Name the population and the sample in each exercise. Explain your answer.

1. The number of roadrunners born within a 50-mile radius of Lubbock.

2. The cars traveling at 75 kilometers per hour between Beaumont and Lufkin.

Name the sampling method that will best represent the whole population in each situation. Explain your answer.

3. Student satisfaction with the middle school cafeteria.
   Method A: Survey 40 students in two seventh-grade math classes. 72 percent are satisfied with the food in the cafeteria.
   Method B: Survey 65 students from a list of all students in the school. 85 percent are satisfied with the food in the cafeteria.
   Method _________ best represents the whole population of the school.

4. Predicted winner in an election for town mayor.
   Method C: Telephone 100 randomly-chosen voters who live in the town. 54 percent plan to vote for the incumbent mayor.
   Method D: Telephone 70 people who have lived in the town for more than 25 years. 45 percent plan to vote for the incumbent mayor.
   Method _________ best represents the whole population of the town’s voters.

Which of these may be biased samples? Explain your answer.

5. A town official surveys 50 people in a library to decide if town residents want the library services and facilities expanded.

6. A cable television company randomly calls 200 customers and asks them if they are satisfied with their service.
UNIT 5: Statistics

MODULE 10 Random Samples and Populations

LESSON 10-1

Practice and Problem Solving: A/B

1. Answers may vary, but students should realize that the number of road runners born within a 50-mile radius of Lubbock, Texas is a subset of the number of road runners born everywhere or in Texas.

2. Answers may vary, but students should realize that the cars traveling at 75 kilometers per hour between Beaumont and Lufkin, Texas is a subset of the cars traveling between Beaumont and Lufkin at all speeds.

3. Answers may vary, but Method B is probably more representative of the opinions of any student chosen at random from the entire school population.

4. Answers may vary, but Method C may be more representative of all voters than a sample that consists of 25-year town residents who may or may not be voters.

5. Biased; library patrons have a vested interest in seeing that the library is expanded.

6. Not biased, if the cable company samples customers, regardless of their history and experience with the company.

Practice and Problem Solving: C

1. Sample A is random within each precinct but not across the city as a whole. If the precincts have different populations, the sampling from one precinct might outweigh that of another, less-populous precinct. The precinct samples may be biased, depending on the content of the survey questions.

Sample B is random across the city. The sample may be biased, depending on the content of the survey questions.

Sample C is not random and is biased in concentrating on the precinct in which the factory would be located and where it would have the greatest impact on infrastructure. It is not clear if this precinct would benefit from the new jobs, either.

2. Some streets may have more residents than others. Some residents may not have private telephones; they may use cell phones or public phones.

3. a. They are not random across all persons in the city center who might rent a scooter, but they could be random across the two clusters that the owner wants to sample, office workers and apartment residents.

b. The questionnaire with the lower weekend rates is biased against the weekday office workers and in favor of possible weekend rentals by apartment residents.

Practice and Problem Solving: D

1. Home runs hit in 2014–2015; Home runs hit one week in July

2. All of the sugar maples in the 12-acre forest; the six sugar maples

3. Sample C is the best method of getting a random sample.

4. Sample Z is the best method of getting a random sample.

5. The question shows bias because it only mentions the benefits of having a professional sports stadium and teams.

Reteach

1. The sample is biased. The passengers on one on-time flight are likely to feel differently about their flight than passengers on delayed flights.

2. The sample is not biased. It is a random sample.

3. The sample is not biased. It is a random sample.

4. The sample is biased. The people who go to movies are more likely to spend money on movies than on other entertainment.