Consider the IQ scores of the low lead group listed in Table 2-1. Table 2-2 is a frequency distribution summarizing those IQ scores. The **frequency** for a particular class is the number of original values that fall into that class. For example, the first class in Table 2-2 has a frequency of 2, so 2 of the IQ scores are between 50 and 69 inclusive.

The following standard terms are sometimes used in constructing frequency distributions and graphs.

**Table 2-2**
IQ Scores of Low Lead Group

| IQ Score | Frequency |
|----------|-----------|
| 50–69    | 2         |
| 70–89    | 33        |
| 90–109   | 35        |
| 110–129  | 7         |
| 130–149  | 1         |

### DEFINITIONS

**Lower class limits** are the smallest numbers that can belong to the different classes. (Table 2-2 has lower class limits of 50, 70, 90, 110, and 130.)

**Upper class limits** are the largest numbers that can belong to the different classes. (Table 2-2 has upper class limits of 69, 89, 109, 129, and 149.)

**Class boundaries** are the numbers used to separate the classes, but without the gaps created by class limits. Figure 2-1 shows the gaps created by the class limits from Table 2-2. In Figure 2-1 we see that the values of 69.5, 89.5, 109.5, and 129.5 are in the centers of those gaps, and following the pattern of those class boundaries, we see that the lowest class boundary is 49.5 and the highest class boundary is 149.5. Thus the complete list of class boundaries is 49.5, 69.5, 89.5, 109.5, 129.5, and 149.5.

**Class midpoints** are the values in the middle of the classes. Table 2-2 has class midpoints of 59.5, 79.5, 99.5, 119.5, and 139.5. Each class midpoint is computed by adding the lower class limit to the upper class limit and dividing the sum by 2.

**Class width** is the difference between two consecutive lower class limits (or two consecutive lower class boundaries) in a frequency distribution. Table 2-2 uses a class width of 20.

**CAUTION** Finding the correct class width and class boundaries can be tricky. For class width, don't make the most common mistake of using the difference between a lower class limit and an upper class limit. See Table 2-2 and note that the class width is 20, not 19.

For class boundaries, remember that they split the difference between the end of one class and the beginning of the next class, as shown in Figure 2-1.
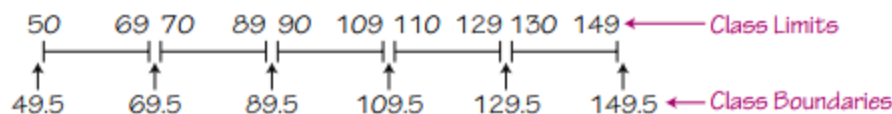


**Figure 2-1   Finding Class Boundaries from Class Limits in Table**

## Procedure for Constructing a Frequency Distribution

We construct frequency distributions (1) so that we can summarize large data sets, (2) so that we can analyze the data to see the distribution and identify outliers, and (3) so that we have a basis for constructing graphs (such as *histograms,* introduced in the next section). Although technology can generate frequency distributions, the steps for manually constructing them are as follows:

1. Select the number of classes, usually between 5 and 20. The number of classes might be affected by the convenience of using round numbers.