

## APPLY YOUR KNOWLEDGE

**2.9 Blood phosphate.** The level of various substances in the blood influences our health. Here are measurements of the level of phosphate in the blood of a patient, in milligrams of phosphate per deciliter of blood, made on 6 consecutive visits to a clinic:

5.6 5.2 4.6 4.9 5.7 6.4

A graph of only 6 observations gives little information, so we proceed to compute the mean and standard deviation.

(a) Find the mean step-by-step. That is, find the sum of the 6 observations and divide by 6.

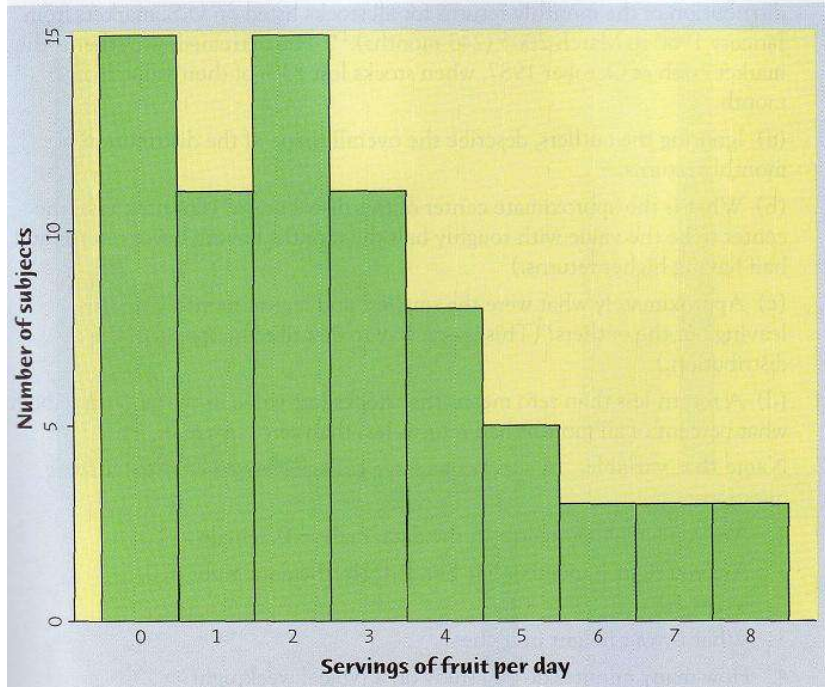
(b) Find the standard deviation step-by-step. That is, find the deviations of each observation from the mean, square the deviations, then obtain the variance and the standard deviation. Example 2.7 shows the method.

(c) Now enter the data into your calculator and use the mean and standard deviation buttons to obtain  $\bar{x}$  and  $s$ . Do the results agree with your hand calculations?

**2.10  $\bar{x}$  and  $s$  are not enough.** The mean  $\bar{x}$  and standard deviation  $s$  measure center and spread but are not a complete description of a distribution. Data sets with different shapes can have the same mean and standard deviation. To demonstrate this fact, use your calculator to find  $\bar{x}$  and  $s$  for these two small data sets. Then make a stemplot of each and comment on the shape of each distribution.

Data A	9.14	8.14	8.74	8.77	9.26	8.10	6.13	3.10	9.13	7.26	4.74
Data B	6.58	5.76	7.71	8.84	8.47	7.04	5.25	5.56	7.91	6.89	12.50

**2.29 How much fruit do adolescent girls eat?** Figure 1.13 (page 29) is a histogram of the number of servings of fruit per day claimed by 74 seventeen-year-old girls. With a little care, you can find the median and the quartiles from the histogram. What are these numbers? How did you find them?



**FIGURE 1.13** The distribution of fruit consumption in a sample of 74 seventeen-year-old girls, for Exercise 1.30.

- 2.42 You create the data.** Create a set of 5 positive numbers (repeats allowed) that have median 10 and mean 7. What thought process did you use to create your numbers?
- 2.43 You create the data.** Give an example of a small set of data for which the mean is larger than the third quartile.
- 2.46 Athletes' salaries.** Which members of the Boston Red Sox (Table 2.4) have salaries that are suspected outliers by the  $1.5 \times IQR$  rule?

**TABLE 2.4** 2005 salaries for the Boston Red Sox baseball team

Player	Salary	Player	Salary	Player	Salary
Manny Ramirez	\$19,806,820	Tim Wakefield	\$4,670,000	Doug Mirabelli	\$1,500,000
Curt Schilling	14,500,000	David Wells	4,075,000	Wade Miller	1,500,000
Johnny Damon	8,250,000	Jay Payton	3,500,000	John Halama	850,000
Edgar Renteria	8,000,000	Kevin Millar	3,500,000	Matt Mantei	750,000
Jason Varitek	8,000,000	Alan Embree	3,000,000	Ramon Vazquez	700,000
Trot Nixon	7,500,000	Mike Timlin	2,750,000	Mike Myers	600,000
Keith Foulke	7,500,000	Mark Bellhorn	2,750,000	Kevin Youkilis	323,125
Matt Clement	6,500,000	Bill Mueller	2,500,000	Adam Stern	316,000
David Ortiz	5,250,000	Bronson Arroyo	1,850,000		