The lesson documents provide information about using the calculator provided with the lessons. The purpose of this supplement is to supply information about another possible technology, namely the TI-83/84 series calculator.

CAUTION: You should note that the interface for the calculator has changed in the past and may well change in the future – accordingly, some of the information given here may prove to be out of date.

Lesson 10

We will use the data from Exercise 1, reproduced below, to illustrate the process. We have labeled this the table of ***observed counts*** – it contains the counts that were observed in the sample.

Observed counts	Major concern	Not a major concern	Totals
Have children	515	340	855
No children	473	437	910
Totals	988	777	1765

Here are the steps you use to carry out the chi-square hypothesis test using your calculator.

Note: The table as shown above contains a row of totals and a column of totals. However, these values will not be entered into your calculator. You will instead enter only the actual counts observed by the researchers, as shown in this version of the contingency table:

Observed counts	Major concern	Not a major concern
Have children	515	340
No children	473	437

1. Begin by entering the observed counts into a matrix, as follows.

a. Press 2^{nd} x^{-1} key (MATRX) on newer models, MATRIX key on older models.

b. Right arrow over to EDIT and hit enter or 1, to choose MATRIX[A] as the matrix to be entered.

c. Next to MATRIX[A], enter the number of rows followed by the number of columns in the table. Hit Enter. The size of the matrix will automatically adjust to hold exactly that number of rows and columns.

Reminder: Do not include the "totals" row and column! This table has two rows and two columns.

d. Input the observed counts into the matrix exactly as they appear in the table. Your screen should look like this at this point:

MATRIX[A] 2 x 2
[515 340]
[473 437]

e. Use 2^{nd} quit to exit.

2. Run the test, as follows.

a. Go to STAT and right arrow over to TESTS.

b. Scroll down to the χ^2***-Test*** option and hit enter.

c. Down arrow to CALCULATE and hit enter. The calculator display includes the χ^2 test statistic value and the *P*-value, shown here rounded to four places.

$\chi^2 = 12.1928$
p = 4.7975E⁻4 (that is, 0.00047975)
df = 1

Using technology, the test statistic is $\chi^2 = 12.1928$, with a corresponding *p*-value of 0.0005. At either significance level (0.05 or 0.01) we reach the same conclusion: reject the null hypothesis.

Additional information for the calculations "by hand" section.

Calculating the *p*-value

There is a **χ^2cdf** on the 2nd DISTR menu whose use is quite similar to the normalcdf you already know about. The form is **χ^2cdf(*a, b, df*)** where *a* and *b* have the same meaning as for normalcdf and df is the degrees of freedom. For the example in the lesson, we use 2nd DISTR to select that function, then fill in the values to obtain this result: χ^2cdf(12.1901, 10000, 1) = 4.8044E-4 = 0.00048044

Comment on expected counts

When you do the calculations "by hand," the first step is to find the table of expected counts. When you perform the calculations using the calculator, it is also possible to determine the expected counts, as follows:

The expected counts are calculated for you and stored in matrix B. To see the expected counts go again to MATRIX, right arrow over to EDIT, scroll down to [B] and hit enter, with these results:

MATRIX[B] 2 x 2
[478.61 376.39]
[509.39 400.61]