46. About ____% of the area is between $z = -2$ and $z = 2$ (or within 2 standard deviations of the mean).

47. About ____% of the area is between $z = -3$ and $z = 3$ (or within 3 standard deviations of the mean).

48. About ____% of the area is between $z = -3.5$ and $z = 3.5$ (or within 3.5 standard deviations of the mean).

6-2 Beyond the Basics

49. For bone density scores that are normally distributed with a mean of 0 and a standard deviation of 1, find the *percentage* of scores that are

a. within 1 standard deviation of the mean.

b. more than 2 standard deviations away from the mean.

c. within 1.96 standard deviations of the mean.

d. between $\mu - 2\sigma$ and $\mu + 2\sigma$.

e. more than 3 standard deviations away from the mean.

50. In a continuous uniform distribution,

$$\mu = \frac{\text{minimum} + \text{maximum}}{2} \qquad \text{and} \qquad \sigma = \frac{\text{range}}{\sqrt{12}}$$

a. Find the mean and standard deviation for the distribution of the subway waiting times represented in Figure 6-2.

b. For a continuous uniform distribution with $\mu = 0$ and $\sigma = 1$, the minimum is $-\sqrt{3}$ and the maximum is $\sqrt{3}$. For this continuous uniform distribution, find the probability of randomly selecting a value between -1 and 1, and compare it to the value that would be obtained by incorrectly treating the distribution as a standard normal distribution. Does the distribution affect the results very much?

TOP 20 6-3 Applications of Normal Distributions

Key Concept The objective of this section is to extend the methods of the previous section so that we can work with normal distributions having any mean and any standard deviation, instead of being limited to the standard normal distribution with mean 0 and standard deviation 1. The key element of this section is a simple conversion (Formula 6-2) that allows us to standardize any normal distribution so that the methods of the preceding section can be used with real and meaningful applications. Specifically, given some nonstandard normal distribution, we should be able to find probabilities corresponding to values of the variable x, and given some probability value, we should be able to find the corresponding value of the variable x.

> **When working with a normal distribution that is nonstandard (with a mean different from 0 and/or a standard deviation different from 1), we use Formula 6-2 to transform a value x to a z score, then we proceed with the same methods from Section 6-2.**