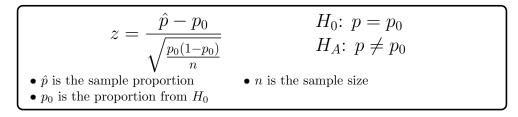
# **One-Sample Hypothesis Test for Proportions**

Answers a yes/no question about a population proportion p. Lets you decide if there is statistically significant evidence that p is different from a proportion  $p_0$ .



## Steps

- 1. Make hypotheses.  $H_0$  says that there is no difference between the true population proportion p and the number  $p_0$ .  $H_A$  can be one-sided if you have prior knowledge or two-sided if you aren't sure.
- 2. Calculate z-value. Use the formula.
- 3. Find the p-value. Use the normal distribution on the Probability Distributions app.
- 4. Explain what it means. This works the same as any other hypothesis test. Lower p-values are more significant.

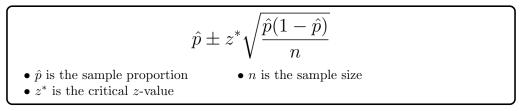
#### Assumptions

- 1. Randomness You have a simple random sample from a large population (no sample bias).
- 2. Normality Sample size is large enough so that  $\hat{p}$  has a roughly normal distribution.

In order to have a big enough sample size, you should expect at least 10 successes and 10 failures in your sample, if the null hypothesis were true. In other words, both  $p_0N$  and  $(1 - p_0)N$  should be at least 10.

### **One-Sample Confidence Interval for Proportions**

Estimates a population proportion p. We can be confident that the true value of p is between the upper and lower bound from the formula.



## Assumptions

These are the same as for the hypothesis test, except that confidence intervals are a little less robust (need even bigger samples). You can make these confidence intervals more robust by using the **plus-4 method**. To make a plus-4 confidence interval, add two fake failures and two fake successes to the data. These work well as long as  $n \ge 10$ .