

Matching Terms Practice

- _____ The complete set of people or things being studied.
- _____ A subset of the population from which data are actually obtained.
- _____ Data that consist of values that can be placed into nonnumerical categories
- _____ Neither the participants nor any experimenters know who belongs to the treatment group and who belongs to the control group
- _____ Samples are chosen because they are readily available, such as polling people who live nearby.
- _____ Every possible sample of a particular size has an equal chance of being selected.
- _____ Samples are chosen by dividing the population into subgroups, and selecting the subgroups at random.
- _____ Samples are chosen by some rule, such as selecting every 10th or every 50th member of the population.
- _____ Samples are chosen by dividing the population into subgroups, and a random sample is chosen from within each subgroup.
- _____ Observes or measures characteristics of the subjects, but do not attempt to influence or modify these characteristics.
- _____ Applies some treatment and observes its effects on the subjects.
- _____ A variable that may explain or cause the effect.
- _____ A variable that responds to changes.
- _____ The group of subjects who receive the treatment being tested.
- _____ The group of subjects who do not receive the treatment being tested.
- _____ The participants do not know whether they are members of the treatment group or members of the control group, but the experimenters do know.
- _____ Data that consist of values representing counts or measurements.
- _____ Describes how closely a measurement approximates a true value.
- _____ Describes the amount of detail in a measurement.
- _____ Lacks the active ingredients of a treatment being tested in a study, but looks or feels like the treatment.
- _____ $\text{claimed or measured value} - \text{true value}$
- _____ $\frac{\text{claimed or measured value} - \text{true value}}{\text{true value}} \times 100$
- _____ Study which uses data from the past, such as official records or past interviews.
- _____ Study set up to collect data in the future from groups that share common factors.
- _____ Specific numbers describing characteristics of the population.
- A.** Convenience Sampling
- B.** Observational Study
- C.** Simple Random Sampling
- D.** Sample
- E.** Single-blind
- F.** Qualitative Data
- G.** Response Variable
- H.** Experimental Study
- I.** Prospective
- J.** Cluster Sampling
- K.** Precision
- L.** Retrospective
- M.** Control Group
- N.** Double-blind
- O.** Relative Error
- P.** Treatment Group
- Q.** Systematic Sampling
- R.** Explanatory Variable
- S.** Stratified Sampling
- T.** Quantitative Data
- U.** Accuracy
- V.** Population
- W.** Absolute Error
- X.** Population Parameters
- Y.** Placebo

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

- a. The average age of 45 employees of a large company is found to be 32 years.
- b. A researcher examines the records of all the registered voters in one city and finds that 43% are registered Democrats.

2. Determine the following for the examples.

- a. A poll of 700 persons attending the Taste of Chicago showed that 455 persons, 65% of the sample, with a margin of error of 5 percentage points, believe that the food is overpriced.
 - A. What was the goal of the study?
 - B. What is the raw data of the study?
 - C. What is the sample statistic of the study?
 - D. What is the confidence interval for the study?
 - E. What conclusions can we draw from the study?
- b. 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.
 - A. What was the goal of the study?
 - B. What is the raw data of the study?
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3. Identify which of these types of sampling is used: random, stratified, systematic, cluster, convenience.

- a. 49, 34, and 48 students are selected from the Sophomore, Junior, and Senior classes with 496, 348, and 481 students respectively.
- b. A sample consists of every 49th student from a group of 496 students.
- c. A market researcher selects 500 people from each of 10 cities.
- d. A pollster uses a computer to generate 500 random numbers, then interviews the voters corresponding to those numbers.
- e. To avoid working late, a quality control analyst simply inspects the first 100 items produced in a day.
- f. An education researcher randomly selects 48 middle schools and interviews all the teachers at each school.

4. Is the study experimental or observational?

- a. 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.
- b. A political pollster reports that his candidate has a 10% lead in the polls with 10% undecided.

5. Provide an appropriate response.

- a. 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?
- b. A study is being done to assess the effectiveness of a hair loss product. Half of the participants are randomly assigned to a treatment group and given the hair loss treatment and the other half are randomly assigned to a control group and given a placebo. Neither the participants nor the researchers who study them know who is in the treatment and control groups. What kind of blinding is being used?

- 6. Identify the type of study most appropriate to the question: experimental, observational, or single or double - blinded.**
- Is the aspirin produced by a particular pharmaceutical company better than that of a competitor at relieving headaches?
 - A science project question: Which of two paper towels is more absorbent?
 - 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)?
- 7. Identify the following variable as either qualitative or quantitative and explain why.**
- A person's height in feet
 - A person's political affiliation
- 8. State whether the actual data are discrete or continuous and explain why.**
- The freshman class sizes at mid-western colleges in a given year
 - The heights of freshmen at mid-western colleges in a given year
- 9. Determine which of the four levels of measurement (nominal, ordinal, interval, and ratio) is most appropriate.**
- The temperatures of eight different plastic spheres
 - The sample of spheres categorized from softest to hardest
 - Salaries of college professors
 - Nationalities of survey respondents
- 10. Determine whether the data described are qualitative or quantitative and give their level of measurement. If the data are quantitative, state whether they are continuous or discrete.**
- Average daily temperature on the Fahrenheit scale
 - Maximum daily temperature on the Kelvin scale
 - Soft drink sizes: small, medium, large
 - ZIP codes
 - Chapter numbers in a textbook
- 11. Provide an appropriate response.**
- A digital scale reads 0.01 g when it is empty. Identify the potential error in the measurements made on this scale as random or systematic.
 - A cook estimates thirds of a cup in a measuring cup marked in quarters. Identify the potential measurement error as random or systematic.
- 12. Answer the question.**
- The results of a poll are stated as follows: "Based on a survey of 156 randomly selected students, 90% of the student body of 2870 students agree that no student should have to take final exams in two consecutive exam periods." If 2578 students actually agree, then what is the absolute and relative error in the reported result?
 - The pickup time of an answering machine is set at 5 rings, but the machine picks up after 4 rings. What is the absolute and relative error?

13. Provide an appropriate response.

- a. According to a specification, the nominal length of a particular manufactured part is 5.4523 cm. Quality control randomly selects four of the parts, and the lengths are measured by four different quality control technicians. The measurements are 5.3234 cm, 5.11259 cm, 5.351 cm, and 5.45 cm. Which measurement is the most precise? More accurate?
- b. The approximate value of π is 3.1415927. Which of the following experimentally determined values is the most precise? Most accurate?
- A) 3.14 B) 3.412114 C) 3.3245 D) 3.247

14. Solve the problem.

- a. A study was conducted to determine whether flipping a penny or spinning a penny has an effect on the proportion of heads. Among 56,126 trials, 25,586 involved flipping pennies, and 12,630 of those pennies turned up heads. The other 30,540 trials involved spinning pennies, and 12,815 of those pennies turned up heads.
- A. What percentage of the trials involved flipping pennies?
- B. What percentage of the trials involved spinning pennies?
- C. Among the pennies that were flipped, what is the percentage that turned up heads?
- D. Among the pennies that were spun, what is the percentage that turned up heads?

Round your answers to the nearest percent.

- b. The enrollment of the district was 1114 last year and is 1379 this year. Calculate the relative percentage change to the nearest percent.
- c. Humanities majors spend an average of \$105 per course on books. Mathematics majors spend an average of \$75 per course on books. What is the percent difference between the two amounts relative to the amount for mathematics majors (round to the nearest percent)?
- d. A professor's checking account balance a year ago was \$1,440. Currently, it is \$1,170. Calculate the relative percentage change to the nearest percent.
- e. Research shows that **12%** of 6th graders in K-6 schools have tried cigarettes and **61%** of 7th graders in 8-9 or 7-9 middle schools have tried cigarettes. The percent increase, to the nearest percent, is
- f. Research shows that 10.7% of persons 20-25 years old vote and 59.3% of persons 60 - 65 years old vote. What is the absolute and relative increase from the younger group to the older group, to the nearest percentage point and percentage (respectively)?

15. Fill in the blank. Explain your reasoning.

- a. If a motorcycle weighs 25% less than a car, then the motorcycle's weight is _____ % of the car's weight.
- b. If an elephant weighs 10% more than a rhino, then the elephant's weight is _____ % of the rhino's weight.

Answer Key

1. a. Sample
b. Population
2. a. A.To determine people's attitudes to pricing
B. The survey answers; C. 65%; D. 60% to 70%
E. The majority think the food is overpriced
b. A.To determine the % of US adults unemployed
B. The survey answers; C. 3.4%; D. 3.3% to 3.5%
E. That around 3.4% of US adults are unemployed
3. a. Stratified
b. Systematic
c. Stratified
d. Random
e. Convenience
f. Cluster
4. a. Experimental
b. Observational
5. a. single-blind
b. double-blind
6. a. Double-blind experimental
b. Experimental
c. Observational
7. a. Quantitative because it consists of a measurement
b. Qualitative because it is not a measurement or a count
8. a. Discrete because only counting numbers are used, and no values between the counting numbers are possible
b. Continuous because the numbers can have any value within some range of values
9. a. Interval
b. Ordinal
c. Ratio
d. Nominal
10. a. Quantitative, interval, continuous
b. Quantitative, ratio, continuous
c. Qualitative, ordinal
d. Qualitative, nominal
e. Quantitative, ratio, discrete
11. a. Systematic
b. Random
12. a. 5 students; 0.19%
b. -1 ring; -20%
13. a. More Precise: 5.11259; More Accurate: 5.45
c. More Precise: B; More Accurate: D
14. a. (A) 46%; (B) 54%; (C) 49%; (D) 42%
b. 24%
c. 40%
d. -19%
e. 408%
f. Abs. Increase: 49 percentage points
Rel. Increase: 454%
15. a. 75%;
the motorcycle weighs 100% of the car's weight minus 25% of the car's weight.
b. 110%;
the elephant weighs 100% of the rhino's weight plus another 10%.