$\bar{x} - EBM = 127.45 - 10.038 = 117.412$

$\bar{x} + EBM = 127.45 + 10.038 = 137.488$

We estimate with 90% confidence that the mean number of all targeted industrial chemicals found in cord blood in the United States is between 117.412 and 137.488.

Solution

USING THE TI-83, 83+, 84, 84+ CALCULATOR

Enter the data as a list.
Press STAT and arrow over to TESTS.
Arrow down to `8:TInterval` and press ENTER (or you can just press 8). Arrow to Data and press ENTER.
Arrow down to `List` and enter the list name where you put the data.
Arrow down to `Freq` and enter 1.
Arrow down to `C-level` and enter 0.90
Arrow down to `Calculate` and press ENTER.
The 90% confidence interval is (117.41, 137.49).

TRY IT 8.9

A random sample of statistics students were asked to estimate the total number of hours they spend watching television in an average week. The responses are recorded in Table 8.4. Use this sample data to construct a 98% confidence interval for the mean number of hours statistics students will spend watching television in one week.

0	3	1	20	9
5	10	1	10	4
14	2	4	4	5

Table 8.4

8.3 A Population Proportion

During an election year, we see articles in the newspaper that state **confidence intervals** in terms of proportions or percentages. For example, a poll for a particular candidate running for president might show that the candidate has 40% of the vote within three percentage points (if the sample is large enough). Often, election polls are calculated with 95% confidence, so, the pollsters would be 95% confident that the true proportion of voters who favored the candidate would be between 0.37 and 0.43: (0.40 – 0.03,0.40 + 0.03).

Investors in the stock market are interested in the true proportion of stocks that go up and down each week. Businesses that sell personal computers are interested in the proportion of households in the United States that own personal computers. Confidence intervals can be calculated for the true proportion of stocks that go up or down each week and for the true proportion of households in the United States that own personal computers.

The procedure to find the confidence interval, the sample size, the **error bound**, and the **confidence level** for a proportion is similar to that for the population mean, but the formulas are different.

How do you know you are dealing with a proportion problem? First, the underlying **distribution is a binomial distribution**. (There is no mention of a mean or average.) If X is a binomial random variable, then $X \sim B(n, p)$ where n is the number of trials and p is the probability of a success. To form a proportion, take X, the random variable for the number of successes and divide it by n, the number of trials (or the sample size). The random variable P' (read "P prime")