

CHAPTER 1 FORM B

Name _____ Course Number: _____ Section Number: _____

Directions: Answer the questions in the spaces provided, or attach paper. Circle the correct choice for each response set.

Provide an appropriate response.

- 1) A student surveyed a simple random sample of students at her college. Is this sample likely to be representative of all students at her college? Of all adults in the United States? Explain.

Use common sense to determine whether the given event is impossible; possible, but very unlikely; or possible and likely.

- 2) Luis and his sister both won more than a million dollars in lotteries last year
- A) Possible and likely
- B) Impossible
- C) Possible, but very unlikely

Provide an appropriate response.

- 3) The table shows the weights, in pounds, of seven subjects before and after following a particular diet for two months. Assume that the x-values are the weights before the diet and the y-values are the weights after the diet.

Subject	A	B	C	D	E	F	G
Before	166	151	167	188	176	157	161
After	159	142	165	193	162	159	149

Are the x-values matched with the corresponding y-values? That is, is each x-value associated with the corresponding y-value in some meaningful way? If the x- and y-values are matched, does it make sense to use the difference between each x-value and the y-value that is in the same column? Why or why not?

Form a conclusion about statistical significance. Do not make any formal calculations. Either use the results provided or make subjective judgments about the results.

- 4) Last year, the average math SAT score for students at one school was 475. The headmaster introduced new teaching methods hoping to improve scores. This year, the mean math SAT score for a sample of students was 481. Is there statistically significant evidence that the new teaching method is effective? If the teaching method had no effect, there would be roughly a 3 in 10 chance of seeing such an increase. Does the result have statistical significance? Why or why not? Does the result have practical significance?

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

- 5) A sample of 120 employees of a company is selected, and the average age is found to be 37 years.
- A) Statistic B) Parameter

Determine whether the given value is from a discrete or continuous data set.

- 6) The total number of phone calls a sales representative makes in a month is 425.
- A) Continuous B) Discrete

Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate.

- 7) Amount of fat (in grams) in cookies.
- A) Ratio B) Interval C) Ordinal D) Nominal
- 8) Temperatures of the ocean at various depths.
- A) Ordinal B) Ratio C) Interval D) Nominal

Identify the sample and population. Also, determine whether the sample is likely to be representative of the population.

- 9) An employee at the local ice cream parlor asks three customers if they like chocolate ice cream.

Use critical thinking to develop an alternative conclusion.

- 10) In a study of headache patients, every one of the study subjects with a headache was found to be improved after taking a week off of work. Conclusion: Taking time off work cures headaches.

Use critical thinking to address the key issue.

- 11) A researcher wished to gauge public opinion on gun control. He randomly selected 1000 people from among registered voters and asked them the following question: "Do you believe that gun control laws which restrict the ability of Americans to protect their families should be eliminated?". Identify the abuse of statistics and suggest a way the researcher's methods could be improved.

Perform the requested conversions. Round decimals to the nearest thousandth and percents to the nearest tenth of a percent, if necessary.

- 12) Convert 58% to an equivalent fraction and decimal.

A) $\frac{14}{25}$, 0.58

B) $\frac{14}{25}$, 5.8

C) $\frac{29}{50}$, 0.58

D) $\frac{29}{50}$, 5.8

Solve the problem.

- 13) On a test, if 80 questions are answered and 78 of them are correct, what is the percent of correct answers? Round to the nearest percent.
- A) 103% B) 98% C) 2% D) 0.98%

Provide an appropriate response.

- 14) Jon consulted with an accountant to prepare his tax return. He recommended the accountant to his friend saying that this year the amount he paid in taxes was 150% less than last year. What is wrong with this statement?

Determine whether the given description corresponds to an observational study or an experiment.

- 15) 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 study B) Experiment
- 16) A T.V. show's executives commissioned a study to gauge the impact of the show's ratings on the sales of its advertisers.
- A) Observational study B) Experiment

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

- 17) A market researcher selects 500 drivers under 30 years of age and 500 drivers over 30 years of age.
- A) Systematic
 - B) Random
 - C) Stratified
 - D) Convenience
 - E) Cluster

Provide an appropriate response.

- 18) A polling company obtains an alphabetical list of names of voters in a precinct. They select every 20th person from the list until a sample of 100 is obtained. They then call these 100 people. Does this sampling plan result in a random sample? Simple random sample? Explain.
- A) No; no. The sample is not random because not all voters have the same chance of being selected. The second person on the list has no chance of being selected. It is not a simple random sample because some samples are not possible, such as a sample containing the second person on the list.
 - B) Yes; no. The sample is random because all voters have the same chance of being selected. It is not a simple random sample because some samples are not possible, such as a sample containing the second person on the list.
 - C) No; yes. The sample is not random because not all voters have the same chance of being selected. The second person on the list has no chance of being selected. It is a simple random sample because all samples of 100 voters have the same chance of being selected.
 - D) Yes; yes. The sample is random because all voters have the same chance of being selected. It is a simple random sample because all samples of 100 voters have the same chance of being selected.

Identify the type of observational study (cross-sectional, retrospective, prospective).

- 19) A statistical analyst obtains data about ankle injuries by examining a hospital's records from the past 3 years.
- A) Prospective
 - B) Cross-sectional
 - C) Retrospective
 - D) None of these

Provide an appropriate response.

- 20) In a clinical trial for a new headache medication, participants are randomly assigned to a treatment group or a placebo group. They do not know whether they are receiving the medication or a placebo. However the doctors administering the medication and evaluating the results do know which participants are receiving the medication. This experiment is blind but not double blind. Explain what this means and why the absence of double blinding could cause a problem.

Answer Key

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- 1) Yes. Since the sample is a simple random sample drawn from students at her college it is likely to be representative of this group. No. Since students at her college are not representative of all adults in the United States, a sample from this group, however well selected, is unlikely to be representative of all United States adults.
- 2) C
- 3) The x-values are matched with the corresponding y-values. It makes sense to use the difference between each x-value and the y-value that is in the same column. Both represent weights measured in pounds and both are associated with the same person. The x-value is the weight of a person before the diet and the y-value in the same column is the weight of the same person after the diet. The difference represents the amount of weight lost (or gained) by that person.
- 4) No. The new mean SAT score is not substantially higher. Even if the new teaching method had no effect, a small increase such as this could easily be seen just by chance. No. The increase is not sufficient to be of practical significance.
- 5) A
- 6) B
- 7) A
- 8) C
- 9) Sample: the 3 selected customers; population: all customers; not representative
- 10) Headaches generally last for only a few hours, so anything would seem like a cure. There is no evidence to suggest that taking time off work will cure a headache.
- 11) The question is loaded. A more neutral way to phrase the question would be, for example, "Do you believe that gun control laws should be strengthened, weakened, or left in their current form?"
- 12) C
- 13) B
- 14) If Jon's taxes were reduced by 100% he would be paying no taxes at all, so it is not possible for his taxes to be reduced by more than 100%.
- 15) B
- 16) A
- 17) C
- 18) A
- 19) C
- 20) This experiment is blind because participants do not know whether they are receiving the treatment or a placebo. This will allow investigators to determine whether the treatment effect is significantly different from the placebo effect. However, the experiment is not double blind because the doctors administering the medication and evaluating the results know which participants are receiving the medication. The doctors may not be impartial and their evaluation and analysis of results could be influenced by their knowledge of which participants are receiving the treatment.