1. Name and define two areas of statistics. Descriptive statistics describe the data set. Inferential statistics use the data to draw conclusions about the population.

2. What is probability? Name two areas where probability is used. Probability deals with events that occur by chance. It is used in gambling and insurance.

3. Suggest some ways that statistics can be used in everyday life. Answers will vary.

4. Explain the differences between a sample and a population. A population is a totality of all subjects possessing certain common characteristics that are being studied.

5. Why are samples used in statistics? Samples are used to save time and money when the population is large and when the units must be destroyed to gain information.

6. In each of the statements, tell whether descriptive or inferential statistics have been used.
   a. In the year 2010, 148 million Americans will be enrolled in HMO. inferential
   b. Nine out of ten on-the-job fatalities are men. descriptive
   c. Expenditures in the cable industry were $5.66 billion in 1996. descriptive
   d. The median Household income for people aged 24-35 is $35,888. descriptive
   e. Allergy therapy makes bees go away. inferential
   f. Drinking decaffeinated coffee can raise cholesterol levels by 7%. inferential
   g. The national average annual medicine expenditure per person is $1052. descriptive
   h. Experts say that mortgage rates may soon hit bottom. inferential

7. Classify each as nominal-level, ordinary-level, interval-level, or ratio-level measurement.
   a. pages in the city of Cleveland telephone book. ratio
   b. Rankings of tennis players. ordinal
   c. Weights of air conditioners. ratio
   d. Temperatures inside 10 refrigerators. interval
e. Salaries of the top 5 CEOs in the United States. ratio
f. Rating of eight local plays (poor, fair, good, excellent). ordinal
g. Times required for mechanics to do a tune-up. ratio
h. Age of students in a classroom. ratio
i. Marital status of patients in a physician’s office. nominal
j. Horsepower of tractor engines. ratio

8. Classify each variable as qualitative or quantitative.
   a. Number of bicycles sold in 1 year by a large sporting goods store. quantitative
   b. Colors of baseball caps in a store. qualitative
   c. Times it takes to cut down a lawn. quantitative
   d. Capacity in cubic feet of six truck beds. quantitative
   e. Classification of children in a day-care center (infant, toddler, preschool). qualitative
   f. Weights of fish caught in Lake George. quantitative
   g. Marital status of faculty members in a large university. qualitative

9. Classify each variable as discrete or continuous.
   a. number of doughnuts sold each day by Doughnut Heaven. discrete
   b. Water temperature of six swimming pools in Pittsburg on a given day. continuous
   c. Weights of cats in a pet shelter. continuous
   d. Lifetime (in hours) of 12 flashlight batteries. continuous
   e. Number of cheeseburgers sold each day by a hamburger stand on a college campus. discrete
   f. Number of DVDs rented each day by a video store. discrete
   g. Capacity (in gallons) of six reservoirs in Jefferson County. Continuous
10. Give the boundaries of each value.
   
   b) 1.55-1.65 milliliters
   
   c. 5.36 ounces 5.355-5.365 ounces
   
   d. 18 tons 17.5-18.5 tons
   
   e. 93.8 ounces 93.75-93.85 ounces

11. Name and define the four basic sampling methods. Random, systematic, stratified, cluster

12. Classify each sample as random, systematic, stratified, or cluster.
   
   a. 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. cluster
   
   b. Every seventh customer entering a shopping mall is asked to select his or her favorite store. systematic
   
   c. Nursing supervisors are selected using random number in order to determine annual salaries. random
   
   d. Every 110th hamburger manufactured is checked to determine its fat content. systematic
   
   e. 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 last year. stratified

13. Give three samples each of nominal, ordinal, interval, and ratio data. Answers will vary

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 six months, the numbers of respiratory tract infections each group had were compared. experimental
   
   b. A researcher stood at each busy intersection to see if the color of an automobile that a person drives is related to running red lights. observational
c. A researcher finds that people who are more hostile have higher total cholesterol levels than those who are less hostile. **observational**

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. **experimental**

23. In many ads for weight loss products, under the product claims in small print, the following statement is made: ”These results are not typical.” What does this say about the product being advertised? Since the results are not typical, the advertisers selected only a few people whom the weight loss product worked extremely well.

25. An ad for an exercise product stated: ”Using this product will burn 74% more calories.” What is misleading about this statement? “74% more calories” than what? No comparison group is stated.

27. “Just 1 capsule of Brand X can provide 24 hours of acid control.” (Actual brand name will not be named.) What needs to be more clearly defined in this statement? **What is meant by the “24 hours of acid control”?**

29. In the 1980s, a study linked coffee to a higher risk of heart disease and pancreatic cancer. In the early 1990s, studies show that drinking coffee posed minimal health threats. However, in 1994, a study showed that pregnant women who drank 3 or more cups of tea daily may be at risk for spontaneous abortion. In 1998, a study claimed that women who drank more than a half-cup of caffeinated tea everyday may actually increase their fertility. In 1998, a study showed that over a lifetime, a few extra cups of coffee everyday can raise blood pressure, heart rate, and stress. Suggest some reasons why these studies appear to be conflicting. **Possible answer: it could be the amount of caffeine in the coffee or tea. It could have been the brewing method.**