



1. **Explain what the difference between descriptive statistics and inferential statistics.**
2. **The 2010 General Social Survey asked the question, “After an average work day, about how many hours do you have to relax or pursue activities that you enjoy?” to a random sample of 1,155 Americans. The average relaxing time was found to be 1.65 hours. Determine which of the following is an observation, a variable, a sample statistic, or a population parameter.**
  - a. An American in the sample
  - b. Number of hours spent relaxing after an average work day.
  - c. 1.65
  - d. Average number of hours all Americans spend relaxing after an average work day. -
3. **Consider a list of all current graduate seniors at American colleges and universities. A random sample of 10,000 current graduating seniors is selected from the list. After analyzing the data, the conclusion is that current graduating seniors at American colleges and universities take on average 7 math courses during their four years in school. This conclusion is an example of:**
  - a. Descriptive statistics
  - b. Exploratory data analysis
  - c. Inferential statistics
  - d. Randomized experiment
  - e. None of the above
4. **Explain the difference between a survey and a census.**
5. **In what type of study would you generally know the value of the parameter?**
  - a. Experiment
  - b. Census
  - c. Sample Survey
  - d. All of the Above
6. **What is the name of a study that the purpose is to determine whether a treatment causes a change in the variable of study?**
  - a. Observational Study
  - b. Randomized Experiment
  - c. Census
  - d. Sample Survey
  - e. More than one of the above



**7. Lauren wants to determine what the average house price is for single family homes in Los Angeles, California. She randomly selects 50 single family homes in Los Angeles and looks up the most recent value for each of these 50 homes. What is the sample in this study?**

- a. All residents of Los Angeles, California
- b. All single-family homeowners in Los Angeles, California
- c. All single-family homes in Los Angeles, California
- d. The 50 selected homes in Los Angeles, California
- e. The homeowners of the 50 selected homes in Los Angeles, California

**8. Which of the following is an example of a self-selected (volunteered) sample? More than one might apply.**

- a. Researcher splits their population into a group of males and a separate group of females; she takes a random sample of 25 males and a separate random sample of 25 females
- b. Radio asks people listening to call in and say whether or not they want a new stoplight at a busy intersection
- c. Student selects 15 classmates to answer a survey about university fees
- d. Researcher at a major university randomly selects 50 students to participate in a survey. She sends the survey to the 50 selected students via email and 45 of them return the survey. – this error is called no-response
- e. More than one of the above

**9. Consider the list below of different sampling methods. Which of these sampling methods don't provide a representative sample?**

- |                   |                              |
|-------------------|------------------------------|
| a. 1 only         | 1. Simple Random Sample      |
| b. 3 and 4        | 2. Convenience Sample        |
| c. 1, 3, and 4    | 3. Cluster Sample            |
| d. 2 and 5        | 4. Stratified Sample         |
| e. 2, 3, 4, and 5 | 5. Voluntary Response Sample |

**10. A study finds that an increase in glove sales is associated with an increase in snowboarding accidents. Does that mean that gloves cause snowboarding accidents? Explain your answer. What is one possible lurking variable that could explain this correlation?**

**11. A university wants to determine what fraction of its undergraduate student body support a new \$25 annual fee to improve the student union. For each proposed method below, indicate whether the method is reasonable or not. Explain.**

- a. Survey a simple random sample of 500 students.



- b. Stratify students by their field of study, then sample 10% of students from each stratum.
- c. Cluster students by their ages (e.g. 18 years old in one cluster, 19 years old in one cluster, etc.), then randomly sample three clusters and survey all students in those clusters.
- d. Design a randomized experiment.
- e. None of the above

**12. In a study where researchers collected data to examine the relationship between air pollutants and preterm births in Southern California, they measured the air pollution levels by air quality monitoring stations. Length of gestation data were collected on 143,196 births between the years 1989 and 1993, and air pollution exposure during gestation was calculated for each birth. They found that higher air pollution levels are associated with preterm births.**

- a. What type of study is this?
- b. Identify the population of interest and the sample in this study.
- c. Identify the explanatory and response variables.
- d. Could you identify a lurking variable in this study?
- e. Can we conclude that higher air pollution levels cause preterm births? (Establish causal relationships)
- f. Comment on whether or not the results of the study can be generalized to the population.

**13. Buteyko shallow breathing technique reduces asthma symptoms and improve quality of life. As part of this study 600 asthma patients aged 18-69 who relied on medication for asthma treatment were recruited and randomly assigned to two groups: one practiced the Buteyko method and the other did not. Those in the Buteyko group experienced, on average, a significant reduction in asthma symptoms and an improvement in quality of life.**

- a. What type of study is this?
- b. Identify the population of interest and the sample in this study.
- c. What are the cases?
- d. What is (are) the response variable(s) in this study?
- e. What is (are) the explanatory variable(s) in this study?
- f. Can we establish a causal link between the explanatory and response variables?
- g. Can the results of the study be generalized to the population at large?