

## Review Exercises

**Note:** All odd-numbered problems and even-numbered problems marked with “ans” are included in the answer section at the end of this book.

- Name and define the two areas of statistics.
- What is probability? Name two areas where probability is used.
- Suggest some ways statistics can be used in everyday life.
- Explain the differences between a sample and a population.
- Why are samples used in statistics?
- (ans)** In each of these statements, tell whether descriptive or inferential statistics have been used.
  - In the year 2010, 148 million Americans will be enrolled in an HMO (Source: *USA TODAY*).
  - Nine out of ten on-the-job fatalities are men (Source: *USA TODAY Weekend*).
  - Expenditures for the cable industry were \$5.66 billion in 1996 (Source: *USA TODAY*).
  - The median household income for people aged 25–34 is \$35,888 (Source: *USA TODAY*).
  - Allergy therapy makes bees go away (Source: *Prevention*).
  - Drinking decaffeinated coffee can raise cholesterol levels by 7% (Source: American Heart Association).
  - The national average annual medicine expenditure per person is \$1052 (Source: *The Greensburg Tribune Review*).
  - Experts say that mortgage rates may soon hit bottom (Source: *USA TODAY*).
- Classify each as nominal-level, ordinal-level, interval-level, or ratio-level measurement.
  - Pages in the city of Cleveland telephone book.
  - Rankings of tennis players.
  - Weights of air conditioners.
  - Temperatures inside 10 refrigerators.
  - Salaries of the top five CEOs in the United States.
  - Ratings of eight local plays (poor, fair, good, excellent).
  - Times required for mechanics to do a tune-up.
  - Ages of students in a classroom.
  - Marital status of patients in a physician’s office.
  - Horsepower of tractor engines.
- (ans)** Classify each variable as qualitative or quantitative.
  - Number of bicycles sold in 1 year by a large sporting goods store.
  - Colors of baseball caps in a store.
  - Times it takes to cut a lawn.
  - Capacity in cubic feet of six truck beds.
  - Classification of children in a day-care center (infant, toddler, preschool).
  - Weights of fish caught in Lake George.
  - Marital status of faculty members in a large university.
- Classify each variable as discrete or continuous.
  - Number of doughnuts sold each day by Doughnut Heaven.
  - Water temperatures of six swimming pools in Pittsburgh on a given day.
  - Weights of cats in a pet shelter.
  - Lifetime (in hours) of 12 flashlight batteries.
  - Number of cheeseburgers sold each day by a hamburger stand on a college campus.
  - Number of DVDs rented each day by a video store.
  - Capacity (in gallons) of six reservoirs in Jefferson County.
- Give the boundaries of each value.
  - 42.8 miles.
  - 1.6 milliliters.
  - 5.36 ounces.
  - 18 tons.
  - 93.8 ounces.
  - 40 inches.
- Name and define the four basic sampling methods.
- (ans)** Classify each sample as random, systematic, stratified, or cluster.
  - In a large school district, all teachers from two buildings are interviewed to determine whether they believe the students have less homework to do now than in previous years.
  - Every seventh customer entering a shopping mall is asked to select her or his favorite store.
  - Nursing supervisors are selected using random numbers in order to determine annual salaries.
  - Every 100th hamburger manufactured is checked to determine its fat content.
  - Mail carriers of a large city are divided into four groups according to gender (male or female) and according to whether they walk or ride on their

- routes. Then 10 are selected from each group and interviewed to determine whether they have been bitten by a dog in the last year.
13. Give three examples each of nominal, ordinal, interval, and ratio data.
  14. For each of these statements, define a population and state how a sample might be obtained.
    - a. The average cost of an airline meal is \$4.55 (Source: *Everything Has Its Price*, Richard E. Donley, Simon and Schuster).
    - b. More than 1 in 4 United States children have cholesterol levels of 180 milligrams or higher (Source: The American Health Foundation).
    - c. Every 10 minutes, 2 people die in car crashes and 170 are injured (Source: National Safety Council estimates).
    - d. When older people with mild to moderate hypertension were given mineral salt for 6 months, the average blood pressure reading dropped by 8 points systolic and 3 points diastolic (Source: *Prevention*).
    - e. The average amount spent per gift for Mom on Mother's Day is \$25.95 (Source: The Gallup Organization).
  15. Select a newspaper or magazine article that involves a statistical study, and write a paper answering these questions.
    - a. Is this study descriptive or inferential? Explain your answer.
    - b. What are the variables used in the study? In your opinion, what level of measurement was used to obtain the data from the variables?
    - c. Does the article define the population? If so, how is it defined? If not, how could it be defined?
    - d. Does the article state the sample size and how the sample was obtained? If so, determine the size of the sample and explain how it was selected. If not, suggest a way it could have been obtained.
    - e. Explain *in your own words* what procedure (survey, comparison of groups, etc.) might have been used to determine the study's conclusions.
    - f. Do you agree or disagree with the conclusions? State your reasons.
  16. Information from research studies is sometimes taken out of context. Explain why the claims of these studies might be suspect.
    - a. The average salary of the graduates of the class of 1980 is \$32,500.
    - b. It is estimated that in Podunk there are 27,256 cats.
    - c. Only 3% of the men surveyed read *Cosmopolitan* magazine.
    - d. Based on a recent mail survey, 85% of the respondents favored gun control.
    - e. A recent study showed that high school dropouts drink more coffee than students who graduated; therefore, coffee dulls the brain.
    - f. Since most automobile accidents occur within 15 miles of a person's residence, it is safer to make long trips.
  17. Identify each study as being either observational or experimental.
    - a. Subjects were randomly assigned to two groups, and one group was given an herb and the other group a placebo. After 6 months, the numbers of respiratory tract infections each group had were compared.
    - b. A researcher stood at a busy intersection to see if the color of the automobile that a person drives is related to running red lights.
    - c. A researcher finds that people who are more hostile have higher total cholesterol levels than those who are less hostile.
    - d. Subjects are randomly assigned to four groups. Each group is placed on one of four special diets—a low-fat diet, a high-fish diet, a combination of low-fat diet and high-fish diet, and a regular diet. After 6 months, the blood pressures of the groups are compared to see if diet has any effect on blood pressure.
  18. Identify the independent variable(s) and the dependent variable for each of the studies in Exercise 17.
  19. For each of the studies in Exercise 17, suggest possible confounding variables.
  20. According to a pilot study of 20 people conducted at the University of Minnesota, daily doses of a compound called arabinogalactan over a period of 6 months resulted in a significant increase in the beneficial lactobacillus species of bacteria. Why can't it be concluded that the compound is beneficial for the majority of people?
  21. Comment on the following statement, taken from a magazine advertisement: "In a recent clinical study, Brand ABC [actual brand will not be named] was proved to be 1950% better than creatine!"
  22. In an ad for women, the following statement was made: "For every 100 women, 91 have taken the road less traveled." Comment on this statement.
  23. In many ads for weight loss products, under the product claims and in small print, the following statement is made: "These results are not typical." What does this say about the product being advertised?