

CHAPTER 1 FORM A

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 teacher was interested in knowing how much tax people pay in the United States. She selected a simple random sample of her friends and asked them about their taxes. Is this sample likely to be representative of all adults in the United States?

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

- 2) Andre flipped a coin twice and it came up the same way both times.
- A) Impossible
 - B) Possible, but very unlikely
 - C) Possible and likely

Provide an appropriate response.

- 3) Use the data in the table to answer the question. The x-values are amounts of saturated fat (in grams) in various regular two-ounce muffins. The y-values are amounts of saturated fat (in grams) in various "low fat" two-ounce muffins.

Amounts of Saturated Fat in Regular and Low-Fat Muffins

x	4.6	6.1	4.6	3.6	5.8	6.4
y	1.2	2.1	1.5	2.2	1.2	1.5

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

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) A manufacturer of laptop computers claims that only 1% of their computers are defective. In a sample of 600 computers, it was found that 3% were defective. If the proportion of defectives were really only 1%, there would be less than 1 chance in 1000 of getting such a large proportion of defective laptops in the sample. Is there statistically significant evidence against the manufacturer's claim? Why or why not?

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

12) Convert 0.64 to an equivalent fraction and percent.

- A) $\frac{16}{25}$, 64% B) $\frac{3}{5}$, 64% C) $\frac{16}{25}$, 6.4% D) $\frac{3}{5}$, 6.4%

Solve the problem.

13) On a test, 95% of the questions are answered correctly. If 57 questions are correct, how many questions are on the test?

- A) 167 B) 95 C) 19 D) 60

Provide an appropriate response.

14) An advertisement for a heating pad says that it can reduce back pain by 200%. What is wrong with this statement?

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

15) 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) Experiment B) Observational study

16) A quality control specialist compares the output from a machine with a new lubricant to the output of machines with the old lubricant.

- A) Experiment B) Observational study

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

17) A pollster uses a computer to generate 500 random numbers, then interviews the voters corresponding to those numbers.

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

Provide an appropriate response.

- 18) An education expert is researching teaching methods and wishes to interview teachers from a particular school district. She randomly selects ten schools from the district and interviews all of the teachers at the selected schools. Does this sampling plan result in a random sample? Simple random sample? Explain.
- A) No; yes. The sample is not random because teachers in small schools are more likely to be selected than teachers in larger schools. It is a simple random sample because all samples have the same chance of being selected.
 - B) Yes; no. The sample is random because all teachers have the same chance of being selected. It is not a simple random sample because some samples are not possible, such as a sample that includes teachers from schools that were not selected.
 - C) No; no. The sample is not random because teachers in small schools are more likely to be selected than teachers in larger schools. It is not a simple random sample because some samples are not possible, such as a sample that includes teachers from schools that were not selected.
 - D) Yes; yes. The sample is random because all teachers have the same chance of being selected. It is a simple random sample because all samples have the same chance of being selected.

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

- 19) A town obtains current employment data by polling 10,000 of its citizens this month.
- A) Cross-sectional
 - B) Prospective
 - C) Retrospective
 - D) None of these

Provide an appropriate response.

- 20) A researcher conducts an experiment to determine whether acupuncture can help people to recover from back injuries. Participants are randomly assigned to a treatment group or a control group. Over a period of three weeks, those assigned to the treatment group receive acupuncture treatments. At the end of the three weeks, the improvement reported by those in the treatment group is compared with the improvement reported by those in the control group. In this experiment there is no blinding. What does this mean and why could this cause a problem?

Answer Key

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- 1) No. In terms of income, the teacher's friends are unlikely to be representative of all adults in the United States. So a sample from this group, however well selected, is unlikely to be representative of all adults in the United States.
- 2) C
- 3) The x-values are not matched with the y-values, so it does not make sense to use the differences between each x-value and the y-value that is in the same column.
- 4) Yes. If the claimed proportion of defectives of 1% were correct, there would be a very small likelihood of getting 3% defectives in the sample. The sample rate of 3% is significantly greater than the claimed rate of 1%.
- 5) B
- 6) B
- 7) D
- 8) B
- 9) Sample: the 100,000 selected adults; population: all adults; representative
- 10) Desk job workers are confined to their chairs for most of their work day. Other jobs require standing or walking around which burns calories. It is probably the lack of exercise that causes higher weights, not the desk job itself. Avoid causality altogether by saying lack of walking and exercise is associated with higher weights.
- 11) This is a voluntary response sample. The survey is based on voluntary, self-selected responses and therefore has serious potential for bias.
- 12) A
- 13) D
- 14) If a person's back pain was reduced by 100%, it would be completely eliminated, so it is not possible for a person's back pain to be reduced by more than 100%.
- 15) B
- 16) A
- 17) B
- 18) B
- 19) A
- 20) An experiment is blind if participants do not know whether they are receiving the treatment or a placebo. Blinding allows investigators to determine whether the treatment effect is significantly different from the placebo effect. This experiment is not blind because participants know whether they are receiving treatment. This may make it hard to determine to what extent improvements in the treatment group are due to the acupuncture and to what extent they are due to the placebo effect.