Conditions

Given a sample size of 65, with sample mean 726.2 and sample standard deviation 85.3, we perform the following hypothesis test.

Ho: μ = 750

H1: μ < 750

What is the conclusion of the test at the σ= 0.10 level? Explain your answer.

Solution

Here we must use t-test.

$E(X) = 726.2$

$\sigma = 85.3$

Following to the t-test criterion:

$$t = \frac{|E(X) - \mu_0|}{\sigma/\sqrt{n}} = \frac{|726.2 - 750|}{85.3/\sqrt{65}} \approx 2.24949$$

The degrees of freedom used in this test is n – 1 = 64

So, for these degrees there are following t-criterion (taken from a special table of t-criterion values):

1.997 for p=0.95

2.3851 for p=0.98

2.6536 for p=0.01

3.4466 for p=0.001

As we have $t = 2.24949$, which is > 1.997 but < 2.3851, we can say, that with probability of 0.95% the hypothesis Ho is rejected.

For $\sigma = 0.10$ we have the following calculations:

$$t = \frac{|E(X) - \mu_0|}{\sigma/\sqrt{n}} = \frac{|726.2 - 750|}{0.1/\sqrt{65}} \approx 1918.82$$

t-criterion = 3.4466 for p=0.001 and no more values for t-criterion in the table.

Here we can say, that with the probability of 99.9% the hypothesis Ho is rejected.