EXERCISE SET 14-1

1.
Random, systematic, stratified, cluster.

2.
Samples can save the researcher time and money. They are used when the population is large or infinite. They are used when the units are to be destroyed such as in testing the breaking strength of ropes.

3.
A sample must be randomly selected.

4.
Random numbers are used to ensure every element of the population has the same chance of being selected.

5.
Talking to people on the street, calling people on the phone, and asking one's friends are three incorrect ways of obtaining a sample.

6.
Over the long run each digit, 0 through 9, will occur with the same probability.

7.
Random sampling has the advantage that each unit of the population has an equal chance of being selected. One disadvantage is that the units of the population must be numbered, and if the population is large this could be somewhat time consuming.

8.
Systematic sampling has an advantage that once the first unit is selected each succeeding unit selected has been determined. This will save time.

8. continued
A disadvantage would be if the list of units was arranged in some manner so that a bias would occur, such as selecting all men when the population consists of both men and women.

9.
An advantage of stratified sampling is that it ensures representation for the groups used in stratification; however, it is virtually impossible to stratify the population so that all groups could be represented.

10.
Clusters are easy to use since they already exist, but it is difficult to justify that the clusters actually represent the population.

11 through 20.
Answers will vary.

21.
Sampling or selection bias occurs when some subjects are more likely to be included in a study than others.

22.
Answers will vary. One possible answer is that if there are more males in the population than females, such as football players, it is possible that some samples would be all male subjects.

23.
Nonresponse bias occurs when subjects who do not respond to a survey question would answer the question differently than the subjects who responded to the survey question.

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24.
Answers will vary. Nonresponse bias can occur if people who are addicted to drugs might give different answers to questions on drug use than those who are not addicted to drugs.

25.
Answers will vary. Response or interview bias occurs when the subject does not give his or her true opinion and gives an opinion that he or she feels is politically correct.

26.
Answers will vary. Response or interview bias could occur if the subject feels intimidated by the interviewer.

27.
Volunteer bias occurs when people volunteer to participate in a study because they are interested in the study or survey.

28.
Volunteer bias can occur in a call-in survey where only those who have a strong opinion will make the call.

EXERCISE SET 14-2

1.
Flaw - biased; it's confusing.

2.
Flaw - the purpose of the question is unclear. You could like him personally but not politically.

3.
Flaw - the question is too broad.

4.
Flaw - none. The question is good if the respondent knows the mayor's position; otherwise his position needs to be stated.

5.
Flaw - confusing wording. The question could be worded: "How many hours did you study for this exam?"

6.
Possible order problem. Ask first, "Do you use artificial sweetener regularly?"

7.
This question has confusing wording. Change the question to read: "If a plane were to crash on the border of New York and New Jersey, where should the victims be buried?"

8.
Flaw - none.

9.
Flaw - the word "vaguely" is too general.

10.
A respondent might not know what the present gun control laws are.

11.
The word *family* could mean different things to the respondent, for example, in cases of separated families.

12.
A person might not even care about presidential debates.

13.
The word regularly is vague.

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14.
People might not want others to know their incomes.

15.
A person might not know of the situation four years ago.

16.
Here people have varied opinions about slavery.

17.
This question assumes the subject feels texting while driving is bad. Not all people will agree with this.

18.
Almost all people will answer “Yes” to this question.

19.
Here the question limits the response to “repeated” tours. Subjects might not be in favor of any tour.

20.
The question can be answered in several ways besides “Yes” and “No.”

21.
Answers will vary.

22.
Answers will vary.

EXERCISE SET 14-3

1.
Simulation involves setting up probability experiments that mimic the behavior of real life events.

2.
Answers will vary.

3.
John Van Neumann and Stanislaw Ulam.

4.
Using the computer to simulate real life situations can save time since the computer can generate random numbers and keep track of the outcomes very quickly and easily.

5.
The steps are:

1. List all possible outcomes.
2. Determine the probability of each outcome.
3. Set up a correspondence between the outcomes and the random numbers.
4. Conduct the experiment using random numbers.
5. Repeat the experiment and tally the outcomes.
6. Compute any statistics and state the conclusions.

6.
Random numbers can be used to ensure the outcomes occur with appropriate probability.

7.
When the repetitions increase there is a higher probability that the simulation will yield more precise answers.

8.
Coins, dice, and cards can be used to perform simulation experiments.

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9.
Use three-digit random numbers; numbers 001 through 681 mean that the mother is in the labor force.

10.
Select two-digit random numbers in groups of 5. For one person, 01 through 70 means a success. For the other person, 01 through 75 means a success.

11.
Select 100 two-digit random numbers. Numbers 00 through 34 mean the household has at least one set with permium cable service. Numbers 35 to 99 mean the household does not have the service.

12.
Use the odd digits to represent a match and the even digits to represent a non-match.

13.
Let an odd number represent heads and an even number represent tails. Then each person selects a digit at random.

14.
Use a table of random numbers. Select 40 random numbers. Numbers 01 through 16 mean the person is foreign-born.

15 through 26.
Answers will vary.

REVIEW EXERCISES - CHAPTER 15

1 - 8.
Answers will vary.

9.
Flaw - asking a biased question. Change the question to read: "Have you ever driven through a red light?"

10.
Flaw - using a double negative. Change the question to read: "Do you think students who are not failing should be given tutoring if they request it?"

11.
Flaw - asking a double-barreled question. Change the question to read: "Do you think all automobiles should have heavy-duty bumpers?"

12.
Flaw - people might not know the meaning of open-ended or closed-ended questions.

13.
Use one-digit random numbers 1 through 4 to represent a strikeout and 5 through 9 and 0 to represent anything other than a strikeout.

14.
Use two-digit random numbers. The numbers 01 through 15 represent an overbooked flight, and 16 through 99 and 00 represent a flight that is not overbooked.

15.
The first person selects a two-digit random number. Any two-digit random number that has a 7, 8, 9, or 0 is ignored, and another random number is selected. Player 1 selects a one-digit random number; any random number that is not 1 through 6 is ignored, and another one is selected.

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16.
Let the digits 1 – 3 represent “rock".
Let the digits 4 – 6 represent “paper".
Let the digits 7 – 9 represent “scissors".
Omit 0.

17 - 21.
Answers will vary.

CHAPTER 14 QUIZ

1. True

2. True

3. False, only random numbers generated by a random number table are random.

4. True

5. a

6. c

7. c

8. Larger

9. Biased

10. Cluster

11 through 14. Answers will vary.

15.
Use two-digit random numbers: 01 through 45 constitute a win. Any other two-digit number means the player loses.

16.
Use two-digit random numbers: 01 – 05 constitute a cancellation. Any other two-digit random number means the person shows up.

17.
Use two-digit random numbers 01 through 10 to represent the 10 cards in hearts. The random numbers 11 through 20 represent the 10 cards in diamonds. The random numbers 21 through 30 represent the 10 spades, and 31 through 40 represent the 10 clubs. Any number over 40 is ignored.

18.
Use two-digit random numbers to represent the spots on the face of the dice. Ignore any two-digit random numbers with 7, 8, 9, or 0. For cards, use two-digit random numbers between 01 and 13.

19.
Use two-digit random numbers. The first digit represents the first player, and the second digit represents the second player. If both numbers are odd or even, player 1 wins. If a digit is odd and the other digit is even, player 2 wins.

20 through 24. Answers will vary.

25.
Here regularly is vague.

26.
Bad weather means different things to different people.

27.
What is meant by readable?

28.
Smoking a lot means different things to different people.

29.
Some respondents might not know much about herbal medicine.

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30.

Almost everybody would answer “No” to this question.

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