e. All seniors take the senior capstone course. There are 25 sections of the course. Eight of the 25 sections are randomly selected and all seniors in those sections are asked about their favorite food.

Solution

a. This is systematic sampling as every n^{th} person is selected.

b. This is convenience sampling as the selection of the sample is convenient to you, the researcher.

c. This is random sampling as all seniors have an equally likely chance of being selected.

d. This is stratified sampling as the seniors are separated into groups based on a similar characteristic (academic major), and then seniors are randomly selected from each group.

e. This is cluster sampling as the seniors are separated into sections of the course (clusters), and then entire clusters are randomly selected.

Now work margin exercise 2.

Margin exercise answers

1. a. Population: local junior high teachers, Sample: 35 teachers surveyed, 60% is a sample statistic as it only refers to the teachers surveyed. **b.** Population: bowlers in a Western state, Sample: 600 bowlers surveyed, 42% is a population parameter as it refers to all bowlers in the Western state. The population parameter is based on sample statistics that are not reported. **2. a.** This is cluster sampling as the employees are separated into departments in the factory (clusters), and then entire clusters are randomly selected. **b.** This is systematic sampling as every n^{th} person is selected. **c.** This is random sampling as all student workers have an equally likely chance of being selected. **d.** This is convenience sampling as the selection of the sample is convenient to the researcher. **e.** This is stratified sampling as the employees are separated into groups based on a similar characteristic (years of service), and then employees are randomly selected from each group.

10.1 Exercises

Concept Check

Fill-in-the-blank. Complete the sentences using information found in this section.

1. A _____ is the particular group of interest being studied.

2. A _____ involves collecting data from every member of the population.

3. A subset of a population is called a _____.

4. A number that describes a particular characteristic of a population is called a _____.

5. A number that describes a particular characteristic of a sample is called a _____ _____.

6. A _____ _____ reflects the population by having the same characteristics and does not favor any group over another.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

7. A census collects data from every member of a sample.

8. A sample statistic gives information about the entire population.

9. In a study that interviews all high school students at the local school to find out what percentage of American teenagers have an iPhone, American teenagers are the population.

10. Asking everyone in your homeroom class what type of soda is their favorite is an example of stratified sampling.

Practice

For the following scenarios, identify the population, sample, and whether the results represent a population parameter or sample statistic. See Example 1.

1. A school board recently read a report indicating that unhealthy eating habits were increasing in teenagers. As a result, the school board surveyed the local high school students. Of the 300 students surveyed, 62% indicated that they ate unhealthy foods at least once a day.

2. A local youth organization interviewed 1000 adults across a Midwest state about their views on teenagers' involvement in youth sports. The resulting report stated that approximately 73% of the adults in the Midwest state are in favor of increased teenager involvement in youth sports.

3. The local parent-teacher organization interviewed 850 parents across a large metropolitan area regarding their views on homework in middle school. The report the organization released stated that approximately 54% of the parents in the large metropolitan area believed there is too much homework in middle school.

4. A small athletic conference read a report indicating that students participating in high school sports were more likely to have negative body images. As a result, the conference surveyed the local high school athletes. Of the 400 athletes surveyed, 38% indicated that they had a negative body image.

Identify the sampling technique used to obtain each sample. See Example 2.

5. The school board divides the city by school boundaries and then all student test scores are used from three randomly selected school districts.

6. The names of all the students are placed in a hat and 20 names are selected without looking. Data are collected from those 20 students.

7. A study of sleep habits classifies participants according to age using groupings of 20–29, 30–39, and 40–49. Random samples of participants are taken from each group.

8. A big box store company has multiple stores in 50 large cities. Ten of the 50 large cities are selected and all stores in each of the 10 cities are checked for cleanliness.

9. Every 100^{th} music box on an assembly line is given a reliability test.

10. A vision study uses participants who are classified by eye color (blue, brown, hazel, etc.). A random sample of participants are taken from each group.

11. The first 50 people leaving a hospital are asked how much money they spend per day on lunch in the hospital cafeteria.

12. Students who are registered for mathematics classes are classified according to their academic major and then random samples of students from each major are selected.

13. Every 20^{th} cell phone coming off an assembly line is checked for defects.

14. The last 25 people leaving the cinema are asked for their opinion of the movie.

15. Every 8^{th} person leaving the amusement park are asked about their favorite ride.

16. Illinois is divided into 102 counties and then 13 individual counties are randomly selected and data from all residents of those counties are collected.

17. The names of all members of a population are entered into a database. A computer uses a random number generator to select members of the population.

18. A group of people are classified according to race and then random samples are taken from each group.

19. The Registrar's Office puts all 2000 students' names in a list and randomly generates 125 names to gather information.

20. Students at the local high school are classified according to their class (fr., so., etc.). Then a random sample of 20 students from each class is selected.

21. All students are required to take a mathematics course. There are 10 sections of the course. Three of the 10 sections are randomly selected, and data are collected from all students in those sections.

22. Every 10^{th} person walking through a shopping mall is surveyed about their spending habits.

23. Twenty people are assigned numbers 1–20. An icosahedron (20-sided die) is rolled and the person corresponding to the number is selected.

24. A taste test for potato chips is given at the end cap of a snack aisle in a grocery store.

25. Every 5^{th} car in a parking garage is checked for the appropriate parking pass.

26. A group of local runners are surveyed as to the best marathon training program.

27. A state is divided by area codes and then 4 area codes are randomly selected and data from all members of those area codes are collected.

28. The "best restaurant in town" is determined by the responses from local readers who voluntarily mail in a survey printed in the newspaper.

29. The names of all 250 employees are placed in a bin and 5 names are selected without looking.

30. The last 35 people leaving the Homecoming talent show are asked for their opinion of the show.

Writing & Thinking

31. Give one example for each of the five sampling techniques.

32. Explain, in your own words, what a representative sample is.