a. Find the mean and standard deviation, and verify that the data have a distribution that is roughly normal.

b. Treating the unrounded values of the mean and standard deviation as parameters, and assuming that the weights are normally distributed, find the weight separating the lowest 0.5% and the weight separating the highest 0.5%. These values could be helpful when quality control specialists try to control the manufacturing process so that underweight or overweight cans are rejected.

6-3 Beyond the Basics

35. Curving Test Scores A statistics professor gives a test and finds that the scores are normally distributed with a mean of 40 and a standard deviation of 10. She plans to curve the scores.

a. If she curves by adding 35 to each grade, what is the new mean? What is the new standard deviation?

b. Is it fair to curve by adding 35 to each grade? Why or why not?

c. If the grades are curved so that grades of B are given to scores above the bottom 70% and below the top 10%, find the numerical limits for a grade of B.

d. Which method of curving the grades is fairer: Adding 35 to each original score or using a scheme like the one given in part (c)? Explain.

36. Using Continuity Correction There are many situations in which a normal distribution can be used as a good approximation to a random variable that has only *discrete* values. In such cases, we can use this *continuity correction:* Represent each whole number by the interval extending from 0.5 below the number to 0.5 above it. The Chapter Problem for Chapter 3 includes Table 3-1, which lists the numbers of chocolate chips in Chips Ahoy regular cookies. Those numbers have a distribution that is approximately normal with a mean of 24.0 chocolate chips and a standard deviation of 2.6 chocolate chips. Find the percentage of such cookies having between 20 and 30 chocolate chips inclusive.

a. Find the result without using the continuity correction.

b. Find the result using the continuity correction.

c. Does the use of the continuity correction make much of a difference in this case?

37. Outliers For the purposes of constructing modified boxplots as described in Section 3-4, outliers defined as data values that are above Q_3 by an amount greater than $1.5 \times$ IQR or below Q_1 by an amount greater than $1.5 \times$ IQR, where IQR is the interquartile range. Using this definition of outliers, find the probability that when a value is randomly selected from a normal distribution, it is an outlier.

38. SAT and ACT Tests Based on recent results, scores on the SAT test are normally distributed with a mean of 1511 and a standard deviation of 312. Scores on the ACT test are normally distributed with a mean of 21.1 and a standard deviation of 5.1. Assume that the two tests use different scales to measure the same aptitude.

a. If someone gets an SAT score that is in the 95th percentile, find the actual SAT score and the equivalent ACT score.

b. If someone gets an SAT score of 2100, find the equivalent ACT score.