fixed values for the mean and standard deviation, respectively. Once specific values are selected for μ and σ, we can graph Formula 6-1 and the result will look like Figure 6-1. From Formula 6-1 we see that a normal distribution is determined by the fixed values of the mean μ and standard deviation σ. Fortunately, that's all we need to know about that formula.

6-2 The Standard Normal Distribution

Key Concept In this section we present the *standard normal distribution,* which has these three properties:

1. The graph of the standard normal distribution is bell-shaped (as in Figure 6-1).
2. The standard normal distribution has a mean equal to 0 (that is, $\mu = 0$).
3. The standard normal distribution has a standard deviation equal to 1 (that is, $\sigma = 1$).

In this section we develop the skill to find areas (or probabilities or relative frequencies) corresponding to various regions under the graph of the standard normal distribution. In addition, we find *z* scores that correspond to areas under the graph. These skills become important as we study nonstandard normal distributions and all of the real and important applications that they involve.

Uniform Distributions

The focus of this chapter is the concept of a normal probability distribution, but we begin with a *uniform distribution.* The uniform distribution allows us to see the following two very important properties:

1. The area under the graph of a probability distribution is equal to 1.
2. There is a correspondence between area and probability (or relative frequency), so some probabilities can be found by identifying the corresponding areas in the graph.

Chapter 5 considered only discrete probability distributions, but we now consider continuous probability distributions, beginning with the *uniform distribution.*

DEFINITION A continuous random variable has a **uniform distribution** if its values are spread *evenly* over the range of possibilities. The graph of a uniform distribution results in a rectangular shape.

Example 1 Subway to Mets Game

For New York City weekday late-afternoon subway travel from Times Square to the Mets stadium, you can take the #7 train that leaves Times Square every 5 minutes. Given the subway departure schedule and the arrival of a passenger, the waiting time *x* is between 0 min and 5 min, as described by the uniform distribution depicted in Figure 6-2. Note that in Figure 6-2, waiting times can be *any* value between 0 min and 5 min, so it is possible to have a waiting time of 2.33457 min. Note also that all of the different possible waiting times are equally likely.

The graph of a continuous probability distribution, such as in Figure 6-2, is called a **density curve.** A density curve must satisfy the following two requirements.