Practice Problems for Chapter 1

OpenIntro

P11 #1.1

P19 #1.3c, 1.5c, 1.11

P29 #1.13, 1.15, 1.17, 1.19, 1.23

P36 #1.39, 1.43b

1. In a study of crop rotation techniques, agricultural researchers are interested in making general statements concerning the effectiveness of a given technique for all corn fields in Manitoba. Using a cluster technique, they randomly choose 30 farms from across the state for their study. Some of the chosen farms are randomly selected to use the rotation technique whereas others are not. In this study, the population is best described as:

   (a) 30 farms chosen from across Manitoba
   (b) all corn fields in Manitoba
   (c) the effectiveness of crop rotation
   (d) whether the rotation technique was used or not

2. Magazines, newspapers, and books have become more readily available in digital format. In addition, the quality of readers, for example, the Kindle, Nook, and iPad, has increased. A recent study suggests that 21% of adults read an ebook within the past year. Suppose a sample of 500 adults in the United States is obtained. Describe the population, the sample, the variable in this problem.

3. A set of numerical observations is obtained as described below. Classify each resulting data set as discrete or continuous.

   (a) the weight of baseball bats
   (b) The number of bees in hives
   (c) the area of selected dorm rooms
   (d) the height of a storm surge during hurricanes
   (e) the number of fish in an office aquarium
   (f) amount of ink used in office printers per week.

4. Classify each univariate data set as categorical, discrete, or continuous.

   (a) Randomly selected prime-television shows are selected and the number of violent acts is recorded for each show.

   (b) A random sample of mattresses is obtained and the firmness (medium, medium firm, firm, or extra firm) of each is recorded.

   (c) An HMO selects a random sample of subscribers and records the number of office visits over the past year for each patient.

   (d) A representative sample of employees from a large company is obtained, and the overtime hours for the past month are recorded for each employee.

5. Electrical engineers are attempting to maximize the efficiency of an experimental battery cell. They wish to determine the optimum charge rate that will provide maximum battery capacity. They sample 50 cells and randomly assign five different charge rates to the sample (10 cells for each charge rate). All cells are then discharged at the same rate with total battery capacity for each cell recorded in amp-hours. This is an example of what kind of study? (a) simple random (b) experimental (c) observational (d) probability

6. Spray-on tans, or fakes tans, contain several chemicals that have been linked to allergies, diabetes, and obesity. Twenty fake tan products are selected and the amount of dihydroxyacetone (the active ingredient) in each is measured. Describe the population, the sample, the variable in this problem.

7. The Faber Floral Company in Kankakee, Illinois, claims to have developed a special spray for roses that cause the blossom to last longer than an untreated flower. The first 50 long-stemmed roses of the season are obtained and randomly assigned to one to two groups: treated versus untreated. The treated roses are sprayed, and the lifetime of each blossom is recorded.

   (a) is this an observational or experimental study?

   (b) what is the variable of interest?

   (c) is this a random sample? If so, justify your answer.

8. In January 2013, flaws were discovered in two Boeing 787 Dreamlines aircraft. Japan Airlines found racks in the cockpit window in one jet and a minor oil leak in another. To assure the public that the jet is safe, the FAA selected 20 Dreamlines currently operated by American Airlines and carefully inspected each for any flaws.

   (a) is this an observational or experimental study?

   (b) what is the variable of interest?

   (c) is this a random sample? If so, justify your answer.