MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

1) Parking at a university has become a problem. University administrators are interested in determining the average time it takes a student to find a parking spot. An administrator inconspicuously followed 100 students and recorded how long it took each of them to find a parking spot. Identify the variable of interest to the university administration.
   A) number of empty parking spots
   B) students who drive cars on campus
   C) number of students who cannot find a spot
   D) time to find a parking spot

   Answer: D

2) An insurance company conducted a study to determine the percentage of cardiologists who had been sued for malpractice in the previous four years. The sample was randomly chosen from a national directory of doctors. What is the variable of interest in this study?
   A) the number of doctors who are cardiologists
   B) the responses: have been sued/have not been sued for malpractice in the last four years
   C) all cardiologists in the directory
   D) the doctor's area of expertise (i.e., cardiology, pediatrics, etc.)

   Answer: B

3) A study attempted to estimate the proportion of Florida residents who were willing to spend more tax dollars on protecting the Florida beaches from environmental disasters. Forty–three hundred Florida residents were surveyed.Which of the following describes the variable of interest in the study?
   A) the response to the question, "Are you willing to spend more tax dollars on protecting the Florida beaches from environmental disasters?"
   B) the response to the question "Do you use the beach?"
   C) the 4300 Florida residents surveyed
   D) the response to the question "Do you live along the beach?"

   Answer: A

4) Parking at a large university has become a very big problem. University administrators are interested in determining the average parking time (e.g. the time it takes a student to find a parking spot) of its students. An administrator inconspicuously followed 250 students and carefully recorded their parking times. Identify the variable of interest to the university administration.
   A) the parking time, defined to be the amount of time the student spent finding a parking spot
   B) the 250 students that data was collected from
   C) the entire set of students that park at the university
   D) a single student that parks at the university

   Answer: A

5) As part of an economics class project, students were asked to randomly select 500 New Your Stock Exchange (NYSE) stocks from the Wall Street Journal. As part of the project, students were asked to summarize the current prices (also referred to as the closing price of the stock for a particular trading date) of the collected stocks using graphical and numerical techniques. Identify the variable of interest for this study.
   A) a single stock traded on the NYSE
   B) the entire set of stocks that are traded on the NYSE
   C) the 500 NYSE stocks that current prices were collected from
   D) the current price (or closing price) of a NYSE stock

   Answer: D

6) A study in the state of Georgia was conducted to determine the percentage of all community college students who have taken at least one online class. 1500 community college students were contacted and asked if they had taken at least one online class during their time at their community college. These responses were then used to estimate the percentage of all community college students who have taken at least one online class. Identify the variable of interest in this study.
A) the number of online classes a student has taken
B) all community college students in the state of Georgia
C) the 1500 community college students contacted
D) the response (Yes/No) to the question, "Have you taken at least one online class?"

Answer: D

Answer the question.

7) A magazine publisher mails a survey to every subscriber asking about the quality of its subscription service. The total number of subscribers represents what?
A) The population B) The sample

Answer: A

8) A magazine publisher mails a survey to every subscriber asking about the timeliness of its subscription service. The publisher finds that only 5% of the subscribers responded. This 5% represents what?
A) The population B) The sample

Answer: B

9) A magazine publisher always mails out a questionnaire six months before a subscription ends. This questionnaire asks its subscribers if they are going to renew their subscriptions. On average, only 3% of the subscribers respond to the questionnaire. Of the 3% who do respond, an average of 45% say that they will renew their subscription. This 3% who respond to the questionnaire are known as what?
A) The population B) The sample

Answer: B

10) An employee at the local ice cream parlor asks three customers if they like chocolate ice cream. Identify the sample and population.
A) Sample: the 3 selected customers; population: all customers
B) Sample: all customers; population: the 3 selected customers
C) Sample: the customers who like chocolate ice cream; population: all customers
D) Sample: the 3 selected customers; population: the customers who like chocolate ice cream

Answer: A

11) 100,000 randomly selected adults were asked whether they drink at least 48 oz of water each day and only 45% said yes. Identify the sample and population.
A) Sample: the 100,000 selected adults; population: all adults
B) Sample: all adults ; population: the 100,000 selected adults
C) Sample: the 100,000 selected adults; population: the 45% of adults who drink at least 48 oz of water
D) Sample: the 45% of adults who drink at least 48 oz of water; population: all adults

Answer: A

12) In a poll of 50,000 randomly selected college students, 74% answered "yes" when asked "Do you have a television in your dorm room?" Identify the sample and population.
A) Sample: the 74% who answered "yes"; population: all college students
B) Sample: all college students; population: the 50,000 selected college students
C) Sample: the 50,000 selected college students; population: the 74% who answered "yes"
D) Sample: the 50,000 selected college students; population: all college students

Answer: D

13) A computer network manager wants to test the reliability of some new and expensive fiber–optic Ethernet cables that the computer department just received. The computer department received 9 boxes containing 20 cables each. The manager does not have the time to test every cable in each box. The manager will choose one box at random and test 4 cables chosen randomly within that box. What is the population?
A) The 9 boxes
B) The 4 cables chosen randomly for testing
C) The one box that was chosen at random from the 9 boxes
D) 180 cables

Answer: D

14) A computer network manager wants to test the reliability of some new and expensive fiber–optic Ethernet cables that computer department just received. The computer department received 7 boxes containing 20 cables each. The manager does not have the time to test every cable in each box. The manager will choose one box at random and test 4 cables chosen randomly within that box. What is the sample?
A) The 4 cables chosen for testing
B) 140 cables
C) The one box that was chosen at random from the 7 boxes
D) The 7 boxes

Answer: A

15) George, a network engineer, ordered 500 CAT 5e Ethernet cables for use at his company's network. After receiving these cables, he decided to randomly test 150 of these cables before using them. He was alarmed to find out that 82% of these cables failed completely. He returned the entire lot to the manufacturer. When he tested the cables, what was George's sample?
A) 123 cables B) 410 cables C) 150 cables D) 500 cables

Answer: C

16) The spell–checker in a desktop publishing application may not catch all misspellings (e.g. their, there) or correctly interpret the spellings of proper names. Jackie is an expert editor and can proofread extremely quickly. Jackie is hired by a book publisher to check the spelling of every word in the latest proof of a history book. With regard to Jackie's assignment, what is the population?
A) Finding misspellings in the latest proof of the history book
B) The total number of misspellings that Jackie finds in the latest proof of the history book
C) The latest proof of the history book
D) Every word in the latest proof of the history book

Answer: D

Provide an appropriate response.

17) A researcher randomly selects a sample of 100 students from the students enrolled at a particular college. She asks each student his age and calculates the mean age of the 100 students. It is 21.3 years. Based on this sample, she then estimates the mean age of all students enrolled at the college to be 21.3 years. In what way are descriptive statistics involved in this example? In what way are inferential statistics involved?

A) When calculating the mean age of the students in the sample, the researcher is using descriptive statistics. When estimating the mean age of all students at the college, the researcher is using inferential statistics.

B) When calculating the mean age of the students in the sample, the researcher is using inferential statistics. When estimating the mean age of all students at the college, the researcher is using descriptive statistics.

Answer: A

18) A meteorologist constructs a graph showing the total precipitation in Phoenix, Arizona in each of the months of 1998. Does this involve descriptive statistics or inferential statistics?

A) Descriptive B) Inferential

Answer: A

19) Thirty of the 198 students enrolled in Statistics 101 were asked if they wanted Exam II to be a take–home or an in–class assessment. Twenty, or about 67%, of the students polled indicated a preference for an in–class exam. The professor concluded that the majority of students in Statistics 101 would prefer an in–class examination for the second assessment. Did the professor perform a descriptive study or an inferential study?

A) Descriptive B) Inferential

Answer: A

20) A statistics student's presentation of the results of her study included many charts, graphs, and tables. Identify the kind of statistical study conducted.

A) The study was purely descriptive.

B) The study was necessarily inferential.

C) The purpose of the study may have been completely descriptive or it might have been inferential.

Answer: C

21) A news article appearing in a national paper stated that "The fatality rate from use of firearms sank to a record low last year, the government estimated Friday. But the overall number of violent fatalities increased slightly, leading the government to urge an increase in police forces in major urban areas. Overall, 15,600 people died from violent crimes in 2005, up from 15,562 in 2004, according to projections from a government source. Is the figure 15,600 a descriptive statistic or an inferential statistic? Is the figure 15,562 a descriptive statistic or an inferential statistic?

A) The figure 15,600 is a descriptive statistic since it reflects the actual number of deaths from violent crimes for the year 2005. The figure 15,562 is a descriptive statistic as well.

B) The figure 15,600 is an inferential statistic since it is indicated in the statement that it is a projection (probably based on incomplete data for the year 2004). The figure 15,562 is an inferential statistic as well.

C) The figure15,600 is an inferential statistic since it is indicated in the statement that it is a projection (probably based on incomplete data for the year 2005). The figure 15,562 is a descriptive statistic since it reflects the actual number of deaths from violent crimes for the year 2004.

D) The figure15,600 is a descriptive statistic since it reflects the actual number of deaths from violent crimes for the year 2004. The figure 15,562 is an inferential statistic since it is indicated in the statement that it is a projection (probably based on incomplete data for the year 2005).

Answer: C

22) An online newspaper conducted a survey by asking, "Do you support the lowering of air quality standards if it could cause the death of millions of innocent people from pollution related diseases?" Determine the type of bias.

A) Nonresponse bias B) Response bias C) Sampling bias

Answer: B

23) A local hardware store wants to know if its customers are satisfied with the customer service they receive. The store posts an interviewer at the front of the store to ask the first 80 shoppers who leave the store, "How satisfied, on a scale of 1 to 10, were you with this stores customer service?" Determine the type of bias.

A) Sampling bias B) Response bias C) Nonresponse bias

Answer: A

24) Before opening a new dealership, an auto manufacturer wants to gather information about car ownership and driving habits of the local residents. The marketing manager of the company randomly selects 1000 households from all households in the area and mails a questionnaire to them. Of the 1000 surveys mailed, she receives 100 back. Determine the type of bias.

A) Response bias B) Nonresponse bias C) Sampling bias

Answer: B

25) The United States can be divided into four geographical regions: Northeast, South, Midwest, and West. The Northeast region consists of 9 states; the South region consists of 16 states; the Midwest consists of 12 states; and the West consists of 13 states. If a survey is to be administered to the governors of 10 of the states and we want equal representation for the states in each of the four regions, how many states from the South should be selected? Round to the nearest whole state.

A) 4 B) 5 C) 2 D) 3

Answer: D

Identify the sampling technique used.

26) Thirty–five sophomores, 43 juniors and 60 seniors are randomly selected from 500 sophomores, 422 juniors and 323 seniors at a certain high school.

A) cluster B) random C) systematic D) stratified E) convenience

Answer: D

27) Every fifth person boarding a plane is searched thoroughly.

A) stratified B) convenience C) random D) systematic E) cluster

Answer: D

28) At a local community college, five statistics classes are randomly selected out of 20 and all of the students from each class are interviewed.

A) random B) cluster C) systematic D) convenience E) stratified

Answer: B

29) A researcher randomly selects and interviews fifty male and fifty female teachers.

A) systematic B) stratified C) random D) cluster E) convenience

Answer: B

30) A researcher for an airline interviews all of the passengers on five randomly selected flights.

A) random B) convenience C) stratified D) systematic E) cluster

Answer: E

31) A community college student interviews everyone in a particular statistics class to determine the percentage of students that own a car.
A) stratified B) systematic C) random D) convenience E) cluster
Answer: D

32) Based on 10,500 responses from 37,500 questionnaires sent to its alumni, a major university estimated that the annual salary of its alumni was $77,500 per year.
A) convenience B) random C) systematic D) cluster E) stratified
Answer: B

33) In a recent television survey, participants were asked to answer "yes" or "no" to the question "Are you in favor of the death penalty?" Six thousand five hundred responded "yes" while 4200 responded "no". There was a fifty–cent charge for the call.
A) cluster B) random C) convenience D) systematic E) stratified
Answer: C

34) A lobbyist for a major airspace firm assigns a number to each legislator and then uses a computer to randomly generate ten numbers. The lobbyist contacts the legislators corresponding to these numbers.
A) cluster B) stratified C) random D) convenience E) systematic
Answer: C

35) To ensure customer satisfaction, every 15th phone call received by customer service will be monitored.
A) convenience B) cluster C) systematic D) stratified E) random
Answer: C

36) A market researcher randomly selects 300 drivers under 55 years of age and 400 drivers over 55 years of age.
A) convenience B) random C) cluster D) stratified E) systematic
Answer: D

37) To avoid working late, the quality control manager inspects the last 70 items produced that day.
A) convenience B) stratified C) random D) systematic E) cluster
Answer: A

38) The names of 50 contestants are written on 50 cards. The cards are placed in a bag, and three names are picked from the bag.
A) systematic B) convenience C) cluster D) stratified E) random
Answer: E

39) A researcher randomly selected 35 of the nation's middle schools and interviewed all of the teachers at each school.
A) stratified B) convenience C) random D) cluster E) systematic
Answer: D

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

40) Which method of sampling is easier: simple random sampling or systematic random sampling?
Answer: Systematic random sampling

41) Describe the advantages and disadvantages of cluster sampling as compared with simple random sampling.

Answer: Answers will vary. Possible answer: Cluster sampling can save time when members of the population are widely scattered geographically. The disadvantage is that members of a cluster may be more homogeneous than the members of the population as a whole and may not mirror the entire population.

42) Describe a double–blind experiment and explain why blinding is used. Define the term "placebo effect" as part of the answer.

Answer: A double–blind experiment is one in which neither the subjects nor the researchers know who is getting the treatment. Blinding is when the subject does not know whether he or she is receiving a treatment or a placebo. Blinding is used to counteract the placebo effect in which an untreated subject believes he or she is receiving a treatment and reports an improvement in symptoms due to this belief.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the study is an observational study or an experiment.

43) A medical researcher obtains a sample of adults suffering from diabetes. She randomly assigns 42 people to a treatment group and 42 to a placebo group. The treatment group receives a medication over a period of three months and the placebo group receives a placebo over the same time frame. At the end of three months the patients' symptoms are evaluated.

A) experiment B) observational study

Answer: A

44) A poll is conducted in which professional musicians are asked their ages.

A) experiment B) observational study

Answer: B

45) A pollster obtains a sample of students and asks them how they will vote on an upcoming referendum.

A) experiment B) observational study

Answer: B

46) The personnel director at a large company would like to determine whether the company cafeteria is widely used by employees. She calls each employee and asks them whether they usually bring their own lunch, eat at the company cafeteria, or go out for lunch.

A) observational study B) experiment

Answer: A

47) A scientist was studying the effects of a new fertilizer on crop yield. She randomly assigned half of the plots on a farm to group one and the remaining plots to group two. On the plots in group one, the new fertilizer was used for a year. On the plots in group two, the old fertilizer was used. At the end of the year the average crop yield for the plots in group one was compared with the average crop yield for the plots in group two.

A) observational study B) experiment

Answer: B

48) A researcher obtained a random sample of 100 smokers and a random sample of 100 nonsmokers. After interviewing all 200 participants in the study, the researcher compared the rate of depression among the smokers with the rate of depression among nonsmokers.

A) experiment B) observational study

Answer: B

A designed experiment is described. Identify the specified element of the experiment.

49) In a clinical trial, 780 participants suffering from high blood pressure were randomly assigned to one of three groups. Over a one–month period, the first group received a low dosage of an experimental drug, the second group received a high dosage of the drug, and the third group received a placebo. The diastolic blood pressure of each participant was measured at the beginning and at the end of the period and the change in blood pressure was recorded. Identify the response variable.

A) The participants in the experiment
B) The dosage of the drug
C) Change in diastolic blood pressure
D) The treatment received (placebo, low dosage, high dosage)

Answer: C

50) An education researcher was interested in examining the effect of the teaching method and the effect of the particular teacher on students' scores on a reading test. In a study, there are four different teachers (Juliana, Felix, Sonia, and Helen) and three different teaching methods (method A, method B, and method C). The number of students participating in the study is 258. Students are randomly assigned to a teaching method and teacher. Identify the response variable.

A) Method A, method B, method C
B) Teacher
C) Teaching method
D) Score on reading test

Answer: D

51) A herpetologist performed a study on the effects of the body type and mating call of the male bullfrog as signals of quality to mates. Four life–sized dummies of male bullfrogs and two sound recordings provided a tool for testing female response to the unfamiliar frogs whose bodies varied by size (large or small) and color (dark or light) and whose mating calls varied by pitch (high, normal, or low). The female bullfrogs were observed to see whether they approached each of the four life–sized dummies. Identify the response variable.

A) The four life–sized dummy male bullfrogs
B) Whether or not the male frogs were large and light–colored
C) Large and small; dark and light; call and no call
D) Whether or not (yes or no) the female frogs approached a male dummy

Answer: D

Select the most appropriate answer.

52) A study shows that the amount of chocolate consumed in Canada and the number of automobile accidents is positively related. Which of the following identifies a potential lurking variable?

A) Vacation
B) Population growth
C) Speed
D) Children

Answer: B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

53) A pharmaceutical company has designed an experimental drug in pill form that is supposed to treat halitosis (bad breath) within 6 months. Design an experiment to test whether the drug works.

Answer: Volunteers with halitosis could be randomly assigned to the treatment and control groups. For six months, individuals in the treatment could be given the experimental drug and the control group could be given sugar pills. The study could be double–blind.

54) A volleyball coach wants to know whether having his players train with a 10–pound weight belt for one month of daily workouts will improve their vertical jump. Design an experiment to help the coach.

Answer: The runners could be randomly assigned to the treatment and control groups. For one month of daily workouts, the runners in the treatment group could train with the weight belt and the runners in the control group could train without a weight belt. The coach could have an assistant oversee the training, so the coach is blind to which runners are in which group.