The 5-number summary is used to construct a boxplot, as in the following procedure.

Procedure for Constructing a Boxplot

1. Find the 5-number summary (minimum value, Q_1, Q_2, Q_3, maximum value).
2. Construct a scale with values that include the minimum and maximum data values.
3. Construct a box (rectangle) extending from Q_1 to Q_3, and draw a line in the box at the value of Q_2 (median).
4. Draw lines extending outward from the box to the minimum and maximum data values.

CAUTION Because there is not universal agreement on procedures for finding quartiles, and because boxplots are based on quartiles, different technologies may yield different boxplots.

Example 8 Constructing a Boxplot

Use the chocolate chip counts listed in Table 3-4 to construct a boxplot.

Solution

The boxplot uses the 5-number summary found in Example 7: 19, 22.5, 24.0, 26.0, and 30. Figure 3-6 is the boxplot representing the chocolate chip counts listed in Table 3-4.

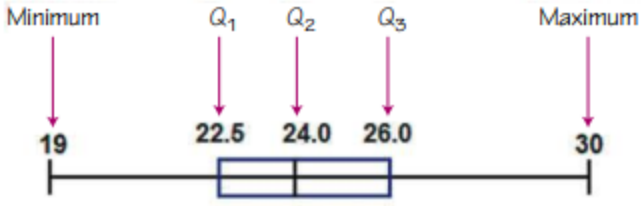
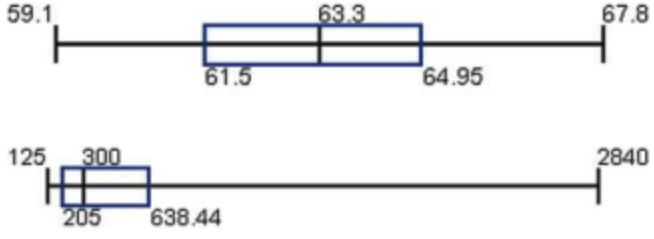


Figure 3-6 Boxplot of Chocolate Chip Counts in Regular Chips Ahoy Cookies

Boxplots give us some information about the spread of the data. Shown below is a boxplot from a data set with a normal (bell-shaped) distribution and a boxplot from a data set with a distribution that is skewed to the right (based on data from *USA Today*).



Normal Distribution: Heights from a simple random sample of women

Skewed Distribution: Salaries (in thousands of dollars) of NCAA football coaches

Because the shape of a boxplot is determined by the five values from the 5-number summary, a boxplot is not a graph of the distribution of the data, and it doesn't show as much detailed information as a histogram or stemplot. However, boxplots are