Table 3-2 IQ Scores of Low Lead Group

IQ Score	Frequency f	Class Midpoint x	f · x
50–69	2	59.5	119.0
70–89	33	79.5	2623.5
90–109	35	99.5	3482.5
110–129	7	119.5	836.5
130–149	1	139.5	139.5
Totals:	$\Sigma f = 78$		$\Sigma(f \cdot x) = 7201.0$

frequency of 2. We pretend that each of the two IQ scores is 59.5 (the class midpoint). With the IQ score of 59.5 repeated twice, we have a total of $59.5 \cdot 2 = 119$ as shown in the last column of Table 3-2. We can then add such products to find the total of all sample values, which we then divide by the sum of the frequencies, Σf. Formula 3-2 is used to compute the mean when the sample data are summarized in a frequency distribution. Formula 3-2 is not really a new concept; it is simply a variation of Formula 3-1.

Formula 3-2

First multiply each frequency and class midpoint; then add the products.
↓

Mean from frequency distribution: $\quad \bar{x} = \dfrac{\Sigma(f \cdot x)}{\Sigma f}$
↑
Sum of frequencies

The following example illustrates the procedure for finding the mean from a frequency distribution.

Example 8 **Computing Mean from a Frequency Distribution**

The first two columns of Table 3-2 constitute a frequency distribution summarizing the full IQ scores of the low lead group in Data Set 5 from Appendix B. Use that frequency distribution to find the mean.

Solution

Table 3-2 illustrates the procedure for using Formula 3-2 when calculating a mean from data summarized in a frequency distribution. The class midpoint values are shown in the third column, and the products $f \cdot x$ are shown in the last column. The bottom row of Table 3-2 shows the two components we need for the calculation of the mean (as in Formula 3-2): $\Sigma f = 78$ and $\Sigma(f \cdot x) = 7201.0$. The calculation using Formula 3-2 is as follows:

$$\bar{x} = \frac{\Sigma(f \cdot x)}{\Sigma f} = \frac{7201.0}{78} = 92.3$$

The result of $\bar{x} = 92.3$ is an approximation because it is based on the use of class midpoint values instead of the original list of full IQ scores. The mean of 92.9 found by using all of the original full IQ scores is a better result.