The t-distribution with degrees of freedom “*n – 1*” is given below.

t=x¯¯¯−μsN−−√t=x¯−μsN

**SOLVED EXAMPLES OF T-DISTRIBUTION**

**Example:**The CEO of light bulbs manufacturing company claims that an average light bulb lasts 300 days. A researcher randomly selects 15 bulbs for testing. The sampled bulbs last an average of 290 days, with a standard deviation of 50 days. If the CEO’s claim were true, what is the probability that 15 randomly selected bulbs would have an average life of no more than 290 days?

**Solution:**

The traditional approach requires you to compute the t statistic, based on data presented in the problem description.

The first thing we need to do is compute the t statistic, based on the following equation:

Where x¯¯¯x¯ is the sample mean, μμ is the population mean, *s* is the standard deviation of the sample, and *n* is the sample size.

Using the formula: t=x¯¯¯−μsN√t=x¯−μsN

t=290−3005015√t=290−3005015

=−1012.909945=0.7745966=−1012.909945=0.7745966

Since we will work with the raw data, we select “Sample mean” from the Random Variable dropdown box.

* The degrees of freedom are equal to 15 – 1 = 14.
* Assuming the CEO’s claim is true, the population mean equals 300.
* The sample mean equals 290.
* The standard deviation of the sample is 50.

The cumulative probability: 0.226. Hence, if the true bulb life were 300 days, there is a 22.6% chance that the average bulb life for 15 randomly selected bulbs would be less than or equal to 290 days