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Indicate the answer choice that best completes the statement or answers the question.

1. In a _____ problem, we assume very little about a population. We use the information about a sample to answer questions concerning the population.

a. statistically determined
b. statistical differential
c. probability
d. statistics

2. A clinical nurse supervisor (CNS) is designing an experiment that will evaluate the effectiveness of household pets in treating depression. Using computer software, she generates a list of 200 people. In the sampling process, every possible sample in the population of size 200 has the same chance of being selected. Is this a simple random sample?

a. Yes
b. No
c. Depends on the information the CNS seeks from the people
d. Need more information to answer the question

3. A researcher wishes to obtain information about American males in the metro area who are between 20 and 25 years of age. He has a phone book that contains the land-line phone numbers of households in the metro area. The researcher uses a random number generator to select 50 households to call. Bearing in mind that he will be contacting only people who have a land line, is this a simple random sample?

a. Yes
b. No
c. Depends on the information the researcher seeks from those surveyed
d. Need more information to answer the question

4. Which of the following is a reasonable estimate of the probability of lung cancer for a typical American adult?

a. The incidence of lung cancer among U.S. adults
b. The average number of U.S. adults who died from lung cancer in 2013
c. The relative frequency of lung cancer among U.S. adults
d. All of the above

5. In a statistical inference procedure, the claim is **best** described as:

a. a statement of which experimental process will be used in the inference.

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b. a statement that we will accept as valid only with sufficient proof.
c. a statement that we want to be true regardless of the evidence.
d. a statement of what we assume to be usually true.

6. In many real-world settings, it is not possible or feasible to know the characteristics of the population. Because we cannot safely assume these characteristics, we must use the information from a sample to answer questions concerning the population. In such cases, we are dealing with a(n) _____ problem.

a. probability
b. underdetermined
c. statistics
d. reality

7. The registrar at a small liberal arts college computes description summaries for all members of the entering class on a regular basis. For example, the average high school grade-point average (GPA) for the entering students in the most recent year was 3.16. The Chemistry department is interested in helping all new students who wish to take a chemistry class identify the appropriate course for them, so it offers a placement exam. The department randomly selects a subset of 175 students who took this exam during the past decade, and finds that they had an average score of 71.05 on the exam. The population of interest to the Chemistry department in this study is:

a. the 175 selected students who took this exam during the past decade.
b. all entering students during the most recent year.
c. all entering students during the past decade.
d. all students who took the chemistry placement exam during the past decade.

8. An office manager wishes to survey 5 of the 20 employees for whom she is responsible. She assigns each of the 20 employees a number and writes the number on 20 identical but separate pieces of paper. She places the 20 pieces of paper in a hat, mixes them up, and then blindly draws five numbers to determine which five employees are included in the sample. If the slips of paper are identical and the selection of each employee is equally likely, is this a simple random sample of size 5?

a. Yes
b. No
c. Depends on the information the manager seeks from the employees
d. Need more information to answer the question

9. A volleyball coach records information about each serve in one game to determine if use of a jump serve rather than a standard overhand serve is more likely to lead to winning a point. This is an example of using:

a. inferential statistics.
b. descriptive statistics.
c. simple random sampling analysis.
d. inferential random sampling analysis.

10. In 2004, the San Francisco police began using DNA evidence in unsolved homicides. The crime lab found

evidence that suggested John Puckett was a DNA match for a crime committed three decades earlier, based on 6 genetic locations. Usually, 13 genetic markers are required to distinguish between two different people. Jurors were told that the chance of randomly finding the defendant's DNA profile at the crime scene was 1 in 1.1 million. The jurors found the DNA evidence compelling and convicted Puckett of first-degree murder. This conclusion is an example of:

a. relative frequency and probability.
b. summary statistics.
c. probability and odds.
d. statistical likelihood and inference.

11. In a study that seeks to evaluate the effect that caffeine has on individuals with narcolepsy, 40 patients with this condition are randomly selected to participate in the study. Fifteen of the patients are given high doses of caffeine, 15 are given moderate doses, and 10 are given low doses over a period of 30 days. The variable of interest in this study is:

a. the 40 narcoleptic patients.
b. the period of 30 days.
c. the dosage of caffeine administered.
d. the sample size used.

12. During July 2007, the National Association of Colleges and Employers reported an increase in the average starting salaries of trades related to engineering. Offers to students awarded a bachelor's degree in chemical engineering rose 5.4% to an average of $59,361, and starting salaries for students awarded a bachelor's degree in computer engineering rose 4.8% to an average of $56,201. The numbers in this case are an example of:

a. relative frequency and probability.
b. summary statistics.
c. probability and odds.
d. statistical likelihood and inference.

13. In a(n) _____, we investigate the effects of certain conditions on individuals or objects in the sample by manipulating the variable.

a. statistical setting
b. observational study
c. experimental study
d. population

14. Consider a population consisting of the approximately 25,000 protein-coding genes in human DNA. Suppose that each gene is assigned a number from 1 to 25,000. Computer software is then used to randomly select 100 of these numbers, yielding a sample of 100 genes. Would this be a simple random sample?

a. Yes
b. No
c. The sample size is too small to tell.
d. Need more information to answer the question

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15. In a(n) _____ problem, certain characteristics of a population are assumed to be known. We then answer questions concerning a sample from that population.

a. statistical inference
b. inferential statistical
c. probability
d. statistics

16. A sample of five people is analyzed to make a general statement about the population from which the people were sampled. This is an example of using:

a. inferential statistics.
b. descriptive statistics.
c. simple random sampling analysis.
d. inferential random sampling analysis.

17. The registrar at a small liberal arts college computes description summaries for all members of the entering class on a regular basis. For example, the average high school grade-point average (GPA) for the entering students in the most recent year was 3.16. The Chemistry department is interested in helping all new students who wish to take a chemistry class identify the appropriate course for them, so it offers a placement exam. The department randomly selects a subset of 175 students who took this exam during the past decade, and finds that they had an average score of 71.05 on the exam. The variable of interest to the Chemistry department in this study is:

a. the 175 selected students who took this exam during the past decade.
b. the student scores on the placement exam
c. the average score on the placement exam.
d. the GPA of the 175 students who took the placement exam.

18. A quality control engineer oversees the production of rubber seals for aircraft manufacturing. In a standard production run, 25 seals are randomly selected for destructive testing. The seals are physically stressed to their common design limit while exposed to increasing temperature, with the trial ending when the seal fails. Of interest is the temperature at which the seal fails. The variable in this experiment is:

a. the 25 seals selected.
b. the common design stress to which each seal is exposed.
c. the temperature to which each seal is exposed.
d. all manufactured rubber seals.

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19. State highway safety experts claim that the recent increase in highway fatalities involving tractor trailers is a result of truckers receiving insufficient rest. They randomly sample 200 truckers who are making interstate deliveries and record the total amount of nondriving time they have had over the past 72 hours. This study is **best** described as a(n) _____ study.

a. observational
b. longitudinal
c. experimental
d. inferential

20. In the mid-1990s, a study was conducted to determine if arthroscopic surgery was an effective treatment for arthritis of the knee. Ten men were scheduled for surgery and each patient was anesthetized. But, after each patient was unconscious, the surgeon consulted a randomly generated code to determine whether to do the actual surgery, or to perform a "sham" surgery (make three small incisions in the knee, stitch the patient up, and leave a small scar). This is **best** described as a(n) _____ study.

a. voluntary
b. observational
c. medical
d. experimental

21. The 2009 National Survey on Drug Use and Health selected a random sample of U.S. college students and asked them about possible illicit drug use. Approximately 23% of the students surveyed reported using illicit drugs in the past year. The sample in this study is:

a. U.S. college students.
b. the 23% of the students who reported using illicit drugs.
c. the college students who responded to the National Survey on Drug Use and Health.
d. all U.S. adults.

22. A 2008 study examined the impact of the color red on how attractive men perceive a woman to be. The men were randomly divided into two groups and were asked to rate the attractiveness of women using a scale of 1 to 9. One group of men was shown pictures of women on a white background, whereas the other group was shown the same pictures on a red background. This is **best** described as a(n) _____ study.

a. experimental
b. observational
c. social
d. inferential

23. The 2009 National Survey on Drug Use and Health selected a random sample of U.S. college students and asked them about illicit drug use. Approximately 23% of the students surveyed reported using illicit drugs in the past year. The population in this study is:

a. U.S. college students.
b. the 23% of the students who reported using illicit drugs.
c. the college students who responded to the National Survey on Drug Use and Health.

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d. all U.S. adults.

24. An experiment that simply records the direction a rat turns at a particular junction in a maze is a(n) _____ study.

a. observational
b. longitudinal
c. experimental
d. None of the above.

25. An artist mass-produces sculptures that are claimed to be 99% identical. To test this claim, 50 of the artist's sculptures are selected from a local retail store. The sculptures are analyzed for any eccentricities. The population in this study is:

a. the artist's statement that the sculptures are 99% identical.
b. the 50 sculptures selected.
c. the analysis conducted for similarity.
d. all sculptures that this artist produces.

26. Electrical engineers are attempting to maximize the efficiency of an experimental battery cell. They wish to determine the optimum charge rate that will provide the maximum battery capacity. They sample 50 cells and randomly assign five different charge rates to the sample (10 cells for each charge rate). All cells are then discharged at the same rate, with the total battery capacity for each cell being recorded in amp-hours. This is an example of a(n) _____ study.

a. simple random
b. experimental
c. observational
d. probability

27. In a study of crop rotation techniques, agricultural researchers are interested in making general statements concerning the effectiveness of a given technique for all corn fields in the state of Kansas. Using a cluster technique, they randomly choose 30 farms from across the state for their study. Some of the chosen farms are randomly selected to use the rotation technique, whereas others are not. In this study, the population is best described as:

a. 30 farms chosen from across the state.
b. all corn fields in the state of Kansas.
c. the effectiveness of crop rotation.
d. whether the rotation technique was used.

28. A major pharmaceutical company is conducting clinical trials on a new drug it wants to bring to market. The company surveys 2000 people who have the particular condition that the drug is designed to treat. A portion of the people surveyed receive a high dose of the drug, a portion of the people surveyed receive a medium dose of the drug, and the remaining portion of the people surveyed receive a placebo (sugar pill). The variable in this experiment is:

a. the 2000 people surveyed.

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b. all people with the condition that the drug is intended to treat.
c. the dosage of drug administered to each person.
d. the placebo (sugar pill).

29. Ten apples are taken off the top of a truckload of apples, and the amount of bruising on those apples is measured to estimate how much bruising is present, on average, in the whole truckload. Is this a simple random sample?

a. Yes
b. No
c. Depends on whether the apples came from a clump or from across the top of the truck
d. Need more information to answer the question

30. In a study that seeks to evaluate the effect that caffeine has on individuals with narcolepsy, 40 patients with this condition are randomly selected to participate. Fifteen of the patients are given high doses of caffeine, 15 are given moderate doses, and 10 are given low doses over a period of 30 days. The total amount of time each patient slept over the 30 days was recorded. This is **best** described as a(n) _____ study.

a. voluntary
b. observational
c. dosage
d. experimental

31. Lenders base applicants' eligibility for home loans on the perspective borrower's credit score. Recent failures of lending corporations have prompted a study of the adherence of lenders to lending guidelines. Two thousand home loans extended between the years 1995 and 2005 are randomly selected for audit. The borrower's credit score is recorded and compared with the normal benchmark for the loan. The population in this study is:

a. the 2000 randomly selected home loans.
b. all home loans extended between 1995 and 2005.
c. the credit score of each borrower selected.
d. all lending agencies that offer home loans.

32. A _____ sample has characteristics similar to those of the entire population and, therefore, can be used to draw a conclusion about the (general) population.

a. general
b. descriptive
c. statistical
d. representative

33. In a(n) _____, we merely observe the response for a specific variable for each individual or object.

a. statistical setting
b. observational study

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c. experimental study
d. population

34. A random sample of 10 cars is analyzed to evaluate the effect on horsepower of installing a computer chip modification. Based on the sample, researchers conclude that this modification will significantly increase a vehicle's horsepower if installed. This is an example of:

a. inferential statistics.
b. the scientific method.
c. descriptive statistics.
d. population statistics.

35. Electrical engineers are attempting to maximize the efficiency of an experimental battery cell. They wish to determine the optimum charge rate that will provide the maximum battery capacity. They sample 50 cells and randomly assign five different charge rates to the sample (10 cells for each charge rate). All cells are then discharged at the same rate, with the total battery capacity being recorded in amp-hours. The variable controlled in this experiment is:

a. all experimental battery cells.
b. the different charge rates.
c. the total capacity recorded in amp-hours.
d. the 50 sampled cells.

36. Descriptive statistics is **best** defined as:

a. techniques and methods used to analyze a small, specific set of data so as to draw a conclusion about a large, more general collection of data.
b. graphical and numerical methods used to describe, organize, and summarize a statistically valid conclusion.
c. graphical and numerical methods used to describe, organize, and summarize data.
d. techniques and methods used to analyze a small data set so as to describe its usefulness in making general statements about a population.

37. A professor wishes to record information on some of his students for later use. He arrives to class early and samples the first five students who enter the room. Is this a simple random sample of size 5?

a. Yes
b. No
c. Depends on the information the professor seeks from the students
d. Need more information to answer the question

38. An experiment that forces rats to take a particular direction at a junction in a maze and then observes the differences in times for the rats that went left and rats that went right is a(n) _____ study.

a. observational
b. longitudinal
c. experimental

d. None of the above.

39. Inferential statistics is **best** defined as:

a. techniques and methods used to analyze a small, specific set of data so as to draw a conclusion about a large, more general population.
b. graphical and numerical methods used to describe, organize, and summarize a statistically valid conclusion.
c. graphical and numerical methods used to describe, organize, and summarize data.
d. techniques and methods used to analyze a small data set so as to make an inference concerning its accuracy.

40. In September 2000, the United Nations adopted an initiative known as the UN Millennium Declaration. Its intention was to take active steps toward eliminating poverty, HIV/AIDS, hunger, and other global issues adversely affecting humanity by 2015. The UN consistently tracks each country's progress by recording data on numerous markers that provide an indication of the country's compliance with these "Millennium Development Goals." The data for each country are summarized by year in tabular format (see http://www.un.org/millenniumgoals/stats.shtml). The organization of these raw data into a more user-friendly table format is an example of:

a. inferential statistics.
b. the scientific method.
c. descriptive statistics.
d. population statistics.

41. To evaluate the objectivity of a certain professor's grading, 20 classes that she previously taught are randomly selected for auditing. The proportion of male students who pass in each class is compared to the proportion of female students who pass in the same selected class. The sample in this study is:

a. the comparison of male and female passing rates for the classes.
b. the proportion of all males who passed and the proportion of all females who passed.
c. the 20 selected classes.
d. a single selected class.

42. A psychologist wishes to test a behavioral modification therapy that is claimed to improve the behavior of preteen autistic children. She randomly selects 20 preteen autistic children and exposes half of the group to the behavioral modification therapy; the other half continue with their standard treatment regimen. A standardized behavioral test is administered to each child both before and after treatment. The population in this experiment is:

a. all preteen autistic children.
b. the behavioral modification therapy.
c. the standardized behavioral test scores.
d. the 20 selected preteen autistic children.

43. Mice are given a protein injection that is designed to promote physical growth. Fifty mice are randomly selected for evaluation in the study. Some of the mice are injected with high levels of the protein, some are

injected with low levels of the protein, and a third group receives a placebo (saline injection). The mice's growth is recorded and compared. In this study, the variable is best described as:

a. 50 randomly selected mice.
b. all mice that receive a protein injection.
c. the type of protein used.
d. the amount of protein injected.

44. All visitors to the CNN website are invited to take part in the daily poll. Is the resulting sample likely to be biased?

a. No, this will result in a simple random sample.
b. No, although this sample would not be random, it would definitely be representative of the population.
c. Yes, the sample is likely to suffer from nonresponse and self-selection bias.
d. More information is needed to answer the question.

45. Nuclear power plants must discharge the excess heat generated in the nuclear process to the environment. Some plants exhaust this heat to nearby water sources. There is concern that this "thermal pollution" has an adverse effect on aquatic life near the plant. Researchers at the Environmental Protection Agency (EPA) catch 100 fish from the discharge pond of a particular power plant. They track the growth rates and life span of these fish, and compare these data to the data for fish from similar streams whose temperatures are not affected by the plant's thermal effluent. The sample in this experiment is:

a. all nuclear power plants.
b. the selected nuclear power plant.
c. all fish in the discharge path.
d. the 100 fish caught by the EPA.

46. The 2009 National Survey on Drug Use and Health selected a random sample of U.S. college students and asked them if they had ever used illicit drugs. Approximately 23% of the students surveyed reported using illicit drugs in the past year. The variable in this study is:

a. the percentage of students who reported using illicit drugs.
b. whether a student used illicit drugs.
c. whether a college student responded to the survey.
d. the number of college students who use illicit drugs.

47. A behavioral scientist wishes to know more about the walking habits of university students while they are traversing a particular campus sidewalk. She positions herself out of sight of the students who are walking and records the time required for several of them to pass between two fixed points along the sidewalk. This is best described as a(n) _____ study.

a. observational
b. educational
c. experimental
d. scientific–study.

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48. The effects of different lighting levels on productivity are evaluated using a designed experiment. Two hundred office workers who have the same basic job assignments are randomly selected to participate. Each worker is randomly assigned a different lighting level at his or her desk. Ambient (background) lighting is held constant for all workers. A benchmark of productivity is recorded for each worker. In this study, the sample is best described as:

a. 200 office workers.
b. the different lighting levels.
c. the amount of productivity.
d. all office workers with similar job assignments.

49. A group of 20 monitor lizards is observed over the course of the lizards' life spans. The total food consumption of each lizard is recorded and displayed on a bar graph. This presentation of raw information in a more user-friendly format is an example of:

a. inferential statistics.
b. simple random sampling.
c. pictorial statistics.
d. descriptive statistics.

50. Two thousand people are surveyed and asked to indicate, using a scale of 1 to 5, their preference for a particular brand of liquid dishwashing detergent. The responses are summarized using a bar graph that displays the total counts of each response (1 to 5). The graph is used to predict the consumer response to a new detergent product. This is an example of:

a. inferential statistics.
b. simple random sampling.
c. pictorial statistics.
d. descriptive statistics.

51. A _____ of size *n* is a sample selected in such a way that every possible sample of size *n* has the same chance of being selected.

a. circular random sample
b. simple random sample
c. systematic random sample
d. synchronized random sample

52. The time required to cure concrete is pivotal in the construction business. Insufficient curing time results in lower structural strength, which can create hazardous conditions. Conversely, too much curing time wastes valuable resources and may result in greatly inflated building costs. To help ascertain the minimum curing time, a random sample of 80 poured concrete foundations is drawn. The total time to completely cure each foundation is recorded. This study is **best** described as a(n) _____ study.

a. observational
b. longitudinal

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c. experimental
d. inferential

53. Suppose we know that a population consists of equally likely numbers 1 to 6, inclusive (in other words, we know everything about the population). We wish to answer questions concerning a sample of two distinct numbers from this population. This is **best** described as a _____ problem.

a. probability
b. statistics
c. major
d. None of the above.

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Answer Key

1. d

2. a

3. b

4. c

5. d

6. c

7. d

8. a

9. a

10. d

11. c

12. b

13. c

14. a

15. c

16. a

17. b

18. c

19. a

20. d

21. c

22. a

23. a

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24. a

25. d

26. b

27. b

28. c

29. b

30. d

31. b

32. d

33. b

34. a

35. b

36. c

37. b

38. c

39. a

40. c

41. c

42. a

43. d

44. c

45. d

46. b

47. a

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48. a

49. d

50. a

51. b

52. a

53. a