

XLSTAT for Confidence Interval: Click on **XLSTAT** at the top. Click on **Parametric tests**, then select **Two sample t test and z test**. In the dialog box that appears, enter the range of values for the first sample (such as A1:A13) and enter the range of values for the second sample. For “Data format,” select the option of **Paired samples**. For the “Column labels” box, include a checkmark only if the first row of the sample data consists of names or labels. Put a checkmark next to “Student’s t test.” Click on the **Options** tab. For the alternative hypothesis, select the format of a two-tailed test. Enter a value in the “Significance level (%)” box. For example, enter 5 for a 95% confidence interval. Click **OK** to get results that include the confidence interval.

Data Analysis Add-in: If using Excel 2013, 2010, or 2007, click on **Data**, then **Data Analysis**; if using Excel 2003, click on **Tools**, found on the main menu bar, then select **Data Analysis**, and proceed to select **t-test Paired Two Sample for Means**. In the dialog box, enter the range of values for each of the two samples, enter the assumed value of the population mean difference (typically 0), and enter the significance level. The displayed

results will include the test statistic, the P -values for a one-tailed test and a two-tailed test, and the critical values for a one-tailed test and a two-tailed test.

TI-83/84 PLUS *Caution:* Do not use the menu item **2-SampTTest** because it applies to *independent* samples. Instead, enter the data for the first variable in list L1, enter the data for the second variable in list L2, then clear the screen and enter **L1 - L2** **STO>** **L3** so that list L3 will contain the individual differences d . Now press **STAT**, then select **TESTS**, and choose the option of **T-Test** (for a hypothesis test) or **TInterval** (for a confidence interval). Use the input option of **Data**. For the list, enter L3. If using **T-Test**, also enter the assumed value of the population mean difference (typically 0) for μ_0 . Press **ENTER** when finished.

STATCRUNCH Click on **Open StatCrunch**. Enter the sample data in columns, or open a data set. Click on **Stat**, then select **T statistics**. Select **Paired**. Click on **Next**, then select **Hypothesis Test or Confidence Interval**. Make the required entries. Click on **Calculate**.

9-4 Basic Skills and Concepts

Statistical Literacy and Critical Thinking

1. True Statements? For the methods of this section, which of the following statements are true?

- The requirement of a simple random sample is satisfied if we have matched pairs of voluntary response data.
- If we have more than 10 matched pairs of sample data, we can consider the sample to be large and there is no need to check for normality.
- If we have five matched pairs of sample data, there is a loose requirement that the five differences appear to be from a normally distributed population.
- The methods of this section apply if we have 50 heights of women from Texas and 50 heights of women from Utah.
- If we want to use a confidence interval to test the claim that $\mu_d > 0$ with a 0.05 significance level, the confidence interval should have a confidence level of 90%.

2. Notation Listed below are combined city–highway fuel consumption ratings (in mi/gal) for five different cars measured under both the old rating system and a new rating system introduced in 2008 (based on data from *USA Today*). The new ratings were implemented in response to complaints that the old ratings were too high. Find the values of \bar{d} and s_d . In general, what does μ_d represent?

Old Rating (mi/gal) 16 18 27 17 33

New Rating (mi/gal) 15 16 24 15 29

3. Units of Measure If the values listed in Exercise 2 are changed so that they are expressed in kilometers per liter (km/L) instead of mi/gal, how is a test statistic affected? How are the confidence interval limits affected?