logistic regression to more diverse situations. The categories in some multinomial are ordered, for example, in attitude surveys. We also discuss the application of the logistic model to ordered response variables.

The book concludes with Chapter 13 entitled Further Topics. Two topics are discussed in this chapter. One extends the concept of linear models so that regression and logistic models are all viewed as special cases of the linear model. This extends the range of applications of linear models to more diverse situations. We also discuss Poisson regression, often used to model count data. A brief discussion of robust regression with illustrative examples is also given in this chapter.

We recommend that the chapters be covered in the same sequence as they are presented, although Chapters 5–12 can be covered in any order after Chapter 4, as long as Chapter 9 is covered before Chapter 10, and Chapter 7 is covered before Chapters 12 and 13.

EXERCISES

1.1 Classify each of the following variables as either quantitative or qualitative. If a variable is qualitative, state the possible categories.

(a) Geographical region
(b) Number of children in a family
(c) Price of a house
(d) Race
(e) Temperature
(f) Fuel consumption
(g) Employment rate
(h) Political party preference

1.2 Give two examples in any area of interest to you (other than those already presented in this chapter) where regression analysis can be used as a data analytic tool to answer some questions of interest. For each example:

(a) What is the question of interest?
(b) Identify the response and the predictor variables.
(c) Classify each of the variables as either quantitative or qualitative.
(d) Which type of regression (see Table 1.15) can be used to analyze the data?
(e) Give a possible form of the model and identify its parameters. (table on lecture slides)

1.3 In each of the following sets of variables, identify which of the variables can be regarded as a response variable and which can be used as predictors? (Explain)

(a) Number of cylinders and gasoline consumption of cars
(b) SAT scores, grade point average, and college admission
(c) Supply and demand of certain goods
(d) Company's assets, return on a stock, and net sales
(e) The distance of a race, the time to run the race, and the weather conditions at the time of running

(f) The weight of a person, whether or not the person is a smoker, and whether or not the person has a lung cancer

(g) The height and weight of a child, his/her parents' height and weight, and the gender and age of the child

1.4 For each of the sets of variables in Exercise 1.3:

(a) Classify each variable as either quantitative or qualitative.

(b) Which type of regression (see Table 1.15) can be used in the analysis of the data? (table on lecture slides)