

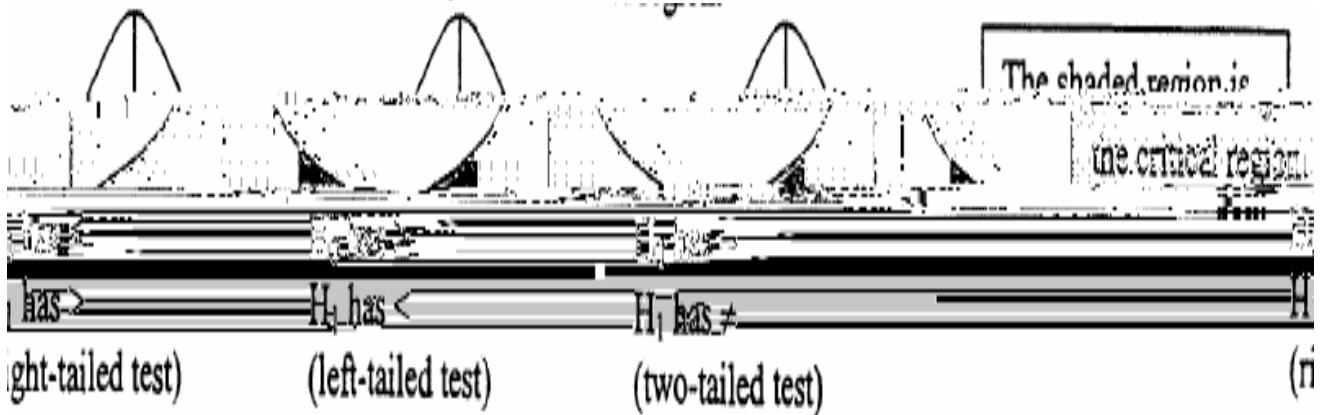
Testing Hypotheses

Testing hypotheses, or testing claims, is a large part of the Elementary Statistics course here at MSTU. The basic idea is to use statistics (items such as the mean, standard deviation, proportion, etc) from a sample in order to infer something about the population. This will allow us to decide whether or not a given claim is supported by the sample data. This idea of using data from a sample to infer something about the entire population is called "Inferential Statistics."

Here are the 8 easy steps to testing hypotheses:

1. Identify the given information. ($n=?$, $\mu=?$, $s=?$, $\sigma=?$, $p=?$)
 - this information is typically given in the problem or can be calculate;
 - also, larger sample sizes yield more reliable results
 - sample sizes also determine whether you use t -test ($n > 30$) or z -test
2. State the null hypothesis (H_0) and the alternative hypothesis (H_a)
 - thus, $H_0: \mu = \mu_0$ vs $H_a: \mu \neq \mu_0$
3. Choose the level of significance (α)
4. Compute the test statistic
5. Determine the critical value
6. Compare the test statistic to the critical value
7. Make a decision to reject or fail to reject the null hypothesis
8. Interpret the decision in the context of the original claim

5. Now that you know what random variable you're dealing with (i.e. z, t, χ^2 , F), draw a picture of the distribution
 - both z and t distributions will be symmetric and bell shaped
 - for chi square (χ^2) the distribution will be skewed
6. Draw a normal distribution curve for a two-tailed test) and place it/them in the appropriate location(s) on your picture of the distribution.
 - the critical value defines the critical region which is a set of values for the test statistic that will lead us to reject the null hypothesis
 - there are three categories for a hypothesis test



- Determine what is rejected by the critical region; with this information, you will be able to look up critical values in a table

