Nielsen Ratings for College Students

The Nielsen ratings are one of the most important measures of television viewing, and they affect billions of dollars in television advertising. In the past, the television viewing habits of college students were ignored, with the result that a large segment of the important young viewing audience was ignored. Nielsen Media Research is now including college students who do not live at home.

Some television shows have large appeal to viewers in the 18–24 age bracket, and the ratings of such shows have increased substantially with the inclusion of college students. For males, NBC's *Sunday Night Football* broadcast had an increase of 20% after male college students were included. For females, the TV show *Grey's Anatomy* had an increase of 54% after female college students were included. Those increased ratings ultimately translate into greater profits from charges to commercial sponsors. These ratings also give college students recognition that affects the programming they receive.

Just as there is not universal agreement on a procedure for finding percentiles, there is not universal agreement on a single procedure for calculating quartiles, and different computer programs often yield different results. If you use a calculator or computer software for exercises involving quartiles, you may get results that differ somewhat from the answers obtained by using the procedures described here.

CAUTION There is not universal agreement on procedures for finding quartiles, and different technologies may yield different quartile values.

In earlier sections of this chapter we described several statistics, including the mean, median, mode, range, and standard deviation. Some other statistics are defined using quartiles and percentiles, as in the following:

$$\text{Interquartile range (or IQR)} = Q_3 - Q_1$$

$$\text{Semi-interquartile range} = \frac{Q_3 - Q_1}{2}$$

$$\text{Midquartile} = \frac{Q_3 + Q_1}{2}$$

$$\text{10–90 percentile range} = P_{90} - P_{10}$$

5-Number Summary and Boxplot

The values of the three quartiles (Q_1, Q_2, Q_3) are used for the 5-number summary and the construction of boxplot graphs.

DEFINITION For a set of data, the **5-number summary** consists of these five values:

1. Minimum
2. First quartile, Q_1
3. Second quartile, Q_2 (same as the median)
4. Third quartile, Q_3
5. Maximum

A **boxplot** (or **box-and-whisker diagram**) is a graph of a data set that consists of a line extending from the minimum value to the maximum value, and a box with lines drawn at the first quartile Q_1, the median, and the third quartile Q_3. (See Figure 3-6.)

Example 7 Finding a 5-Number Summary

Use the chocolate chip counts listed in Table 3-4 to find the 5-number summary.

Solution

Because the chocolate chip counts in Table 3-4 are sorted, it is easy to see that the minimum is 19 and the maximum is 30. The value of the first quartile is $Q_1 = 22.5$, as was found in Examples 5 and 6. Also, $Q_3 = 26.0$ can be found by using the same procedure for finding P_{75} (as summarized in Figure 3-5). The 5-number summary is 19, 22.5, 24.0, 26.0, and 30.