments
C) Self-selected samples ✓ Correct
D) Reporting percentages with counts

Rationale: Self-selected samples are specifically listed as often unreliable because respondents choose whether to participate.

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Q35.

A relationship between two variables does not necessarily imply:

A) frequency
B) causality ✓ Correct
C) measurement
D) sampling variation

Rationale: The chapter emphasizes that association or correlation does not by itself establish cause and effect.

Q36.

Confounding refers to a situation in which:

A) all categories are mutually exclusive and exhaustive
B) multiple factors affect a response and their effects cannot be separated ✓ Correct
C) the cumulative relative frequency equals one
D) the sample is selected with replacement

Rationale: Confounding occurs when the effects of multiple factors on the response cannot be disentangled.

Q37.

The four levels of measurement from lowest to highest are:

A) ordinal, nominal, interval, ratio
B) nominal, ordinal, ratio, interval
C) nominal, ordinal, interval, ratio ✓ Correct
D) categorical, numerical, interval, ratio

Rationale: The chapter orders the levels of measurement as nominal, ordinal, interval, and ratio.

Q38.

Which level of measurement applies to data consisting of names, labels, and categories with no meaningful order?

A) nominal ✓ Correct
B) ordinal
C) interval
D) ratio

Rationale: Nominal data are categorical and have no inherent order.

Q39.

Which level of measurement applies when data can be ranked, but differences between ranks are not measurable?

A) nominal
B) ordinal ✓ Correct
C) interval
D) ratio

Rationale: Ordinal data have a meaningful order, but the distances between categories are not quantified.

Q40.

Temperature measured in Celsius or Fahrenheit is an example of which level of measurement?

A) nominal
B) ordinal
C) interval ✓ Correct
D) ratio

Rationale: Interval data have meaningful differences but no true zero, as with Celsius and Fahrenheit temperatures.

Q41.

Which level of measurement has a true zero and allows meaningful ratios?

A) nominal
B) ordinal
C) interval
D) ratio ✓ Correct

Rationale: Ratio-level data have an absolute zero and permit meaningful ratio comparisons.

Q42.

A frequency is:

A) the proportion of observations at or below a value
B) the number of times a data value occurs ✓ Correct
C) the sum of all relative frequencies below a value
D) a ranking of categories from highest to lowest

Rationale: Frequency counts how often each data value appears.

Q43.

Relative frequency is calculated by:

A) adding all previous frequencies
B) dividing the class width by the total sample size
C) dividing a value's frequency by the total number of observations ✓ Correct
D) subtracting adjacent frequencies

Rationale: Relative frequency is the ratio of a category or value's frequency to the total number of observations.

Q44.

Cumulative relative frequency is:

A) the relative frequency of the largest class only
B) the sum of the relative frequencies for all values less than or equal to a given value ✓ Correct
C) the count of all observations above a given value
D) the average of the frequencies in the table

Rationale: Cumulative relative frequency accumulates the relative frequencies up to and including the current value or class.

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Q45.

If relative frequencies are rounded, their total may:

A) never differ from exactly one

B) be close to one rather than exactly one ✓ Correct

C) always exceed one

D) always equal the sample size

Rationale: Because of rounding, relative frequencies may not sum exactly to one but should be close to one.

Q46.

In an experiment, the variable manipulated by the researcher is the:

A) response variable

B) lurking variable

C) explanatory variable ✓ Correct

D) cumulative variable

Rationale: The explanatory, or independent, variable is the one controlled or manipulated by the researcher.

Q47.

The variable measured for change at the end of an experiment is the:

A) response variable ✓ Correct

B) stratification variable

C) sampling variable

D) control variable

Rationale: The response, or dependent, variable is the outcome measured to assess treatment effects.

Q48.

Different values or components of the explanatory variable applied in an experiment are called:

A) ratios

B) treatments ✓ Correct

C) frequencies

D) strata

Rationale: Treatments are the specific conditions or values of the explanatory variable used in the experiment.

Q49.

What is the main purpose of a control group in a randomized experiment?

A) To ensure the sample size is large enough

B) To provide an inactive comparison condition against which active treatments can be evaluated ✓ Correct

C) To rank outcomes from highest to lowest

D) To eliminate the need for random assignment

Rationale: A control group receives an inactive treatment and serves as the comparison baseline for active treatments.

Q50.

A double-blind experiment is one in which:

A) neither the sample nor the population is known

B) both subjects and researchers working with subjects do not know who receives active treatment or placebo ✓ Correct

C) all participants receive two treatments simultaneously

D) the explanatory and response variables are both hidden from analysis

Rationale: In a double-blind experiment, both participants and the researchers interacting with them are unaware of treatment assignments.

Q51.

A hospital quality director wants to estimate the mean time patients wait in the emergency department before triage. Reviewing every visit from the past year is too costly, so she randomly selects 600 visits and calculates the average wait time from those records. In this study, the average wait time from the 600 selected visits is the:

A) population parameter

B) sample statistic ✓ Correct

C) categorical variable

D) sampling frame

Rationale: The mean computed from the selected sample of 600 visits is a statistic because it summarizes the sample, not the entire population.

Q52.

A home health agency records each patient's primary language as English, Spanish, Vietnamese, or Other to assess interpreter needs. This variable is best classified as:

A) quantitative continuous

B) quantitative discrete

C) qualitative categorical ✓ Correct

D) interval scale

Rationale: Primary language places each patient into a category and is therefore qualitative categorical data.

Q53.

A clinic administrator counts the number of missed appointments each day for one month. This daily count is what type of data?

A) quantitative discrete ✓ Correct

B) quantitative continuous

C) qualitative ordinal

D) qualitative nominal

Rationale: Missed appointments are counted in whole numbers, so the data are quantitative discrete.

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Q54.
A rehabilitation unit measures patient walking distance in meters to one decimal place during discharge testing. These measurements are best classified as:

A) qualitative categorical
B) quantitative continuous ✓ Correct
C) quantitative discrete
D) ordinal

Rationale: Walking distance is measured and can take decimal values, so it is quantitative continuous data.

Q55.
A nurse researcher ranks patient satisfaction responses as poor, fair, good, and excellent. The level of measurement is:

A) nominal
B) ordinal ✓ Correct
C) interval
D) ratio

Rationale: The categories have a meaningful order, but the differences between categories are not measurable, so the scale is ordinal.

Q56.
Which statement best describes inferential statistics in healthcare research?

A) They summarize data only by tables and graphs.
B) They use sample data and probability to draw conclusions about a population. ✓ Correct
C) They eliminate all sampling error when data are collected carefully.
D) They apply only to categorical variables.

Rationale: Inferential statistics use probability and sample information to make conclusions about a larger population.

Q57.
A public health analyst reports that 18 of 60 surveyed adults received a flu vaccine this season. The value 18/60 is a:

A) mean
B) parameter
C) proportion ✓ Correct
D) cumulative frequency

Rationale: A proportion is the number of successes divided by the total number observed.

Q58.
A researcher records whether each physician in a sample has ever been named in a malpractice lawsuit, using yes or no. The variable is:

A) numerical continuous
B) numerical discrete
C) categorical ✓ Correct
D) ratio-level

Rationale: Yes/no lawsuit status is a category rather than a numerical measurement.

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Q59.
A health system wants a representative sample of nurses from medical-surgical, ICU, pediatrics, and obstetrics units, with each unit represented in proportion to its size. Which sampling method is most appropriate?

A) cluster sampling
B) convenience sampling
C) stratified sampling ✓ Correct
D) systematic sampling

Rationale: Stratified sampling divides the population into subgroups and samples proportionately from each one.

Q60.
A medical records manager has a list of 8,000 discharged charts, randomly chooses one starting record, and then audits every 40th chart. This is:

A) simple random sampling
B) systematic sampling ✓ Correct
C) cluster sampling
D) convenience sampling

Rationale: Selecting a random start and then every nth record is systematic sampling.

Q61.
An infection prevention team randomly selects 5 hospital units and reviews every patient on those units for isolation compliance. This sampling approach is:

A) cluster sampling ✓ Correct
B) stratified sampling
C) systematic sampling
D) convenience sampling

Rationale: Entire groups are randomly selected and all members within those groups are included, which is cluster sampling.

Q62.
A researcher studies staff burnout by surveying the first 75 nurses leaving the hospital cafeteria at lunch. The main concern with this design is that it uses:

A) simple random sampling
B) stratified sampling
C) convenience sampling ✓ Correct
D) systematic sampling

Rationale: The sample is based on easy availability rather than random selection, making it convenience sampling.

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Q63.

A healthcare journalist compares percentages of staff by job category across two hospitals with very different employee totals. Why are percentages especially useful here?

A) They remove all sampling bias.
B) They make groups with different total sizes easier to compare. ✓ Correct
C) They convert qualitative data into interval data.
D) They guarantee the graph will total 100%.

Rationale: Percentages standardize the data, making comparisons across groups of different sizes more meaningful.

Q64.

A community survey allows respondents to select all chronic conditions they have from a list. The percentages across conditions sum to 136%. Which graph is most appropriate for displaying the results?

A) pie chart
B) scatterplot
C) bar graph ✓ Correct
D) stem-and-leaf plot

Rationale: Because respondents can belong to multiple categories and percentages exceed 100%, a bar graph is appropriate rather than a pie chart.

Q65.

A hospital dashboard displays patient ethnicity percentages but omits the large Other/Unknown category. What is the strongest statistical concern?

A) The mean cannot be calculated.
B) The graph may mislead because categories are incomplete. ✓ Correct
C) The data must be interval rather than nominal.
D) Sampling error has been eliminated.

Rationale: Leaving out an important category can distort interpretation and create a misleading display.

Q66.

A quality analyst wants the easiest visual way to identify the most common complaint types from highest to lowest frequency. Which display is best?

A) unsorted pie chart
B) Pareto chart ✓ Correct
C) line graph
D) boxplot

Rationale: A Pareto chart orders categories from largest to smallest, making dominant categories easy to identify.

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Q67.
A nursing school wants to know the proportion of graduates who passed the licensure exam on the first attempt. They randomly sample 120 graduates and compute the pass rate. The true first-attempt pass rate for all graduates is the:

A) sample statistic
B) population parameter ✓ Correct
C) response variable
D) relative frequency

Rationale: The value describing the entire population of graduates is the population parameter.

Q68.
A survey asks patients to rate discharge instructions as excellent, good, fair, or poor. Which statement is correct?

A) The data are nominal because the labels are words.
B) The data are ordinal because the responses can be ranked. ✓ Correct
C) The data are interval because differences are measurable.
D) The data are ratio because there is a true zero.

Rationale: The categories have a natural order, so the measurement level is ordinal.

Q69.
A health plan receives 4,000 mailed satisfaction questionnaires and analyzes only the 312 that were voluntarily returned. The greatest threat to validity is:

A) sampling with replacement
B) nonresponse and self-selection bias ✓ Correct
C) cluster sampling error
D) ratio-level measurement

Rationale: People who choose to respond may differ systematically from those who do not, creating self-selection and nonresponse bias.

Q70.
A device company samples 20 infusion pumps from a shipment of 10,000 to estimate the average calibration error. Compared with a sample of 200 pumps selected the same way, the smaller sample will generally have:

A) less sampling error
B) more sampling error ✓ Correct
C) no sampling error
D) more nonsampling error by definition

Rationale: As a rule, smaller samples produce greater sampling error than larger samples.

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Q71.
A hospital epidemiologist studies whether a new hand-hygiene reminder system reduces healthcare-associated infections. The reminder system is the:

A) response variable
B) lurking variable
C) explanatory variable ✓ Correct
D) sampling error

Rationale: The explanatory variable is the factor the researcher manipulates to observe its effect on outcomes.

Q72.
In the same infection study, the monthly rate of healthcare-associated infections is the:

A) response variable ✓ Correct
B) placebo
C) cluster
D) nominal category

Rationale: The response variable is the measured outcome expected to change in response to the intervention.

Q73.
A clinical trial assigns participants by chance to receive either a new sleep medication or an inert pill that looks identical. The inert pill functions as the:

A) parameter
B) placebo ✓ Correct
C) sampling frame
D) stratum

Rationale: An inactive treatment used to mimic the active treatment is a placebo.

Q74.
In a double-blind medication trial, who does not know which participants receive the active drug?

A) Only the participants
B) Only the data analyst
C) Both participants and researchers interacting with them ✓ Correct
D) Only the prescribing physician, but not the participants

Rationale: In a double-blind experiment, both subjects and the researchers working with them are blinded.

Q75.
A hospital compares average body temperatures in degrees Fahrenheit across units. Why is Fahrenheit considered an interval scale rather than a ratio scale?

A) It is categorical rather than numerical.
B) It has ordered values but no true zero point. ✓ Correct
C) It cannot be used to compute differences.
D) It is based on counting rather than measuring.

Rationale: Temperature in Fahrenheit has meaningful differences but no absolute zero, so ratios are not meaningful.

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Q76.
A coding manager audits 50 claims from each of five payer categories to compare denial patterns. This is best described as stratified sampling because the manager:

A) selects every nth claim after a random start
B) uses only the most accessible claims
C) samples from each subgroup of interest ✓ Correct
D) includes all claims from randomly chosen payer groups

Rationale: Stratified sampling intentionally samples from each subgroup to ensure representation.

Q77.
A hospital CEO reads an online poll on the hospital website asking visitors whether parking is adequate. Why should the result be interpreted cautiously?

A) Website polls always use ratio data.
B) The sample is self-selected and may be biased. ✓ Correct
C) The sample is too large to analyze.
D) Online polls eliminate nonsampling error.

Rationale: Respondents choose whether to participate, so self-selection can make the sample unrepresentative.

Q78.
A laboratory supervisor uses a scale that is later found to be miscalibrated while measuring specimen weights. This problem is an example of:

A) sampling error
B) nonsampling error ✓ Correct
C) stratification
D) random assignment

Rationale: A defective measuring device is a nonsampling error because it is unrelated to the act of selecting the sample.

Q79.
A quality improvement team records the number of falls on each hospital unit during a month and then calculates each unit's share of all falls. Each unit's share is its:

A) relative frequency ✓ Correct
B) parameter
C) interval level
D) experimental unit

Rationale: Relative frequency is the proportion of all outcomes represented by a given category or value.

Q80.
A frequency table of patient ages includes a cumulative relative frequency of 0.72 at the end of the 40-49 age group. This means:

A) 72% of patients are exactly 49 years old
B) 72% of patients are younger than 40
C) 72% of patients are in the 40-49 group only
D) 72% of patients are age 49 or younger, based on the grouped data up to that point ✓ Correct

Rationale: Cumulative relative frequency gives the proportion at or below the current class or value.

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Q81.
A long-term care administrator wants to compare resident room types: private, semi-private, and ward. Which graph is generally appropriate for displaying these qualitative categories when all categories are included and total 100%?

A) pie chart ✓ Correct
B) scatterplot
C) histogram
D) line graph

Rationale: A pie chart is appropriate for qualitative categories that represent parts of a whole summing to 100%.

Q82.
A respiratory therapist records oxygen saturation values for a sample of patients and rounds each to the nearest whole percent. The underlying variable is still best viewed as:

A) qualitative nominal
B) quantitative continuous ✓ Correct
C) quantitative discrete
D) ordinal

Rationale: Oxygen saturation is fundamentally a measured quantity and is treated as continuous even if recorded in rounded form.

Q83.
A researcher concludes that a hospital's new wellness app caused lower employee stress because app users reported less stress than nonusers. Which issue most directly weakens this causal claim?

A) Stress is ratio-level data.
B) Correlation alone does not establish causation. ✓ Correct
C) The app is the response variable.
D) A statistic cannot estimate a parameter.

Rationale: An observed association does not prove the app caused the outcome because other factors may explain the relationship.

Q84.
A survey about telehealth satisfaction is funded and promoted by the vendor selling the telehealth platform. Which critical evaluation issue should readers especially consider?

A) systematic sampling
B) self-interest study ✓ Correct
C) cluster assignment
D) ratio scaling

Rationale: A study conducted by an interested party warrants careful review for possible bias or selective interpretation.

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Q85.

A hospital's patient safety office wants to estimate the average number of medication orders per inpatient. Which variable below matches that objective for one patient?

A) Whether the patient had any orders

B) The number of medication orders for that patient ✓ Correct

C) The average number of orders across the hospital

D) The proportion of patients with more than five orders

Rationale: A variable is the characteristic measured on each individual, here the number of medication orders for one patient.

Q86.

In an employee survey, respondents choose one department from a list: nursing, pharmacy, laboratory, environmental services, or administration. This variable is measured on what level?

A) nominal ✓ Correct

B) ordinal

C) interval

D) ratio

Rationale: Department labels are categories without inherent order, so the scale is nominal.

Q87.

A compliance officer wants a simple random sample of 100 patient charts from 5,000 charts. Which procedure best fits simple random sampling?

A) Select every 50th chart after a random start.

B) Randomly choose four hospital units and include all charts from them.

C) Use a random number generator to select 100 chart numbers from the full list. ✓ Correct

D) Review the first 100 charts available in the file room.

Rationale: Simple random sampling gives each possible sample of the same size an equal chance by randomly selecting from the full list.

Q88.

A health services researcher samples with replacement from a small list of rural clinics. What does with replacement mean in this context?

A) Any selected clinic is removed permanently from future selection.

B) The sample must be stratified by clinic size.

C) A selected clinic is returned to the population and could be chosen again. ✓ Correct

D) The sample automatically becomes unbiased.

Rationale: Sampling with replacement means a selected unit goes back into the population and may be selected more than once.

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Q89.
A manager notices two independently drawn random samples of discharged patients from the same month produce slightly different average satisfaction scores. The best interpretation is that:

A) one of the samples must be biased
B) variation between random samples is expected ✓ Correct
C) the population parameter changed during analysis
D) satisfaction is not a measurable variable

Rationale: Different random samples from the same population naturally vary, so differing sample results are expected.

Q90.
A school of nursing surveys 20 students from one advanced pharmacology class to estimate average textbook spending for all nursing students. Why is this sample likely problematic?

A) It is too random to be useful.
B) It may not represent the broader nursing student population. ✓ Correct
C) It uses a numerical variable rather than a categorical one.
D) It eliminates sampling bias by focusing on one class.

Rationale: A single class may differ from the full population, making the sample potentially unrepresentative.

Q91.
A frequency table for clinic no-show counts by patient shows frequencies of 12, 18, 10, and 10 across four categories, totaling 50 patients. The relative frequency for the second category is:

A) 0.18
B) 0.20
C) 0.36 ✓ Correct
D) 0.50

Rationale: Relative frequency equals category frequency divided by total frequency, so 18/50 = 0.36.

Q92.
A rehabilitation researcher measures grip strength in kilograms for participants before and after therapy. Which statement about this variable is most accurate?

A) It is ratio-level because it has a meaningful zero and ratios are interpretable. ✓ Correct
B) It is interval-level because zero is arbitrary.
C) It is ordinal because patients can be ranked.
D) It is nominal because units are labels.

Rationale: Grip strength has a true zero and meaningful ratios, so it is measured on a ratio scale.

Q93.
A hospital compares the proportion of patients readmitted within 30 days across service lines. Which quantity is a proportion?

A) The average length of stay on cardiology
B) The number of readmitted patients divided by the total patients in a service line ✓ Correct
C) The difference between two service-line readmission counts
D) The highest readmission count among all service lines

Rationale: A proportion is calculated by dividing the number of successes by the total number observed.

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Q94.

A study of a new anxiety intervention assigns participants randomly to intervention or usual care groups. What is the main purpose of random assignment?

A) To guarantee a larger sample size

B) To spread lurking variables across groups so treatment differences can be isolated ✓ Correct

C) To convert the study into a survey

D) To eliminate the need for a control group

Rationale: Random assignment helps balance lurking variables so observed differences are more credibly attributed to treatment.

Q95.

A research assistant asks leading questions such as, "You found the new discharge process much easier, didn't you?" This threatens validity primarily through:

A) undue influence ✓ Correct

B) cluster sampling

C) sampling with replacement

D) cumulative frequency

Rationale: Leading or suggestive wording can influence responses and is an example of undue influence.

Q96.

A hospital wants to estimate the average commuting distance of its employees. Distances are reported in miles and can include decimals. Which description is correct?

A) The variable is qualitative because locations differ.

B) The variable is quantitative continuous because distance is measured. ✓ Correct

C) The variable is quantitative discrete because miles are counted.

D) The variable is ordinal because distances can be ranked.

Rationale: Commuting distance is a measured numerical quantity and is therefore quantitative continuous.

Q97.

A state health department reviews a graph showing only percentages for smoking status categories, but the graph provides no sample size or source population. Which critical issue is most relevant?

A) lack of context can make the display misleading ✓ Correct

B) the data cannot be qualitative

C) the percentages must sum to less than 100%

D) sampling error is impossible without counts

Rationale: Without context such as sample size and population, a graph may be misleading even if the percentages are accurate.

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Q98.

A hospital administrator says, "Our sample of 1,200 patients is larger than last year's 800, so this year's sample cannot be biased." Which response is best?

A) Correct, because larger samples eliminate bias.

B) Correct, because bias occurs only in experimental studies.

C) Incorrect, because a large sample can still be biased if the sampling method is flawed. ✓ Correct

D) Incorrect, because only small samples can estimate parameters.

Rationale: Increasing sample size reduces sampling error but does not fix bias from poor sampling methods.

Q99.

A researcher wants to estimate average outpatient copay amounts across an insurer's membership. She samples members from commercial, Medicare Advantage, and Medicaid plans in proportion to enrollment because copays differ by plan type. Why is this design preferable to a single convenience sample from one clinic?

A) It ensures every plan subgroup is represented in line with the population. ✓ Correct

B) It removes all nonsampling error automatically.

C) It guarantees the sample mean equals the population mean.

D) It converts the study from inferential to descriptive only.

Rationale: Proportionate stratified sampling improves representativeness by ensuring important subgroups are included appropriately.

Q100.

A hospital compares two displays of patient complaint categories. The first is an alphabetical bar graph; the second orders categories from most frequent to least frequent. For operational decision-making, why is the second display often superior?

A) It changes qualitative data into quantitative data.

B) It makes it easier to prioritize the largest problem categories. ✓ Correct

C) It eliminates missing data.

D) It guarantees causal interpretation.

Rationale: Ordering categories by size, as in a Pareto-style display, helps decision-makers quickly identify the most important categories to address.

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