

Exam

Name _____

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

Determine whether the evaluated group is a population or a sample.

1) The average age of 45 employees of a large company is found to be 32 years.

A) Population

B) Sample

Answer: B

2) A researcher examines the records of all the registered voters in one city and finds that 43% are registered Democrats.

A) Sample

B) Population

Answer: B

3) A researcher determines that of all 25 year old women in her city, 37% are married.

A) Population

B) Sample

Answer: A

4) A researcher determines that 42.7% of all downtown office buildings have ventilation problems.

A) Population

B) Sample

Answer: A

5) A professor is trying to determine whether performance on the first exam is related to course drop rate in one of her classes. After taking the first exam, 15 of the students dropped the class.

A) Population

B) Sample

Answer: A

6) Among 50 of the 302 patients admitted to an emergency room during one month, 28% had no health insurance.

A) Population

B) Sample

Answer: B

7) Based on a randomly selected group of 500 patients with high cholesterol, it was found that 67% have heart disease.

A) Population

B) Sample

Answer: B

8) An investigation of 150 randomly selected local restaurants concluded that 42% of local restaurants have serious health code violations.

A) Population

B) Sample

Answer: B

9) After inspecting all of 55,000 kg of meat stored at the Wurst Sausage Company, it was found that 45,000 kg of the meat was spoiled.

A) Population

B) Sample

Answer: A

- 10) A health and fitness club surveys 40 randomly selected members and finds that the average weight of those questioned is 157 lb.
A) Population
B) Sample
Answer: B

Determine whether the given value is a sample statistic or a population parameter.

- 11) A sample of 120 employees of a company is selected, and the average age is found to be 37 years.
A) Population parameter
B) Sample statistic
Answer: B

- 12) A researcher examines the records of all the registered voters in one city and finds that 43% are registered Democrats.
A) Population parameter
B) Sample statistic
Answer: A

- 13) A researcher determines that of all 25 year old women in her city, 37% are married.
A) Population parameter
B) Sample statistic
Answer: A

- 14) A researcher determines that 42.7% of all downtown office buildings have ventilation problems.
A) Sample statistic
B) Population parameter
Answer: B

- 15) After taking the first exam, 15 of the students dropped the class.
A) Sample statistic
B) Population parameter
Answer: B

- 16) A sample of 50 patients is selected from among the patients admitted to the emergency room at a hospital, and it is found that 28% have no health insurance.
A) Sample statistic
B) Population parameter
Answer: A

- 17) Based on a sample of 500 patients with high cholesterol, it was found that 67% have heart disease.
A) Population parameter
B) Sample statistic
Answer: B

- 18) An investigation of 150 randomly selected local restaurants concluded that 42% of local restaurants have serious health code violations.
A) Population parameter
B) Sample statistic
Answer: B

- 19) After inspecting all of 55,000 kg of meat stored at the Wurst Sausage Company, it was found that 45,000 kg of the meat was spoiled.
A) Sample statistic
B) Population parameter
Answer: B

- 20) A health and fitness club surveys 40 randomly selected members and finds that the average weight of those questioned is 157 lb.
A) Population parameter
B) Sample statistic
Answer: B

Answer the question.

- 21) Following the Republican National Convention, a poll of 500 voters in a Central Illinois community showed that 59% expected the Republican ticket to win over the Democrat ticket no matter whom the Democrats chose for vice-president. The margin of error was 3 percentage points. There are 21,000 registered voters in the community. What is the range likely to contain the population parameter?

A) 56% to 62% B) 11,760 to 13,020 C) 20,500 to 21,500 D) 280 to 310

Answer: A

- 22) Following the Republican National Convention, a poll of 900 voters in a Central Illinois community showed that 64% expected the Republican ticket to win over the Democrat ticket no matter whom the Democrats chose for vice-president. The margin of error was 3 percentage points. There are 28,000 registered voters in the community. What is the range likely to contain the number of voters who expected the Republican ticket to win?

A) 549 to 603 B) 27,424 to 28,576 C) 61% to 67% D) 17,080 to 18,760

Answer: D

- 23) Based on a poll, a newspaper reported that between 56% and 68% of voters would be likely to vote for a school bond issue. What is the margin of error of the poll?

A) 12% B) 34% C) 6% D) 28%

Answer: C

- 24) Following the Republican National Convention, a poll of 900 voters in a Central Illinois community showed that 62% expected the Republican ticket to win over the Democrat ticket no matter whom the Democrats chose for vice-president. The margin of error was 6 percentage points. There are 29,000 registered voters in the community. What does the range 56% to 68% represent?

A) The range likely to contain the percent of the population that expected the Republican ticket to win
B) The range of voters nationally who expected the Republican ticket to win
C) The range that contains the percent of the population that expected the Republican ticket to win
D) The range of the 800 persons polled who replied that they expected the Republican ticket to win

Answer: A

- 25) A poll conducted the day before the student-body presidential election at a 17,000-student midwestern university showed that 52.5 percent favored Jesus, the rest favoring Yin Ling. The margin of error was 4.5 percentage points. Since the poll showed that over half favored Jesus, Yin Ling should have

A) expected to win, because Jesus would get 48% of the vote.
B) expected to lose, because she knew Jesus would get between 52.5% and 57%.
C) stayed in the race, because the likely population vote for Jesus is in a range containing less than 50%.
D) conceded the race, because Jesus would get more than 50% of the vote on election day.

Answer: C

- 26) A poll of 500 citizens of Normal Illinois showed that 61% favored strict enforcement of speed limits with a margin of error of 4%. A second poll of 482 citizens of the same town showed that 37% favored strict enforcement of speed limits. Based on the results of the two polls, one may conclude that

A) the percent of the population that favors strict enforcement of speed limits is $49\% \pm 4\%$.
B) the percent of the population that favors strict enforcement of speed limits is $49\% \pm 8\%$.
C) there are definite errors in one of the polls.
D) one or both of the samples may have been unlikely samples from the population.

Answer: D

- 27) In a recent published poll of 200 students at a midwestern university, 150, or 75%, said they would try to purchase used textbooks before buying new textbooks. The report stated that somewhere between 70% and 80% of the students at the university would first try to purchase used books. What is the margin of error?
- A) 10% B) 25% C) 75% D) 5%

Answer: D

- 28) In a survey of 80 football players who committed to play in the Division III CCIW conference, 64 said that they would work out in their high school weight rooms in the summer before college. The margin of error for the survey was 6%. A census of CCIW football players showed that 59% worked out at their high schools. One can conclude that
- A) the census results are consistent with the confidence interval of the study.
B) there must have been an error in the determination of the margin of error.
C) the sample was less than forthcoming in their responses to the survey.
D) the sample was an unlikely sample.

Answer: D

- 29) If 68% of the persons in a 100-person sample say that they approve of the actions of the city council with a margin of error of 5%, one can conclude that the number of persons in a population of 2500 that approve of council policies is
- A) 1700. B) probably in the interval 1575 to 1825.
C) probably in the interval 1600 to 1800. D) 250.

Answer: B

- 30) Of 54 college students interviewed, 36 said they were skeptical of statistical studies. The student conducting the study for the campus paper reported that between 15,000 and 17,000 of the 24,000 students on campus were skeptical of statistical studies. Which of the following is an acceptable alternative to the original report?
- A) "Two of every three students on campus are skeptical of statistic studies."
B) "If you are confident in the results of statistical studies, then the person on your left and the person on your right in every class are skeptical of the results of statistical studies."
C) "Between 63% and 71% of students at the university are skeptical of statistical studies."
D) "A total of 16,000 students on this campus are skeptical of statistical studies."

Answer: C

Provide an appropriate response.

- 31) A poll of 700 persons attending the Taste of Chicago showed that 455 persons, 65% of the sample, believed that the food was overpriced. It is estimated that 1,250,000 persons attend the Taste. Statistics suggest that, although 65% of attendees, with a margin of error of 5 percentage points, believe that the food is overpriced, the Taste is a popular event. The raw data of the study is
- A) the margin of error, 5 percentage points. B) 1,250,000 persons, 700 persons, 455 persons.
C) the individual responses to the question. D) 65% of the sample.

Answer: C

- 32) In a reputable international survey of 2,500 pilots, it was found that 59% of them said that they have flown a plane while sleep deprived. The margin of error was 2.5 percentage points. The raw data of the study is
- A) 59% B) the individual responses to the question.
C) 2,500 pilots, 2.5 percentage points D) the total number of pilots currently flying.

Answer: B

- 33) In a reputable international survey of 2,500 pilots, it was found that 59% of them said that they have flown a plane while sleep deprived. The margin of error was 2.5 percentage points. The goal of the study was to
- A) determine the number of pilots who have flown while sleep deprived.
 - B) determine the percentage of pilots who have flown while sleep deprived.
 - C) determine whether pilots fly while sleep deprived.
 - D) determine if sleep deprivation affects flight safety.

Answer: B

- 34) A poll of 700 persons attending the Taste of Chicago showed that 455 persons, 65% of the sample, believed that the food was overpriced. It is estimated that 1,250,000 persons attend the Taste. Statistics suggest that, although 65% of attendees, with a margin of error of 5 percentage points, believe that the food is overpriced, the Taste is a popular event. The goal of the study was to
- A) determine the number of attendees who believe the food is overpriced.
 - B) determine the percentage of attendees who believed the food is overpriced.
 - C) determine whether the food is overpriced.
 - D) determine whether the Taste is popular despite the price.

Answer: B

- 35) A poll of 700 persons attending the Taste of Chicago showed that 455 persons, 65% of the sample, believed that the food was overpriced. It is estimated that 1,250,000 persons attend the Taste. Statistics suggest that, although 65% of attendees, with a margin of error of 5 percentage points, believe that the food is overpriced, the Taste is a popular event. The sample statistic for the study is
- A) the 455.
 - B) the 65% (of the sample).
 - C) the 65% (of the attendees).
 - D) the margin of error 5%.

Answer: B

- 36) Based on a recent survey of adults in 75,000 households, the U.S. Labor Department reported an unemployment rate of 3.4%. The margin of error was 0.1 percentage point. The sample statistic for the study is
- A) 75,000.
 - B) the margin of error 0.1%.
 - C) 75,000 and 3.4%.
 - D) 3.4%.

Answer: D

- 37) Based on a recent survey of adults in 75,000 households, the U.S. Labor Department reported an unemployment rate of 3.4%. The margin of error was 0.1 percentage point. The goal of the study was to
- A) predict the unemployment rate for the following decade.
 - B) determine the percentage of U.S. adults who are unemployed.
 - C) determine the reasons U.S. adults are unemployed.
 - D) determine the number of U.S. adults who are unemployed.

Answer: B

- 38) A U.S. government report stated that "With bank interest rates at 3.0%, 21% of wage earners believe it worthwhile to keep money in a savings account. However, at 5.0% interest, 27% of wage earners believe it worthwhile to keep money in a savings account. The margin of error for both studies is 4 percentage points." The goal of the study
- A) was to determine the effect of interest rates on the percentage of persons saving money.
 - B) was to prove that higher interest rates encourage more people to save money.
 - C) is not clear from the report of the study.
 - D) was to determine the effect of an interest rate increase from 3% to 5% on the percentage of persons saving money.

Answer: C

- 39) A U.S. government report stated that "With bank interest rates at 3.0%, 21% of wage earners believe it worthwhile to keep money in a savings account. However, at 5.0% interest, 27% of wage earners believe it worthwhile to keep money in a savings account. The margin of error for both studies is 4 percentage points." A proper conclusion from the studies is that
- A) increasing the interest rate will increase the number of persons saving money in a savings account.
 - B) the interest rate difference between 3% and 5% may well have no effect on the number of persons saving money in a savings account.
 - C) increasing the interest rate may well have no effect on the number of persons saving money in a savings account.
 - D) increasing the interest rate by 2 percentage points will increase the number of persons saving money in a savings account.

Answer: B

- 40) A student wanted to know the favorite lunch at a large high school with a closed campus. What is the first step in conducting a statistical study to answer the question?
- A) State the goal of the study precisely.
 - B) Select a random sample of students.
 - C) Select a random sample of students and teachers.
 - D) Select a random sample of teachers.

Answer: A

- 41) Data has been collected from a representative sample of a well-defined population to answer the question: "How much money does the average senior male at Normal Community High School have in his pockets at the end of the school day on Friday?" The next step in the study is to
- A) summarize the data with a sample parameter.
 - B) determine the margin of error.
 - C) use the collected data to make inferences about the population.
 - D) summarize the data with a sample statistic.

Answer: D

- 42) Central Illinois has given a majority of its vote to every Republican presidential candidate since John F. Kennedy. A study was conducted three weeks after the Democratic convention to determine the preference of Central Illinois voters. A random sample of 1100 Central Illinoisians was selected from the rolls of registered voters. Each was contacted and asked to declare a Bush or Gore preference electronically. The results showed that 996 of those in the sample showed a preference for Gore. The last step in the statistical study would be to
- A) determine the population parameter and the margin of error.
 - B) publish the results of the study.
 - C) examine the results for reasonableness.
 - D) review the study and see if the design was correct to meet the goal of the study.

Answer: C

- 43) You want to determine percentage of licensed motorcyclists who wore a helmet every time they rode their motorcycles during the last month. You choose a sample of licensed motorcyclists. You then survey a sample of licensed motorcyclists to determine how many of them wore a helmet every time they rode their motorcycles during the last month. For this sample, you find the percentage of licensed motorcyclists who wore a helmet every time they rode their motorcycles during the last month. The next step in the statistical study would be to
- A) determine the goal of the study.
 - B) make an inference about the percentage of licensed motorcyclists who wore a helmet every time they rode their motorcycles during the last month.
 - C) examine the results of the study for reasonableness.
 - D) make an inference about the percentage of licensed motorcyclists who wore a helmet occasionally when they rode their motorcycles during the last month.

Answer: B

- 44) Recognizing that overloading a parking garage would lead to unsafe conditions, you want to determine the average (mean) weight of vehicles parked in the garage. You choose a sample of vehicles. The next step in the statistical study would be to
- A) weigh each selected vehicle and then find the mean of these weights.
 - B) determine the goal of your study.
 - C) make an inference about the mean weight of all vehicles.
 - D) determine the population parameter and the margin of error.

Answer: A

- 45) A pollster wanted to determine the immediate reaction of the electorate to the selection of Joe Lieberman as the Democrat candidate for vice-president. She called 387 random phone numbers and asked the person answering to respond to the question "I approve of the selection of Joe Lieberman as the Democrat candidate for vice-president. Yes or no." What is the weakness of the study?
- A) The sample is not representative of the population.
 - B) The intent of the study is not well-defined.
 - C) The data collected cannot be transferred to the population.
 - D) The population of interest is not well-defined.

Answer: A

- 46) As a science project a student wanted to know the average temperature in her state at noon on the first day of summer. She called a sample of 30 newspaper offices in the state between 11:30 AM and 12:30 PM on the first day of Summer 2000, asking each for the current temperature. What is the weakness of the study?
- A) The data collected will not yield sample statistics that represent the desired population parameter because of the time interval.
 - B) The data collected will not yield sample statistics that represent the desired population parameter, because more densely populated areas may have more newspapers.
 - C) The sample size is too small.
 - D) The population is not defined.

Answer: B

Determine whether the statement is based on census data or sample data.

- 47) The average age of 45 employees of a large company is found to be 32 years.
- A) Sample data
 - B) Census data

Answer: A

- 48) Among 50 of the 302 patients admitted to an emergency room during one month, 28% had no health insurance.
- A) Census data
 - B) Sample data

Answer: B

- 49) Based on a randomly selected group of 500 patients with high cholesterol, it was found that 67% have heart disease.
A) Census data
B) Sample data
Answer: B
- 50) An investigation of 150 randomly selected local restaurants concluded that 42% of local restaurants have serious health code violations.
A) Sample data
B) Census data
Answer: A
- 51) After inspecting all of 55,000 kg of meat stored at the Wurst Sausage Company, it was found that 45,000 kg of the meat was spoiled.
A) Census data
B) Sample data
Answer: A
- 52) After taking the first exam, 15 of the students dropped the class.
A) Sample data
B) Census data
Answer: B
- 53) A researcher determines that 42.7% of all downtown office buildings have ventilation problems.
A) Sample data
B) Census data
Answer: B
- 54) A researcher determines that of all 25 year old women in her city, 37% are married.
A) Census data
B) Sample data
Answer: A
- 55) A researcher examines the records of all the registered voters in one city and finds that 43% are registered Democrats.
A) Sample data
B) Census data
Answer: B
- 56) A health and fitness club surveys 40 randomly selected members and finds that the average weight of those questioned is 157 lb.
A) Sample data
B) Census data
Answer: A

Determine whether a census is practical in the situation described. Explain your reasoning.

- 57) You want to determine the mean weight of all football players on the local high school football team.
A) A census is practical. The population consists of the small number of players on the local high school team and it is easy to obtain their weights.
B) A census is not practical. It is too difficult to obtain the football players' weights.
Answer: A
- 58) You want to determine the mean length of all the snakes in Illinois.
A) A census is not practical. The number of snakes in Illinois is much too large.
B) A census is practical. The population is small and it would be simple to measure their lengths.
Answer: A

- 59) You want to determine the mean cholesterol level of all biology instructors in the United States.
- A) A census is practical. The population is small and it would be simple to get them to take a cholesterol test.
 - B) A census is not practical. The number of biology instructors in the U.S. is large, and it would be extremely difficult to get them all to take a cholesterol test.

Answer: B

- 60) You want to determine the mean salary of all biology instructors at the University of Illinois.
- A) A census is practical. The number of biology instructors at the University of Illinois is not very large and it would probably be easy to obtain their salaries through a survey that promised anonymity.
 - B) A census is not practical. The number of biology instructors at the University of Illinois is too large and it would probably be difficult to obtain their salaries because of privacy issues.

Answer: A

- 61) You want to check the quality of doughnuts before shipping by performing a taste test.
- A) A census is practical. The taste tester could wear latex gloves when tasting the doughnuts.
 - B) A census is not practical. Testing each doughnut by tasting it would leave none intact to sell.

Answer: B

Select the sample most representative of the population of interest.

- 62) The father of a junior high school student wants to determine the most popular book among junior high students.
- A) A randomly selected group of 10 booksellers
 - B) The group of 30 junior high students attending the birthday party of the researcher's child
 - C) A randomly selected group of 30 junior high students leaving the public library
 - D) A randomly selected group of 30 junior high students

Answer: D

- 63) A researcher wants to determine the status of the electorate one month before the presidential election.
- A) A group of 30 persons from church who voted in the last election
 - B) A group of 30 persons on the voter registration list
 - C) A group of 30 persons contacted by phone with the numbers randomly chosen numbers
 - D) A random group of 30 persons in the phone book

Answer: B

- 64) The Director of Food Operations at a small college campus wants to determine student concerns about cafeteria food.
- A) A randomly selected group of 30 registered students
 - B) A randomly selected group of 30 students leaving the dining hall after dinner
 - C) A randomly selected group of 30 students entering the dining hall before dinner
 - D) A randomly selected group of 30 students who have signed food contracts

Answer: D

- 65) A researcher wants to determine the relative merits of oak and maple as firewood.
- A) Fifteen pieces of each picked up from the floor of a hardwood forest
 - B) Thirty friends, half of whom burn only oak, half of whom burn only maple
 - C) Fifteen pieces of each type of wood cut at the same time from branches of the same size
 - D) Fifteen pieces of each obtained from friends with woodpiles

Answer: C

- 66) A local TV station wanted to report average gasoline prices in the early summer of 2000 in Illinois.
- A) Prices reported by 30 gasoline stations uniformly distributed throughout the state
 - B) Prices reported by the first 30 callers to respond to a request for the last price paid for gasoline
 - C) Prices reported by the station employees
 - D) Prices reported by 30 gasoline stations uniformly distributed throughout the viewing area

Answer: D

- 67) A college student who does laundry infrequently wants to determine the effect of blueing on what should be white clothes.
- A) Two loads of wash, one personal, one of a friend, the blueing assigned by a coin flip
 - B) Reports of two friends, one of whom was given blueing
 - C) Two loads of personal wash, one with, one without blueing
 - D) The reports of an internet chatroom on laundry techniques

Answer: C

- 68) A teacher wants to determine the effect of time of bus riding on grades.
- A) A sample of 15 records of students who ride the bus and 15 who do not ride the bus
 - B) The report of GPA and bus riding time of all the students on one bus route
 - C) The report of GPA and bus riding time of all students at two tables in the school cafeteria
 - D) A sample of the records of 15 students eligible to ride the bus as determined by distance from school and another sample of 15 students not eligible to ride the bus

Answer: B

- 69) An employer wanted to determine the importance of health insurance as a benefit to employees.
- A) A group of 30 employees from the company who had medical treatment in the past year
 - B) A group of thirty potential employees at the state office of employment
 - C) A survey of 300 union members conducted by the union that represents workers at the company
 - D) A group of thirty employees of the company

Answer: D

- 70) A social studies teacher wants to know which news magazine, Time or Newsweek, is the most read by the parents of students in his school.
- A) A group of 30 students reporting on magazines they see their parents reading
 - B) The report of a local convenience store on the relative numbers of the two magazines sold
 - C) A group of 30 parents to be contacted by phone
 - D) A group of 30 students reporting on magazines delivered to their homes

Answer: C

- 71) A concerned parent wants to determine the amount of time spent on the phone by her child's friends.
- A) The results of a national poll of 1800 students in the same age group as the child
 - B) The answers to the question by the parent(s) of 10 of the friends
 - C) The phone records of 10 of the group of friends
 - D) The answers to the question by 10 of the friends

Answer: C

Answer the question.

- 72) The father of a junior high school student wants to determine the most popular book among junior high students. Select the sample with the least potential bias.
- A) A randomly selected group of 30 junior high students
 - B) A randomly selected group of 30 junior high students leaving the public library
 - C) The group of 30 junior high students attending the birthday party of the researcher's child
 - D) A randomly selected group of 10 book sellers

Answer: A

- 73) A researcher wants to determine the status of the electorate one month before the presidential election. Select the sample most likely to produce biased data.
- A) A group of 30 persons contacted by phone with the numbers randomly chosen numbers
 - B) A group of 30 persons on the voter registration list
 - C) A group of 30 persons from the researcher's church who voted in the last election
 - D) A random group of 30 persons in the phone book

Answer: C

- 74) The Director of Food Operations at a small college campus wants to determine student concerns about cafeteria food. Select the sample most likely to evidence bias.
- A) A randomly selected group of 30 registered students
 - B) A randomly selected group of 30 students entering the dining hall before dinner
 - C) A randomly selected group of 30 students leaving the dining hall after a Friday dinner
 - D) A randomly selected group of 30 students who have signed food contracts

Answer: C

- 75) A researcher wants to determine the relative merits of oak and maple as firewood. Which process is most likely to bias the results of the study?
- A) Comparison of the reports of wood burners on the internet
 - B) Personal judgement of the fires of 15 pieces of each type of wood picked up from the floor of a hardwood forest
 - C) Comparisons by 5 friends, none of whom have a wood burning fireplace, of the fires of fifteen pieces of each type of wood obtained from friends with woodpiles
 - D) The judgments of the quality of a wood fire by 30 friends, half of whom burn only oak, half of whom burn only maple

Answer: D

- 76) A local TV station wanted to report average gasoline prices in the early summer of 2000 in Illinois. Which sample might evidence bias on the part of the reporter?
- A) Prices reported by 30 gasoline stations uniformly distributed throughout the state
 - B) Prices reported by the first 30 callers to respond to a request for the last price paid for gasoline
 - C) Prices reported by the station employees
 - D) Prices reported by 30 gasoline stations uniformly distributed throughout the viewing area

Answer: D

- 77) A college student who does laundry infrequently wants to determine the effect of blueing on white clothes. Which sample is most likely to give biased data?
- A) Reports of two friends, one of whom was given blueing
 - B) Two loads of wash, one personal, one of a friend, the blueing assigned by a coin flip
 - C) Two loads of personal wash, one with, one without blueing
 - D) The reports of an internet chatroom on laundry techniques

Answer: B

- 78) A teacher wants to determine the effect of time of bus riding on grades. Which sample might be affected by the personal interest of the reporters?
- A) The report of GPA and bus riding time of all students at two tables in the school cafeteria
 - B) The report of GPA and bus riding time of all the students on one bus route
 - C) A sample of the records of 15 students eligible to ride the bus as determined by distance from school and another sample of 15 students not eligible to ride the bus
 - D) A sample of 15 records of students who ride the bus and 15 who do not ride the bus

Answer: B

- 79) An employer wanted to determine the importance of health insurance as a benefit to employees. Which sample is least likely to be biased by personal interest?
- A) All of the groups have potential bias.
 - B) A group of 30 employees from the company who had medical treatment in the past year
 - C) A survey of 300 union members conducted by the union that represents workers at the company
 - D) A group of thirty potential employees at the state office of employment

Answer: A

- 80) A social studies teacher wants to know which news magazine, Time or Newsweek, is the most read by the parents of students in his school. Which sample is most likely to evidence personal bias?
- A) A group of 30 students reporting on magazines delivered to their homes
 - B) None of the samples is likely to bias the results by personal interest.
 - C) A group of 30 students reporting on magazines they see their parent read
 - D) A group of 30 parents to be contacted by phone

Answer: B

- 81) A concerned parent wants to determine the amount of time spent on the phone by her child's friends. Which sample is likely to bias the results of the study by reporting less than the actual time?
- A) The answers to the question by 10 of the friends
 - B) The results of a national poll of 1800 students in the same age group as the child
 - C) The answers to the question by 10 people from the parent's office
 - D) The answers to the question by the parent(s) of 10 of the friends

Answer: C

Identify which of these types of sampling is used: random, stratified, systematic, cluster, convenience.

- 82) 49, 34, and 48 students are selected from the Sophomore, Junior, and Senior classes with 496, 348, and 481 students respectively.

A) Convenience B) Stratified C) Systematic D) Random E) Cluster

Answer: B

- 83) A sample consists of every 49th student from a group of 496 students.

A) Random B) Convenience C) Stratified D) Cluster E) Systematic

Answer: E

- 84) A market researcher selects 500 drivers under 30 years of age and 500 drivers over 30 years of age.

A) Stratified B) Systematic C) Random D) Cluster E) Convenience

Answer: A

- 85) A market researcher selects 500 people from each of 10 cities.

A) Cluster B) Convenience C) Systematic D) Stratified E) Random

Answer: D

- 86) A tax auditor selects every 1000th income tax return that is received.
A) Convenience B) Cluster C) Random D) Systematic E) Stratified

Answer: D

- 87) A pollster uses a computer to generate 500 random numbers, then interviews the voters corresponding to those numbers.
A) Random B) Systematic C) Stratified D) Convenience E) Cluster

Answer: A

- 88) To avoid working late, a quality control analyst simply inspects the first 100 items produced in a day.
A) Cluster B) Systematic C) Random D) Convenience E) Stratified

Answer: D

- 89) An education researcher randomly selects 48 middle schools and interviews all the teachers at each school.
A) Stratified B) Random C) Convenience D) Systematic E) Cluster

Answer: E

- 90) A researcher interviews 19 work colleagues who work in his building.
A) Stratified B) Systematic C) Convenience D) Cluster E) Random

Answer: C

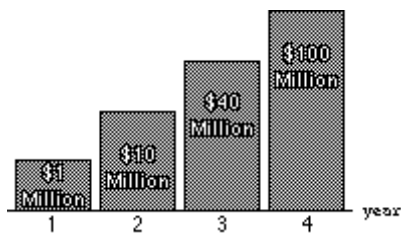
- 91) The name of each contestant is written on a separate card, the cards are placed in a bag, and three names are picked from the bag.
A) Systematic B) Convenience C) Stratified D) Random E) Cluster

Answer: D

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

Provide an appropriate response.

- 92) The graph shows the increases in a certain expenditure over a four-year period. What is wrong with the graph?



Answer: The bars are not drawn in the correct proportions.

- 93) You plan to make a survey of 200 people. The plan is to talk to every 10th person coming out of the school library. Is there a problem with your plan?

Answer: People who don't go to the library are excluded.

- 94) A questionnaire is sent to 10,000 persons. 5000 responded to the questionnaire. 3000 of the respondents say that "They love chocolate ice cream." We conclude that 60% of people love chocolate ice cream. What is wrong with this survey?

Answer: This is not a random sample. The survey is based on voluntary, self-selected responses and therefore has serious potential for bias.

95) "7 out of 10 dentists recommend Brand X toothpaste." This finding is based on the results of a survey of 10 randomly selected dentists. What is wrong with this survey?

Answer: The sample was too small.

96) A researcher published this survey result: "74% of people would be willing to spend 10 percent more for energy from a non-polluting source." The survey question was announced on a national radio show and 1200 listeners responded by calling in. What is wrong with this survey?

Answer: This is not a random sample. The survey is based on voluntary, self-selected responses and therefore has serious potential for bias.

97) "38% of adults in the United States regularly visit a doctor." This conclusion was reached by a college student after she had questioned 520 randomly selected members of her college. What is wrong with her survey?

Answer: The sample is biased. College students are not representative of the U.S. population as a whole.

98) Identify four major flaws in the following: The host of a conservative talk show ran a survey by asking his listeners to respond to the following question: "Do you think that environmental laws which restrict growth should be weakened?" Twenty people responded, and the next day the talk show host announced that the results of his survey suggested that 76% of Americans feel that environmental laws should be weakened.

Answer: The flaws are as follows: 1. The question is loaded because of the phrase "which restrict growth." 2. The sample is self-selected and therefore not random because those with particularly strong views are more likely to respond. 3. The listeners of a particular conservative talk show are not necessarily representative of Americans as a whole. 4. The sample is too small.

99) A college lecturer has devised a new method of teaching a particular mathematical concept and wishes to try out this teaching method on a representative sample of his students. There are 76 students in his class and he wishes to obtain a simple random sample of 25 of them. Describe a method he could use to obtain the sample.

Answer: Answers will vary. Possible answer: List the students' names alphabetically and assign them numbers 1 to 76 according to this list. Use a random number table to construct a list of 25 random numbers between 1 and 76 and select the students corresponding to those numbers.

100) A political researcher wishes to gauge political sentiment regarding a proposed tax cut. He obtains a list of 1000 email addresses from an internet provider, uses a random number table to select a random sample of 100 of these addresses, emails the people in the sample and requests that they respond to his questions by email. Do you think that the group of people who respond is likely to be representative of all registered voters? Explain your answer.

Answer: No; explanations will vary. Possible answer: the sample was obtained from among people who own a computer. That group is likely to include relatively wealthy people who are more likely to favor a tax cut. Furthermore the group includes those who chose voluntarily to respond. People who respond voluntarily are likely to have stronger opinions than the average voter.

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

Is the study experimental or observational?

101) A marketing firm does a survey to find out how many people use a product. Of the one hundred people contacted, fifteen said they use the product.

A) Observational

B) Experimental

Answer: A

- 102) A clinic gives a drug to a group of ten patients and a placebo to another group of ten patients to find out if the drug has an effect on the patients' illness.
A) Observational B) Experimental
Answer: B
- 103) A sample of fish is taken from a lake to measure the effect of pollution from a nearby factory on the fish.
A) Observational B) Experimental
Answer: A
- 104) A political pollster reports that his candidate has a 10% lead in the polls with 10% undecided.
A) Experimental B) Observational
Answer: B
- 105) A quality control specialist compares the output from a machine with a new lubricant to the output of machines with the old lubricant.
A) Observational B) Experimental
Answer: B
- 106) A stock analyst selects a stock from a group of twenty for investment by choosing the stock with the greatest earnings per share reported for the last quarter.
A) Observational B) Experimental
Answer: A
- 107) The highway department paves one section of an Interstate with Type A concrete and an adjoining section with Type B concrete and observes how long it takes until cracks appear in each.
A) Observational B) Experimental
Answer: B
- 108) A T.V. show's executives raised the fee for commercials following a report that the show received a "No. 1" rating in a survey of viewers.
A) Observational B) Experimental
Answer: A
- 109) An Information Technology Manager compares the average time required for 12 megabyte downloads using a standard dial-up connection and using a cable modem.
A) Experimental B) Observational
Answer: A
- 110) A doctor induces a cardiac stress test to determine the reason for a patient's illness.
A) Observational B) Experimental
Answer: B

Identify the variable of interest in the study.

- 111) A marketing firm does a survey to find out how many people use a product. Of the one hundred people contacted, fifteen said they use the product.
A) The number of people who choose a different product
B) The 15 people who said they use the product
C) The individual responses to the survey question
Answer: C

- 112) A clinic gives a drug to a group of ten patients and a placebo to another group of ten patients to find out if the drug has an effect on the patients' illness.
- A) Whether the drug has an effect on the patients' illness
 - B) The group of 10 patients
 - C) Whether the placebo effects the patients' illness

Answer: A

- 113) A sample of fish is taken from a lake to measure the effect of pollution from a nearby factory on the fish.
- A) The sample number of fish taken from the lake
 - B) Whether the factory should remain in operation
 - C) The measure of the effect of pollution from the factory on the fish

Answer: C

- 114) A T.V. show's executives raised the fee for commercials following a report that the show received a "No. 1" rating in a survey of viewers.
- A) The responses to the survey question
 - B) Whether the show's rating has an effect on the cost of the commercials
 - C) Whether raising the fee for commercials has an effect on the show's rating

Answer: A

- 115) A quality control specialist compares the output from a machine with a new lubricant to the output of machines with the old lubricant.
- A) The difference between the measured outputs of a machine using each type of lubricant
 - B) The number of machines tested
 - C) Whether the new lubricant is more cost-effective than the old lubricant

Answer: A

- 116) The highway department paves one section of an Interstate with Type A concrete and an adjoining section with Type B concrete and observes how long it takes until cracks appear in each.
- A) The difference between the measured length of time it takes for cracks to appear in each type of concrete
 - B) Whether Type A concrete provides better traction than Type B concrete
 - C) The difference between cost of the two types of concrete

Answer: A

- 117) An Information Technology Manager compares the average time required for 12 megabyte downloads using a standard dial-up connection and using a cable modem.
- A) The difference between the measured download capacity using standard dial-up connection and cable modem
 - B) Whether standard dial-up is more reliable than cable modem
 - C) The difference between the measured time required for 12 megabyte downloads using standard dial-up connection and cable modem

Answer: C

- 118) A doctor performs several diagnostic tests to determine the reason for a patient's illness.
- A) The effect of the diagnostic test on the patient's illness
 - B) The results of the diagnostic tests
 - C) The effect of a drug on the patient's illness

Answer: B

- 119) An analysis of 10 individual studies attempted to determine if there is a conclusive link between "the Pill" and ovarian cancer.
- A) The effect of a placebo on the subject's illness
 - B) Whether the subject developed ovarian cancer
 - C) The number of studies performed

Answer: B

- 120) Researchers at a university lab found that a genetically modified insect frog a toxin through its skin.
- A) The measured amount of toxin that is released through the frog's skin
 - B) Whether the frog also releases water through its skin
 - C) The measured thickness of the frog's skin

Answer: A

Provide an appropriate response.

- 121) A nutritionist wants to conduct a study to validate the efficacy of an herb as an aid in weight loss. She randomly assigns half of a group of overweight persons to a treatment group who are given the herb with instructions as to use and a planned diet for six weeks. The other half of the group is given a placebo with the same instructions and same diet. None of the participants know to which group they belong. She weighs each subject on Friday of each week. What type of blinding is being used?

- A) single-blind
- B) double-blind
- C) triple-blind
- D) does not use blinding

Answer: A

- 122) A nutritionist wants to conduct a study to validate the efficacy of an herb as an aid in weight loss. She hires an experimenter to randomly assign half of a group of overweight persons to a treatment group who are given the herb with instructions as to use and a planned diet for six weeks. The other half of the group is given a placebo with the same instructions and same diet. None of the participants know to which group they belong. The experimenter weighs each subject on Friday of each week. What type of blinding is being used?

- A) double-blind
- B) does not use blinding
- C) single-blind
- D) triple-blind

Answer: A

- 123) A nutritionist wants to conduct a study to validate the efficacy of an herb as an aid in weight loss. She randomly assigns half of a group of overweight persons to a treatment group who are given the herb with instructions as to use and a planned diet for six weeks. The other half of the group is given the same diet without the herb. Participants are aware as to which group they belong. She weighs each subject on Friday of each week. What type of blinding is being used?

- A) triple-blind
- B) double-blind
- C) does not use blinding
- D) single-blind

Answer: C

- 124) A nutritionist wants to conduct a study to validate the efficacy of an herb as an aid in weight loss. She randomly assigns half of a group of overweight persons to a treatment group who are given the herb with instructions as to use and a planned diet for six weeks. The other half of the group is given a placebo with the same instructions and same diet. None of the participants know to which group they belong. The nutritionist weighs each subject on Friday of each week. Identify any problems that are likely to cause confounding.

- A) Method of assignment to treatment and control groups
- B) Experimenter effect
- C) The study is essentially free of potential confounding.
- D) Placebo effect

Answer: B

- 125) A nutritionist wants to conduct a study to validate the efficacy of an herb as an aid in weight loss. She randomly assigns half of a group of overweight persons to a treatment group who are given the herb with instructions as to use and a planned diet for six weeks. The other half of the group is given a placebo with the same instructions and same diet. None of the participants know to which group they belong. A nurse at the nutrition center weighs each subject on Friday of each week. Identify any problems that are likely to cause confounding.
- A) Method of assignment to treatment and control groups
 - B) Experimenter effect
 - C) The study is essentially free of potential confounding.
 - D) Placebo effect

Answer: C

- 126) A nutritionist wants to conduct a study to validate the efficacy of an herb as an aid in weight loss. She randomly assigns half of a group of overweight persons to a treatment group who are given the herb with instructions as to use and a planned diet for six weeks. The other half of the group is given the same diet without the herb. Participants are aware as to which group they belong. A nurse at the nutrition center weighs each subject on Friday of each week. Identify any problems that are likely to cause confounding.
- A) The placebo effect
 - B) Method of assignment to treatment and control groups
 - C) Experimenter effect
 - D) The study is essentially free of confounding sources.

Answer: A

- 127) A nutritionist wants to conduct a study to validate the efficacy of an herb as an aid in weight loss. One hundred members of a weight loss group who are patrons of the nutrition center sign up for the treatment or the control group. After 50 have signed up for the control group, the rest are assigned to the treatment group. The members of the treatment group are given the herb with instructions as to use and a planned diet for six weeks. The control group is given a placebo with the same instructions and same diet. A nurse at the nutrition center weighs each subject on Friday of each week. Identify any problems that are likely to cause confounding.
- A) Method of formation of the control and treatment groups
 - B) Placebo effect
 - C) Experimenter effect
 - D) The study is essentially free from potential sources of confounding.

Answer: A

- 128) A district administrator wants to determine the effect of truancy on academic achievement. In an effort to 'blind' the experiment, she asks the dean at one high school to randomly select the records of 50 truant students and asks the dean at another high school to randomly select the records of 50 nontruant students. Identify any problems that are likely to cause confounding.
- A) the use of two different deans as selectors
 - B) the use of cases from two different schools
 - C) analysis by the district administrator
 - D) nothing (this is a well-designed retrospective study)

Answer: B

- 129) A district administrator wants to determine the effect of truancy on academic achievement. She asks the dean at a high school to randomly select the records of 50 truant students and to randomly select the records of 50 nontruant students. Identify any problems that are likely to cause confounding.
- A) the use of one person to select the records for members of both groups
 - B) the use of records from only one school
 - C) the number of records in each group (since, presumably, there are more nontruant students, there should be more members selected from that group)
 - D) nothing (this is a well-designed retrospective study)

Answer: D

- 130) An experiment is designed to evaluate the effectiveness of fungicide and light on phlox plant growth. Fungicide is used with one group of phlox plants in a sunny region and fluorescent lamps are used with phlox plants in a shady region. Identify any problems that are likely to cause confounding.
- A) Experimenter effect.
 - B) There are no problems. This is a well-designed experiment.
 - C) There is no way to know if sunlight and fluorescent lamps produce similar effects on growth.
 - D) There is no way to know if any differences in effects from the two groups are attributable to the treatment (fungicide or fluorescent lamps) or the type of region (sunny or shady).

Answer: D

Identify the type of study most appropriate to the question.

- 131) What is the mean campus-home distance for students at Eureka College (alma mater of Ronald Reagan)?
- A) Observational
 - B) Retrospective observational
 - C) Meta-analysis
 - D) Experimental

Answer: A

- 132) Which is the best fertilizer for Mr. Jimenez' backyard grass?
- A) Experimental blinded
 - B) Experimental
 - C) Observational
 - D) Retrospective observational

Answer: B

- 133) Is the Addison Wesley Longman Algebra I text superior to the currently used text in promoting learning of Algebra?
- A) Observational
 - B) Retrospective observational
 - C) Single-blind experiment
 - D) Double-blind experiment

Answer: D

- 134) Which gender performs better in Algebra I?
- A) Observational
 - B) Retrospective observational
 - C) Experimental
 - D) Double-blind experimental

Answer: B

- 135) Is the aspirin produced by a particular pharmaceutical company better than that of a competitor at relieving headaches?
- A) Experimental
 - B) Observational
 - C) Retrospective observational
 - D) Double-blind experimental

Answer: D

- 136) A science project question: Which of two paper towels is more absorbent?
A) Observational
B) Double-blind experimental
C) Single-blind experimental
D) Experimental

Answer: D

- 137) What is the mean number of cars waiting for the green light at Main and Empire at rush hour (4:00 PM to 7:00 PM)?
A) Single-blind experimental
B) Experimental
C) Retrospective observational
D) Observational

Answer: D

- 138) Which of two home/work routes will result in the lower mean commute time?
A) Single-blind experimental
B) Retrospective observational
C) Experimental
D) Observational

Answer: C

- 139) Are the assessments different in two subdivisions advertised as equivalent?
A) Meta-analysis
B) Observational
C) Experimental
D) Retrospective observational

Answer: D

- 140) An analysis of 10 individual studies attempted to determine if there is a conclusive link between "the Pill" and ovarian cancer.
A) Retrospective observational
B) Experimental
C) Single-blind experimental
D) Meta-analysis

Answer: D

Answer the question.

- 141) Analysis of the raw data of a statistical study showed that of 100 married couples, 3 met on a blind date. Which question most probably represents the purpose of the study?
A) What percent of blind dates lead to marriage?
B) How many married couples in the U.S. initially met on a blind date?
C) What percent of married couples initially met on a blind date?
D) What percent of married couples who met on blind dates eventually get divorced?

Answer: C

- 142) Analysis of the raw data of a statistical study showed that of 100 couples who met on a blind date, three married. Which question most probably represents the purpose of the study?
A) What percent of married couples who met on blind dates get divorced?
B) How many married couples in the U.S. initially met on a blind date?
C) What percent of marriages began with a blind date?
D) What percent of blind dates lead to marriage?

Answer: D

- 143) Sixty-seven of the 156 students taking Introductory Statistics are business majors. Which question most probably represents the purpose of the study?
A) What percent of business majors take Introductory Statistics?
B) What percent of students are business majors?
C) What percent of students take Introductory Statistics?
D) What percent of Introductory Statistics students are business majors?

Answer: D

- 144) Which data provide the answer to the question: "How frequently can a student at Eureka College be expected to study more than three hours a day?"
- A) Of 100 students surveyed, 43 reported that they intend to study at least three hours a day next week.
 - B) Of 100 students surveyed, 43 reported that they studied at least three hours a day twice last week.
 - C) Of 100 students surveyed, 43 reported that they study at least three hours a day twice a week.
 - D) Of 100 students surveyed, 43 reported that they have studied at least three hours a day.

Answer: C

- 145) Of the 192 classes I attended last semester, the professor was late 11 times. Which question most probably represents the purpose of the study?
- A) What percent of classes will not start on time?
 - B) How many classes will not start on time during a full school year?
 - C) What percent of professors are late to class?
 - D) For what percent of classes is a professor tardy?

Answer: A

- 146) Which data provide the answer to the question: "What percent of illegal drug use begins with tobacco smoking?"
- A) Twenty-eight of 62 clients of a drug rehab center reported that they smoked cigarettes before using illegal drugs.
 - B) Eleven of a group of 78 smokers said they used illegal drugs.
 - C) Twenty-eight of 62 clients of a drug rehab center reported that they smoked cigarettes while using illegal drugs.
 - D) Sixty-seven of a group of 78 drug users said they smoked.

Answer: A

- 147) Fifty-one of 132 computer users reported that they can touch-type. Which question most probably represents the purpose of the study?
- A) What percent of touch-typers are computer users?
 - B) What percent of computer users can touch-type?
 - C) How many people who use computers touch-type proficiently?
 - D) How many people who touch-type proficiently use computers?

Answer: B

- 148) A survey of 100 dog owners showed that the average dog "checked the mail" eleven times during an evening walk. Which question most probably represents the purpose of the study?
- A) How many dog owners take dogs for an evening walk?
 - B) How many pet owners have dogs?
 - C) How many dogs "check the mail" on an evening walk?
 - D) How many "mail check stops" can a dog be expected to make on an evening walk?

Answer: D

- 149) Two hundred cable TV customers were asked to watch programs at 7:00 PM on Fridays and determine the number of these programs they considered worth watching. There were 180 respondents. Of the 134 programs viewed, the average deemed worthwhile was 23. Which question most probably represents the purpose of the study?
- A) What percent of cable programs are considered worth watching?
 - B) What percent of cable programs at 7:00 PM on Friday are considered worth watching?
 - C) What percent of cable subscribers will respond to a survey?
 - D) What percent of cable viewers watch TV at 7:00 PM on Friday?

Answer: B

- 150) Seven of 23 ticketed speeders were also ticketed for speeding in the last six months. Which question most probably represents the purpose of the study?
- A) What percent of drivers have had at most two citations within the past six months?
 - B) What percent of ticketed drivers have had another citation within the past six months?
 - C) How many drivers will be ticketed at most twice in the six months?
 - D) How many drivers will be ticketed at least twice in the six months?

Answer: B

Determine the evaluation guideline that applies best in questioning the results of the described study.

- 151) A new publisher of educational texts reported: "We had teachers use our texts in six Algebra I classes and other teachers use another leading text in six Algebra I classes. We tested the students at the end of the semester and students using our text scored 11 points higher."
- A) Consider possible confounding variables.
 - B) Consider the source.
 - C) Consider the sampling method.
 - D) Consider the population.

Answer: B

- 152) A homeowner put a brand-name fertilizer/weed killer on half of his lawn and a generic fertilizer/weed killer on the other half. After three weeks, the generic side had 1 weed per square meter, the other side 1.7 weeds per square meter. The generic side required two mowings in the 3 weeks, the brand-name side one. The homeowner concluded that the generic was superior to the brand-name.
- A) Consider the type of study.
 - B) Consider the sample.
 - C) Consider possible confounding variables.
 - D) Consider the source.

Answer: C

- 153) A reading teacher wanted to know how many books her students read over the summer. She asked the local librarian to keep a record for her. The record showed that 7 students checked out a total of 60 books. At the first faculty meeting she reported that, on average, students in her class read 8.6 books over the summer.
- A) Consider the measurement of the variable of interest.
 - B) Consider the sampling method.
 - C) Consider possible confounding variables.
 - D) Consider the source.

Answer: B

- 154) A teacher wanted to know the attitudes of faculty on early dismissal for Homecoming. She randomly selected 20 of the 114 faculty and asked them to circle "agree" or "disagree" on the form as follows: "Agree/Disagree: Valuable learning time should not be sacrificed for extracurricular social activities."
- A) Consider the type of study.
 - B) Consider the form of response.
 - C) Consider the wording of any survey.
 - D) Consider the sampling method.

Answer: C

- 155) A teacher wanted to know the attitudes of faculty on early dismissal for Homecoming. She randomly selected 20 of the 114 faculty and asked them to verbally respond to the question "Agree/Disagree: Afternoon classes should be dismissed for Homecoming." Sixteen of the 20 members of the sample responded "Disagree." She reported to the administration that 80% of the faculty was against dismissing classes for homecoming.
- A) Consider the method of response.
 - B) Consider the wording of any question.
 - C) Consider the method of sample selection.
 - D) There is no reason to question the report of the study.

Answer: A

- 156) To determine the percent of wives in "happy" marriages, a psychologist at a convention dinner asked the female members of couples if she was married and, if so, happily. She reported that 89% of married women are in "happy" marriages.
- A) Consider the presentation of results.
 - B) Consider the setting.
 - C) Consider the sample.
 - D) Consider the source.

Answer: B

- 157) To gauge the audience approval of a local newscast, viewers were asked to call in with their comments. Based on the results, the station advertised that 93 percent of viewers approved of the format of the newscast.
- A) Consider the extension of the sample to the population.
 - B) Consider possible sample participation bias.
 - C) Consider survey wording.
 - D) Consider possible sample selection bias.

Answer: B

- 158) To determine the average amount of physical exercise of the members of the Eureka College faculty, a student randomly selected a sample of 20 faculty and asked them to check a form rating daily exercise from "(1) very little, (2) some, (3) moderate, (4) quite a bit, (5) extensive." The student reported that, on average, a Eureka College faculty member exercises moderately each day.
- A) Consider possible confounding variables.
 - B) Consider the measurement of the variable of interest.
 - C) Consider the method of selection of the sample.
 - D) Consider the source.

Answer: B

- 159) A survey of 100 randomly selected college students asked "How many IQ points would you sacrifice to become better looking?" The result as published in the student newspaper was "Students will sacrifice 18 IQ points to be better looking."
- A) Consider the extension to the population of students.
 - B) Consider the wording of the question.
 - C) Consider the measurement of the variable of interest.
 - D) Consider the definition of the variable of interest.

Answer: D

- 160) A high school dean conducted a study and reported that "Working lowers the GPA of high school juniors by 22%." The data consisted of a sample of 38 working students having a GPA of 2.26 and a sample of 38 nonworking students having a GPA of 2.91.
- A) Consider the source of the data.
 - B) Consider the source of the study.
 - C) Consider possible confounding variables.
 - D) Consider the summary value as calculated from the data.

Answer: C

Identify and explain a source of bias in the study described. Then suggest how the bias might have been avoided.

- 161) A popular news source published an article that included these statements: "Ethanol--the renewable, clean source of fuel that will break our country's ties to foreign oil for good! Several studies, reported in a reputable journal of science and technology, showed that, when burned, Ethanol released fewer toxic chemicals than petroleum-based fuels. The Farmers Association financed much of the research."
- A) Because Ethanol is made from corn and much of the funding was provided by the Farmers Association, the researchers may have been more inclined to provide favorable results. The bias could have been avoided if the researchers had not been paid by this group.
 - B) Because much of the funding was provided by a private agency and not a governmental one, the researchers may have been more inclined to show the petroleum industry in an unfavorable light. The bias could have been avoided if the research had not been paid for privately.

Answer: A

- 162) When a well-known sports writer wrote "Jocks Make Great Dads," he based conclusions about the general population of all men on 3,200 replies that he received after mailing 100,000 questionnaires to various country clubs.
- A) The sample is random but the proportion of replies is small and all from men who play sports. A better sampling procedure, such as interviews with at least 10,000 randomly chosen men, would have helped.
 - B) The sample is self-selected and the proportion of replies is small, so the responses are likely to have come from those with strong feeling about the issues. A better sampling procedure, such as interviews with 3,200 randomly chosen men, would have helped.

Answer: B

- 163) A popular magazine ran a survey about a web site that provides driving directions. Readers could register their responses on the magazine's web site.
- A) The magazine is biased in favor of the web site because it receives funding from the company. An independent pollster should be hired to run the survey.
 - B) Because the respondents are self-selected, they are likely to represent those who have strong feelings about the issue. A better sampling method such as the simple random sampling used by most polling companies is needed.

Answer: B

- 164) You plan to conduct a survey to find the percentage of people in your town who favor a new swimming pool being built at the high school. You obtain addresses from a list of property owners in the town and you mail a survey to 100 randomly selected people from the list.
- A) The list of property owners is clearly biased toward those who can afford to own property. Also, a mail survey will result in a self-selected sample. A better sampling method, such as simple random sampling, is needed.
 - B) The list of property owners is clearly biased toward those who have children. Also, a mail survey will result in a self-selected sample. A better sampling method, such as a voluntary response survey, is needed.

Answer: A

Provide an appropriate response.

165) A reputable research group did a study for a popular magazine illustrating the effects of wording in a survey. Two questions were asked:

- Do you personally believe that euthanasia is wrong?
- Whatever your own personal view of euthanasia, do you favor or oppose a doctor's choice of performing euthanasia with the consent of the patient's family in a case where there is no hope for life beyond a vegetative state?

To the first question, 61% of the respondents replied "yes," while 32% responded "no." In response to the second question, 70% favored the choice, while 28% opposed the choice. Tell why the two questions produced seemingly contradictory results. How could the results of the questions be used selectively by various groups?

- A) The word "personally" in the first question could be misleading (loaded). Some people might personally believe that euthanasia is wrong but be insensitive to other's opinions. The second question could also be confusing, as "consent of the patient's family" is subject to debate. Groups favoring choice would be likely to cite the first question, while groups opposed to euthanasia would be more likely to cite the results of the second question.
- B) The word "wrong" in the first question could be misleading (loaded). Some people might believe that euthanasia is wrong but still favor choice under certain circumstances. The second question could also be confusing, as "no hope for life beyond a vegetative state" is subject to debate. Groups opposed to euthanasia would be likely to cite the first question, while groups favoring choice would be more likely to cite the results of the second question.

Answer: B

166) A Gallop poll asked the following two questions:

· Do you favor a property tax cut or "increased spending on other local government programs?" Result: 89% for the tax cut.

· Do you favor a property tax cut or "spending to fund new and improved sewer systems, sidewalks, streets?" Result: 71% for the spending.

Tell why the two questions produced seemingly contradictory results. How could the results of the questions be used selectively by various groups?

- A) The first question refers only to "governmental programs" which many people consider to be generally wasteful. The second question lists specific programs that are generally very popular. Groups favoring tax cuts would be likely to cite the first question, and groups opposed to tax cuts would be more likely to cite the results of the second question.
- B) The first question refers only to "governmental programs" which are generally very popular. The second question lists specific programs that are generally very unpopular. Groups opposing tax cuts would be likely to cite the first question, and groups favoring tax cuts would be more likely to cite the results of the second question.

Answer: A

167) This exercise poses two related questions that might form the basis of a statistical study. Tell how the two questions differ and how these differences would affect the goal of a study and the design of the study.

First question: How often do high school students attempt suicide?

Second question: How often are suicide attempts made by high school students?

- A) The first question involves a study of high school students in general. The second question involves a study of those who attempt suicide. The first question might be addressed by surveying high school students. The second question would be addressed by surveying people who attempt suicide, a group that would be much more difficult to survey.
- B) The first question involves a study of people who attempt suicide. The second question involves a study of high school students in general. The first question would be addressed by surveying all those who attempt suicide, a group that would be difficult to survey. The second question might be addressed by surveying high school students.

Answer: A

168) This exercise gives a headline and a brief description of the statistical news story that accompanied the headline. whether the headline accurately represents the story.

Headline: "Looks more important than intelligence"

Story Summary: A survey found that 78% of 400 people interviewed by phone ranked looks in a mate important or very important, while 71% ranked intelligence in a mate as important or very important.

- A) The story does not include the margin of error. However, with a sample size of 400, the margin of error is around 2 percentage points, so the likely range for looks in a mate is 76% to 80% and the likely range for intelligence in a mate is 69% to 73%. Because these ranges do not overlap, it is quite possible that the headline is correct.
- B) The story does not include the margin of error. With a sample size of 400, the margin of error is around 5 percentage points, so the likely range for looks in a mate is 73% to 83% and the likely range for intelligence in a mate is 66% to 76%. Because these ranges overlap, it is quite possible that the headline is incorrect.

Answer: B

169) In the following summary of a statistical report, tell what crucial information is missing and what more you would know before you acted on the report.

A news program reports on a Survey of America's Top Hospitals which found that "only ten hospitals received a rare 48 out of a possible 50 rating and none of those hospitals are in the Windy City."

- A) The report appears to be making a statement about the quality of hospitals in Chicago (the "Windy City"), but much information is missing. What about hospitals with ratings of 49 or 50? What criteria were used for the ratings? Who actually did the rating?
- B) The sample size and population size are given. However, no information is given about the meaning of "rating" or "rare" or about who actually did the rating.

Answer: A

170) In the following summary of a statistical report, tell what crucial information is missing and what more you would know before you acted on the report.

A popular newspaper headline reported that "Idaho Feels Carb Crisis as Potatoes Lose Appeal," and the accompanying graph showed that while 150 million potatoes were exported from Idaho in 1990, only 75 million were exported from Idaho in 2007.

- A) The headline makes a reference to the popular anti-carb diet, but the statistics provide no information about the number of people on the diet during the given years.
- B) The article suggests that the state of Idaho is having a crisis, so some change is having a dramatic effect, but no information is given about any such change.

Answer: B