Solution   Variables 1 and 3 are both *qualitative* because only a quality or characteristic is measured for each individual. The categories for these two variables are shown in parentheses. The other three variables are *quantitative*. Variable 2, the number of consumers, is a *discrete* variable that can take on any of the values $x = 0, 1, 2, \ldots$, with a maximum value depending on the number of consumers called. Similarly, variable 5, the number of children reading at or above grade level, can take on any of the values $x = 0, 1, 2, \ldots$, with a maximum value depending on the number of children in the class. Variable 4, the winning time for a Kentucky Derby horse, is the only *continuous* variable in the list. The winning time, if it could be measured with sufficient accuracy, could be 121 seconds, 121.5 seconds, 121.25 seconds, or any values between any two times we have listed.

MY TIP

Discrete variables often involve the "number of" items in a set.

Figure 1.2 depicts the types of data we have defined. Why should you be concerned about different kinds of variables and the data that they generate? The reason is that the methods used to describe data sets depend on the type of data you have collected. For each set of data that you collect, the key will be to determine what type of data you have and how you can present them most clearly and understandably to your audience!

FIGURE 1.2

Types of data
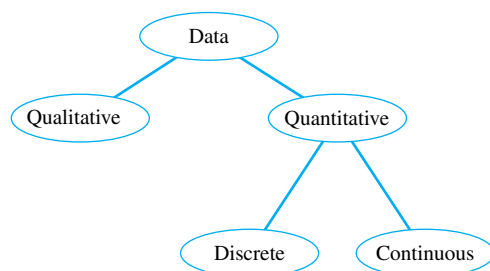
GRAPHS FOR CATEGORICAL DATA

1.3

After the data have been collected, they can be consolidated and summarized to show the following information:

- What values of the variable have been measured
- How often each value has occurred

For this purpose, you can construct a *statistical table* that can be used to display the data graphically as a data distribution. The type of graph you choose depends on the type of variable you have measured.

When the variable of interest is *qualitative*, the statistical table is a list of the categories being considered along with a measure of how often each value occurred. You can measure "how often" in three different ways:

- The **frequency,** or number of measurements in each category
- The **relative frequency,** or proportion of measurements in each category
- The **percentage** of measurements in each category