

Getting Ready for the Midterm – Chapter 1

Practice Problems – Answer Key

Qualitative/Quantitative

Determine whether the variable is qualitative or quantitative.

- 1) Distance between a student's home and the college. **Quantitative (numerical measurement)**
- 2) A student's favorite ice cream flavor. **Qualitative (categorical measurement)**

Discrete/Continuous

Determine whether the quantitative variable is discrete or continuous.

- 3) Number of identity thefts in a city. **Discrete (whole numbers only, counting)**
- 4) Height of a college student. **Continuous (decimals possible, measuring)**

Levels of Data

Determine whether the following data is nominal-level, ordinal-level, interval-level or ratio-level data.

- 5) The colors of the marshmallows in a box of cereal **Nominal (Categorical, no order)**
- 6) A college student's degree (Associate's, Bachelor's, Master's, etc.) **Ordinal (Categorical, can be ordered)**
- 7) Temperatures of beers from a tap (°C) **Interval (Numerical, can be negative)**
- 8) Weight of a college student **Ratio (Numerical, cannot be negative)**
- 9) Letter grades on an exam (A, B, C, D, F) **Ordinal (Categorical, can be ordered)**
- 10) Percentage grade on an exam **Ratio (Numerical, cannot be negative)**
- 11) Elevations of U.S. National Parks, in feet above/below sea level **Interval (Numerical, can be negative)**
- 12) Major in college (Mathematics, Biology, Psychology, etc.) **Nominal (Categorical, no order)**

Explanatory/Response Variables

Identify the explanatory and response variable in the given designed experiment.

13) To determine whether fluoride is effective in preventing cavities, participants were divided into two groups. One group used a toothpaste containing fluoride, and the other group used a toothpaste that did not contain fluoride. After a 5-year period, the number of cavities for each participant was recorded.

Explanatory: Whether the participant got fluoride or not Response: Number of cavities

14) A university wanted to determine whether adding a support class to Introductory Statistics would improve student understanding. Students were randomly assigned to a statistics class. Some classes had a support class, while the others did not. At the end of the semester, scores on a common final exam were recorded for each student.

Explanatory: Whether the student took a support class or not Response: Final exam score

Sampling Techniques

For the following scenarios, determine which sampling technique was used.

15) Percentage of 18- to 25-year-olds who used drugs during the past 30 days: At a shopping mall, people who appear to be in the proper age group are stopped and asked for their age and whether they've used drugs in the past 30 days. **Convenience Sampling**

16) Percentage of Master's degrees in Mathematics earned by females: Several universities are selected at random and asked for the number of Master's degrees awarded in Mathematics, and how many were awarded to females. **Cluster Sampling (The clusters are the different universities.)**

17) Average SAT score for females compared to males: Fifty students are randomly selected from a University's list of students. Their gender and SAT scores are recorded. **Random Sampling**

Systematic Sampling

18) A college has 16,000 students. The president of the college wanted to survey 200 students using systematic sampling.

a) Compute the step size, k .

$$k = \frac{N}{n} = \frac{16,000}{200} = 80$$

b) If $p = 75$ was randomly selected as the starting point, list the first, second, third, and last (200th) student included in the survey.

75, 155 (75+80), 235 (155+80), ... 15995 (75+199x80)