

E Chapter 1 Exercises

Respond thoughtfully to the following exercises.

- Eighty-nine percent of Americans polled are in favor of arts education being taught in public schools.
 - Does the above numerical value describe a parameter or a statistic?
 - After reading the above statement, you decide to campaign for the arts in education and use the statement: “A majority of Americans are in favor of art education, which shows their love of arts. Americans support ballet teaching in public schools.” What branch of statistics would you be applying?
- The average lifespan of Americans in 1990 was 75.37 years.
 - Does the above numerical value describe a parameter or a statistic?
 - Giving a complete breakdown of the above statement into categories of gender, race, and geographical region would be an example of which branch of statistics?
- Determine whether the following data sets are qualitative or quantitative and classify each set according to its level of measurement.
 - The street addresses of houses along North Lamar Avenue
 - The years in which Christmas falls on a Sunday
 - The monthly rates for digital cable service for five competing companies
- Jake wanted to know the most popular brand of cereal among teenagers. He stood in the center of the cereal aisle at the local grocery and surveyed every 10th teenager who approached him.
 - How many biases can you name?
 - In what ways could Jake better collect data to answer his question?
- A university dorm housing only freshmen and sophomores assigns freshmen to odd-numbered rooms and sophomores to even-numbered rooms. Would choosing every 10th room give a representative sample of dorm residents? What about sampling every 5th room?
- If someone is looking at the proportion of students who are left-handed, is your statistics class a good sample? Is this class a good indicator of the male-to-female ratio on a campus?
- A supermarket wants to decide whether or not to carry a new brand of salsa and uses a free taste-test stand in the store.
 - What is the population being studied?
 - What sampling method is being used?
 - Is the sample obtained for the taste test representative of the population?
- Explain how cluster sampling is different from stratified sampling. If you wanted to make sure to include certain characteristics of the population in the sample, would you use cluster sampling or stratified sampling?
- How could you use cluster sampling if you want to know the average price of gasoline at gas stations located within a mile of rental car return locations at airports?
- A researcher wants to determine the average age of people attending the state fair.
 - Give three different methods of sampling that could be used in this scenario. Which method is best and why?
 - Describe any potential for bias in the method you chose as “best” in part a.

11. Suppose that a researcher wants to determine the optimal number of hours of sleep that the average adult requires each night.
 - a. Identify the following: the population and appropriate type of study to conduct.
 - b. Give a brief discussion on how you would set up and conduct this type of study using the steps covered in Section 1.3.
12. Convenience sampling is the sampling technique most prone to bias. However, it is possible to obtain a representative sample using the convenience method. Give one example of how the convenience method could produce a representative sample and one example of it producing a biased sample.
13. Suppose that the governor of Nebraska wants to determine his approval rating among his constituents. A team from the governor's staff is assigned to the task. Four of the state's largest cities are chosen, and 100 registered voters from each city are chosen to be included in the sample.
 - a. Identify the sampling technique for this scenario.
 - b. Describe three potential sources of bias.

Answer the following questions for Exercises 14 and 15.

- a. What is the population being studied?
 - b. What is the sample?
 - c. What are the sample statistics?
 - d. Describe at least 2 potential sources of bias.
14. In a 2018 Pew Research Center poll of 3,425 US adults who are members of the center's nationally representative American Trends Panel, subjects were asked about their preferred mode of news consumption. The results were as follows:
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|-------------|-----|
| Television: | 44% |
| Online: | 34% |
| Radio: | 14% |
| Print: | 7% |

Source: Pew Research Center. "Americans Still Prefer Watching to Reading the News - and Mostly Still Through Television." 29 Nov. 2018. http://www.journalism.org/2018/12/03/americans-still-prefer-watching-to-reading-the-news-and-mostly-still-through-television/pj_2018-12-03_read-watch-listen_0-02/ (23 July 2019).

15. According to a survey conducted from Sept. 15 to Oct. 10, 2017 by Gallup and Northeastern University, 73% of Americans surveyed say artificial intelligence will eliminate more jobs than it creates. Results were based on a mail survey of 3,297 Americans over the age of 18.

Source: Gallup, Inc. and Northeastern University. "Optimism and Anxiety." January 2018. <https://www.northeastern.edu/gallup/pdf/OptimismAnxietyNortheasternGallup.pdf> (23 July 2019).