

A one tailed Hypothesis Test of a Mean

There are four steps in testing a hypothesis.

Identify the claim.

Calculate the Test statistic.

Find the p-value.

Interpret Test results.

Identify the claim and the hypotheses.

Example: You are the head of quality control for a company that makes light bulbs. You want to test at a 5% significance level, a report that the company's light bulbs last more than 850 hours. You randomly select and test 47 bulbs and find the mean life of the bulbs is 865 hours with a standard deviation 67 hours.

H_0 : mean $\mu = 850$ hours. Note the null hypothesis will always contain the equality sign.

H_1 : mean $\mu > 850$ hours. This is the company's claim. Right tail test.

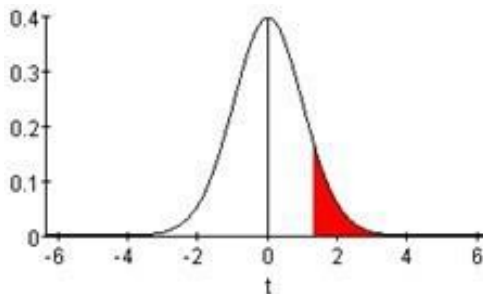
Calculate the test statistic.

Use a T-distribution because the population standard deviation is unknown.

$$t = \frac{\bar{x} - \mu}{S/\sqrt{n}} = \frac{865 - 850}{67/\sqrt{47}} = 1.534848045$$

Find the p-value.

This is a right tail test because H_0 will only be rejected in favor of H_1 if the test statistics is significantly greater than the mean. The p-value is the area to the right of the test statistic, 1.5348. This area can be found by using the calculator tcdf tool. To access press 2nd then VARS select option 4 TCDF press enter. The input in the tcdf tool is the following left limit, right, and degrees of freedom. tcdf(1.534848045,E99,46)



Interpret results.

The p-value for the test statistics is 0.065835616, which is greater than 0.05, the significance level. This means there is not strong evidence to reject the H_0 .

This is a way to do it with the calculator.

Press STAT scroll left to TEST select option 2: T-test press enter.

Enter the following in the calculator.

Inpt: select STATS

μ_0 : 850

\bar{x} : 865

Sx: 67

n: 47

mean μ : $>\mu_0$

The calculator will produce the following output:

Mean $\mu >$ 580

t = 1.534848045

p = .065835616

\bar{x} = 865

Sx = 67

n = 47

The p is the p-value and since it is larger than the significance level do not reject the H_0 .