STATDISK also provides sample sizes. With STATDISK, select **Analysis, Sample Size Determination,** and then **Estimate St Dev.** If using Minitab Release 16 or later, select **Stat,** then **Power and Sample Size.** Excel, StatCrunch, and the TI-83/84 Plus calculator do not provide such sample sizes.

Example 3 **Finding Sample Size for Estimating σ**

We want to estimate the standard deviation σ of all IQ scores of people with exposure to lead. We want to be 95% confident that our estimate is within 10% of the true value of σ. How large should the sample be? Assume that the population is normally distributed.

Solution

From Table 7-2, we can see that 95% confidence and an error of 10% for σ correspond to a sample of size 192. We should obtain a simple random sample of 192 IQ scores from the population of subjects exposed to lead.

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using TECHNOLOGY

For Confidence Intervals

STATDISK   First obtain the descriptive statistics and verify that the distribution is normal by using a histogram or normal quantile plot. Next, select **Analysis** from the main menu, then select **Confidence Intervals,** and **Population StDev.** Enter the required data.

MINITAB   Click on **Stat,** click on **Basic Statistics,** and select 1 **Variance.** In the Data box, select the option of using a column containing the list of sample data or enter the value of the sample standard deviation or sample variance. Click on the **Options** button and enter the confidence level, such as 95.0. Click **OK** twice. The results will include a confidence interval for the standard deviation and a confidence interval for the variance.

EXCEL   Neither Excel nor XLSTAT has a function for generating a confidence interval estimate of standard deviation or variance.

TI-83/84 PLUS   The TI-83/84 Plus calculator does not provide confidence intervals for σ or σ^2 directly, but the program **S2INT** can be used. That program was written by Michael Lloyd of Henderson State University, and it is on the CD included with this book, or it can be downloaded from www.aw.com/triola. The program S2INT uses the program ZZINEWT, so that program must also be installed. After storing the programs on the calculator, press **PRGM**, select **S2INT,** and enter the sample variance s^2, the sample size n, and the confidence level (such as 0.95). Press **ENTER**, and wait a while for the display of the confidence interval limits for σ^2. Find the square root of the confidence interval limits if an estimate of σ is desired.

STATCRUNCH   Click on **Open StatCrunch.** Click on **Stat,** then select **Variance.** Select **One sample,** then select **with data** (for a list of sample data) or **with summary** (for summary statistics). Click on **Next,** then select **Confidence Interval** and click on **Calculate.**

7-4 Basic Skills and Concepts

Statistical Literacy and Critical Thinking

1. LDL Cholesterol Using the 40 LDL cholesterol levels of women listed in Data Set 1, we get this 95% confidence interval estimate: $916.591 < \sigma^2 < 2252.119$, and the units of measurement are $(\text{mg/dL})^2$. Identify the corresponding confidence interval estimate of σ and include the appropriate units. Given that the original values are whole numbers, round the limits using the round-off rule given in this section. Write a statement that correctly interprets the confidence interval estimate of σ.