

# What is the T critical value, and how can it be calculated using Python?

Authored by  
**stats writer**

April 17, 2024

## RECOMMENDED CITATION

stats writer (2024). *What is the T critical value, and how can it be calculated using Python?*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=136217>

The T critical value, also known as the critical t-score, is a statistical measure that is used to determine the significance of a sample mean in relation to a population mean. It is calculated based on the level of confidence desired and the degrees of freedom of the sample. In Python, the T critical value can be calculated using the "scipy.stats.t.ppf" function, which takes in the desired confidence level and degrees of freedom as parameters. This function returns the T critical value, which can then be used for hypothesis testing and determining the confidence interval of a sample mean.

## Find the T Critical Value in Python

**Whenever you conduct a t-test, you will get a test statistic as a result. To determine if the results of the t-test are statistically significant, you can compare the test statistic to a T critical value. If the absolute value of the test statistic is greater than the T critical value, then the results of the test are statistically significant.**

**The T critical value can be found by using a or by using statistical software.**

**To find the T critical value, you need to specify:**

**A significance level (common choices are 0.01, 0.05, and 0.10)The degrees of freedom**

**Using these two values, you can determine the T critical value to be compared with the test statistic.**

## How to Find the T Critical Value in Python

To find the T critical value in Python, you can use the `scipy.stats.t.ppf`, which uses the following syntax:

```
scipy.stats.t.ppf(q, df)
```

where:

**q:** The significance level to use  
**df:** The degrees of freedom

The following examples illustrate how to find the T critical value for a left-tailed test, right-tailed test, and a two-tailed test.

Left-tailed test

Suppose we want to find the T critical value for a left-tailed test with a significance level of .05 and degrees of freedom = 22:

```
import scipy.stats
```

```
#find T critical value
```

```
scipy.stats.t.ppf(q=.05,df=22)
```

```
-1.7171
```

**The T critical value is -1.7171. Thus, if the test statistic is less than this value, the results of the test are statistically significant.**

**Right-tailed test**

**Suppose we want to find the T critical value for a right-tailed test with a significance level of .05 and degrees of freedom = 22:**

```
import scipy.stats
```

```
#find T critical value
```

```
scipy.stats.t.ppf(q=1-.05,df=22)
```

```
1.7171
```

**The T critical value is 1.7171. Thus, if the test statistic is greater than this value, the results of the test are statistically significant.**

**Two-tailed test**

**Suppose we want to find the T critical value for a two-tailed test with a significance level of .05 and degrees of freedom = 22:**

```
import scipy.stats
```

```
#find T critical value
```

```
scipy.stats.t.ppf(q=1-.05/2,df=22)
```

```
2.0739
```

**Whenever you perform a two-tailed test, there will be two critical values. In this case, the T critical values are 2.0739 and -2.0739. Thus, if the test statistic is less than -2.0739 or greater than 2.0739, the results of the test are statistically significant.**

***Refer to the for the exact details of the `t.ppf()` function.***

***Refer to the for the exact details of the `t.ppf()` function.***