

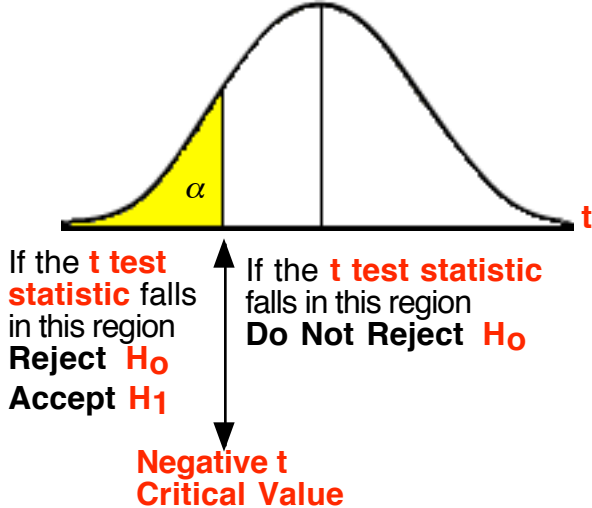
**Hypothesis Tests involving a claim about
the true value of the Population Mean μ_x
if the Population Standard Deviation σ_x is unknown
but the Sample Standard Deviation s_x is known**

Step 1: **Take a random sample value** of size > 30 or take a sample from a normal population. The Population Standard Deviation σ_x **is unknown**. Use a calculator to input the sample values and find the sample mean \bar{x} and the sample standard deviation s_x .

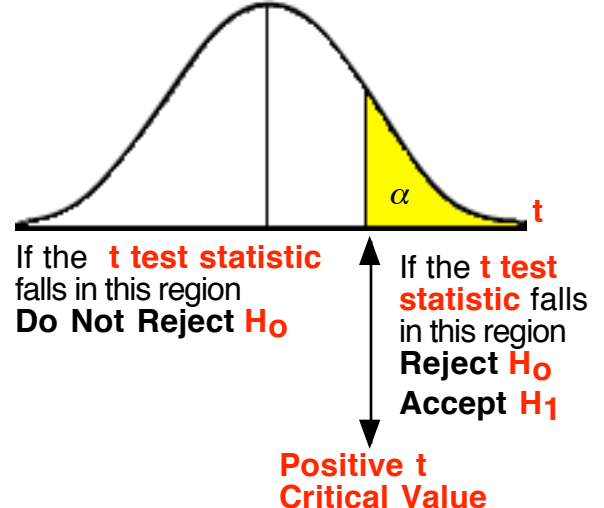
Step 2: State H_0 as an **equality** and H_1 as the alternate **inequality**.

Step 3: Decide the appropriate critical region(s) (One Tail Left, One Tail Right or Two Tail Left and Right) based on the significance level α

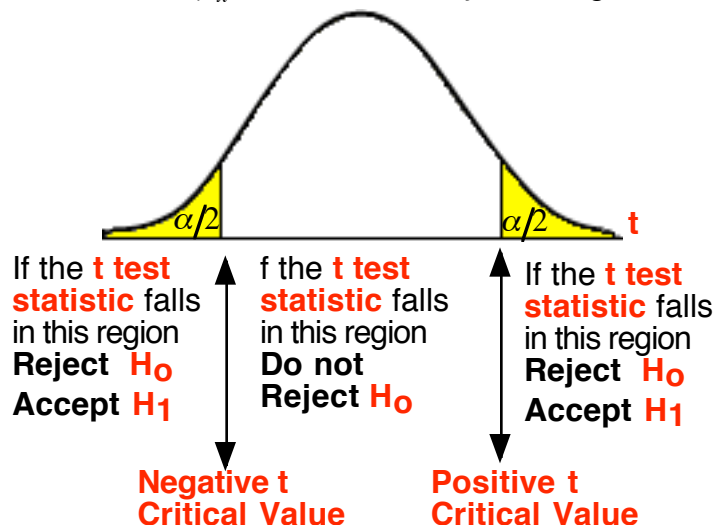
If H_1 is a **less than** statement like $H_1 \mu_x < 2.7$ then the rejection region is in the **left tail**



If is a **greater than** statement like $H_1 \mu_x > 2.7$ then the rejection region is in the **right tail**



If H_1 is a **not equal** statement like $H_1 \mu_x \neq 2.7$ then the rejection regions are in the **left and right tails**

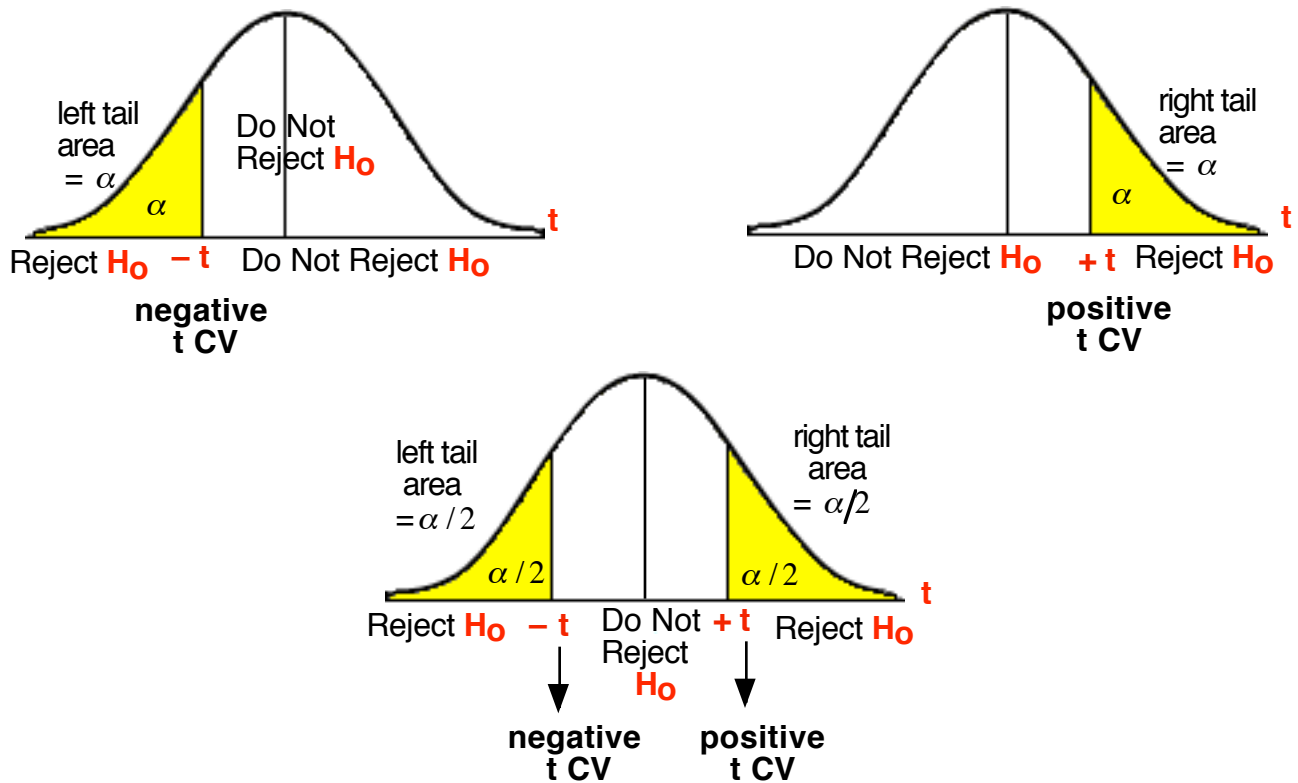


Step 4: **The t distribution is used to test claims about the population mean** if the population standard deviation is not known. Graph the normal t curve. Compute the critical t values using a t table and the correct degrees of freedom and place them on the graph. Label the Reject and Do not Reject regions.

Step 5: Compute the value of the **t test statistic** using the values stated in H_0 and H_1 . Only the **Sample Standard Deviation is known**. We will use s_x to compute the t test statistic.

The **t Test Statistic** for the **Population Mean** is:
$$t = \frac{(\bar{x} - \mu_x)}{\left(\frac{\sigma_x}{n}\right)}$$

Step 6: Decide if the test statistic falls into the Reject or DNR region. If the test statistic falls in the Rejection Region than the difference between the claimed value in H_0 and the sample value is significantly large enough to reject the **H_0 claim** of equality



State a conclusion based on H_0 : Either Reject H_0 or Do Not Reject H_0

Conclusion based on the problem:

Reject H_0

There is sufficient evidence at the α level to **support the claim** of “inequality” in H_1

Do Not Reject H_0

There is **not sufficient** evidence at the α level to reject the “statement of equality in H_0 ”

or

There is not sufficient evidence at the α level to support the “statement of inequality in H_1 ”