

CHAPTER 19 Appendix

Inference about a Proportion

Your text uses the Normal approximation to the binomial distribution in calculating both the confidence interval and the hypothesis test. For this approximation to be accurate, you must have at least 15 successes *and* 15 failures for a confidence interval (if not, use the “plus four” method) and *expect* at least 10 successes *and* 10 failures for the hypothesis test. Check Chapter 19 in your text for exact assumptions.



Excel

Excel has no built-in functions for making inferences for one proportion. If you are using Excel, you can compute a z test statistic for a hypothesis test, and then use **NORM.S. DIST** from the **Formulas → More Functions → Statistical** menu to compute the P -value.

For a video that shows how to use Excel and the formulas with an example, see the Excel Video Technology Manuals *One Proportion Inference: CI—Summarized Data* and *One Proportion Inference: Sample Size Computation*.



Confidence Interval for One Proportion

1. **Help → Calculators → Confidence Interval for One Proportion**
2. Select the input method (**Raw Data** or **Summary Statistics**). For almost all exercises and examples in this text, you will select “Summary Statistics.”
3. **OK**
4. Enter the number of successes, the sample size (n), and the confidence level in the boxes.
5. Press **Enter**.

For a plus four interval, simply add 2 to the number of successes and 4 to the number of trials/samples.

For a video that shows how to use JMP to calculate the confidence interval for one proportion with an example, see the JMP Video Technology Manuals on *One Proportion Inference: CI—Summarized Data* and *One Proportion Inference: Sample Size Computation*.

Z Test for One Proportion

1. **Help → Calculators → Hypothesis Test for One Proportion**
2. Select the input method (**Raw Data** or **Summary Statistics**). For almost all exercises and examples in this text, you will select “Summary Statistics.”
3. **OK**
4. Select the form of the alternative hypothesis (not equal, greater than, or less than), and enter the hypothesized value of the proportion, the number of successes, the sample size, and the significance level of the test.
5. Press **Enter**.
6. If you desire, check the box labeled **Reveal Decision**. A Reject/Fail to Reject message will appear below the P -value of the test at the lower right.

For an example, see the JMP Video Technology Manuals *One Proportion Inference: CI and test—raw data*.



Minitab

Confidence intervals and tests are done from the same dialog box regardless of whether you have raw data (in a column) or only summary statistics.

1. **Stat → Basic Statistics → 1 Proportion**
2. Change the drop-down at the top to reflect whether you have summary statistics (typical for this text) or raw data in a column.
3. For raw data, highlight and **Select** the column name into the box.
4. For summary statistics, enter the number of “events” (successes, x) and the sample size (n).

If you want a plus four interval, simply add 2 to the number of successes and 4 to the number of trials.

1. The defaults are a 95% confidence level and a “not equal” alternative hypothesis (two-sided confidence interval). To change either of these, click **Options**, change the value, and then click **OK**.
2. For the confidence interval, **OK**.
3. For a hypothesis test, check the box, enter the value of p_0 , and then click **OK**.

For more information and an example, see the Minitab Video Technology Manual: *One Proportion Inference: CI and Test: summarized data*.



SPSS does not compute confidence intervals or hypothesis tests for one proportion.

Note: See the SPSS video technology manual for this chapter for instructions on using SPSS as a calculator to perform the tests and procedures in this chapter.



Both confidence intervals and hypothesis tests are done through the **Statistics → Proportion → One-Sample** dialog.

1. For “raw data” in a column, click the **Columns** tab; otherwise (typically), click **Summarized**.
2. For raw data, select the column of interest.
3. For summarized data, enter the sample size (n) and the number of successes (x).

If you want a plus four interval, simply add 2 to the number of successes and 4 to the number of trials.

1. Click the **Confidence Interval** tab and enter the desired confidence level.
2. Alternatively, click the **Hypothesis Test** tab. Enter the hypothesized proportion value and type of alternative hypothesis.
3. **Calculate**

For more information (and an example), see the CrunchIt! Help Video *Inference for One Proportion*.



TI-83/-84

Confidence Interval for One Proportion

If you want a plus four interval, simply add 2 to the number of successes and 4 to the number of trials.

1. Press **STAT** **▶** **▶** to select **TEST**.
2. Select **A:1-PropZInt**.
3. Enter the number of successes (x), the sample size (n), and the confidence level.
4. Select **Calculate**.
5. Press **ENTER**.

Test for One Proportion

1. Press **STAT** **▶** **▶** to select **TEST**.
2. Select **5:1-PropZTest**.
3. Enter the value of the population proportion (p_0) under the null hypothesis.
4. Enter the number of successes (x) and the sample size (n).
5. Select the desired type of alternative hypothesis.
6. Select **Calculate**.
7. Press **ENTER**.

For more help and an example, see the TI-83/-84 Video Technology Manuals for *One Proportion Inference: CI—summarized data* and *One Proportion Inference: Sample Size Computation*.



R does not have a built-in function to perform a z test for one proportion. There is a `prop.test` command, but it uses the chi-square distribution; its p -values and confidence intervals will be different than those found using a z distribution.

For an example using R (as a calculator here), see the R Video Technology Manual: *One Proportion Inference: Confidence Intervals*. (The part you are interested in appears at the end.)