MINITAB Enter the paired data in columns C1 and C2, then select **Stat** from the main menu bar, choose **Basic Statistics,** followed by **Correlation,** and enter C1 and C2 for the columns to be used. Minitab will provide the value of the linear correlation coefficient *r* as well as a *P*-value. To obtain a scatterplot, select **Graph, Scatterplot,** then enter C1 and C2 for *X* and *Y*, and click **OK.**

With Minitab 16, you can also click on **Assistant,** then **Regression.** Click on the box with the message **Click to perform analysis.** Fill out the dialog box and select **Linear** for the methods of this section. Click **OK** to get four windows of results that include the value of the linear correlation coefficient *r*, the *P*-value, a scatterplot, and much more helpful information.

EXCEL Excel has a function that calculates the value of the linear correlation coefficient. First enter the paired sample data in columns A and B. Click on the *fx* function key located on the main menu bar. Select the function category **Statistical** and the function name **CORREL,** then click **OK.** In the dialog box, enter the cell range of values for *x*, such as A1:A6. Also enter the cell range of values for *y* such as B1:B6. To obtain a scatterplot, click

on the **Insert** tab, then use the chart type identified as **Scatter.** The style of the scatterplot can be edited by right-clicking on the desired feature.

XLSTAT can also be used. The instructions are included near the end of the following section.

TI-83/84 PLUS Enter the paired data in lists L1 and L2, then press **STAT** and select **TESTS.** Using the option of **LinRegT-Test** will result in several displayed values, including the value of the linear correlation coefficient *r* and a *P*-value.

To obtain a scatterplot, press **2ND**, then **Y=** (for STAT PLOT). Press **ENTER** **ENTER** to turn Plot 1 on, then select the first graph type, which resembles a scatterplot. Set the *X* list and *Y* list labels to L1 and L2 and press **ZOOM**, then select **ZoomStat** and press **ENTER**.

STATCRUNCH Click on **Open StatCrunch.** Enter the columns of data or open a data set. Click on **Stat,** then select **Regression,** then select **Simple Linear.** Enter the columns to be used, then click on **Calculate.**

10-2 Basic Skills and Concepts

Statistical Literacy and Critical Thinking

1. Notation For each of several randomly selected years, the sunspsot number and the high value of the Dow Jones Industrial Average are recorded. The sunspot number is a measure of sunspot activity on the sun, and the Dow Jones Industrial Average is one measure of stock market value. For this sample of paired data, what does *r* represent? What does ρ represent? Without doing any research or calculations, estimate the value of *r*.

2. Physics Experiment A physics experiment consists of recording paired data consisting of the time (seconds) elapsed since the beginning of the experiment and the distance (cm) of a robot from its point of origin. Using the paired time/distance data, the value of *r* is calculated to be 0. Is it correct to conclude that there is no relationship between time and distance? Explain.

3. Cause of High Blood Pressure Some studies have shown that there is a correlation between consumption of salt and blood pressure. As more salt is consumed, blood pressure tends to rise. A reporter reads one of these studies and writes the headline "Increased Salt Consumption Causes Blood Pressure to Rise." Is that headline justified? If not, help this reporter by rewriting the headline so that it is correct.

4. Weight Loss and Correlation In a test of the Weight Watchers weight loss program, weights of 40 subjects are recorded before and after the program. Assume that the before/after weights result in *r* = 0.876. Is there sufficient evidence to support a claim of a linear correlation between the before/after weights? Does the value of *r* indicate that the program is effective in reducing weight? Why or why not?

Interpreting r. *In Exercises 5–8, use a significance level of* $\alpha = 0.05$.

5. Old Faithful For 40 eruptions of the Old Faithful geyser in Yellowstone National Park, duration times (sec) were recorded along with the time intervals (min) to the next eruption. The paired durations and interval times were used to obtain the results shown in the accompanying