T-stats ÷ J test → One Sample t- test.

① In the population the average IQ is 100. A team of researchers want to test a new medication to see if it has either a positive or negative effect on intelligence, or no effect at all. A sample of 30 participants who have taken the medication has a mean of 140 with a standard deviation of 20. Did the medication affect intelligence? C.I = 95% α = 0.05

provided with question

Ans) $\mu = 100$ $n = 30$ $\bar{x} = 140$ $S = 20$ C.I = 95% $\alpha = 0.05$

① Null Hypothesis H_0 ÷ $\mu = 100$

Alternate Hypothesis H_1 ÷ $\mu \neq 100$ {2 Tail Test}

② $\alpha = 0.05$

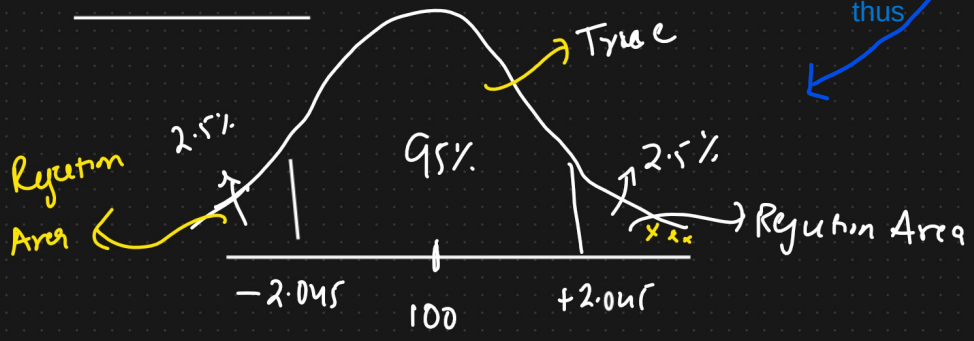
③ Degree of freedom

$dof = n - 1 = 30 - 1 = 29$.

as dof is 29, we will check the corresponding t value in the t table which is 2.045

④ Decision Rule

thus



if t test is less than −2.045 or greater than 2.045, reject the null hypothesis

⑤ Calculate Test statistics

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{140 - 100}{20/\sqrt{30}} = \frac{40}{3.65} = 10.96$$

$$t = 10.96$$

Since

$t = 10.96 > 2.045$ {Reject the NULL Hypothesis}.

Conclusion : Medicaton used has affected the Intelligence

Medication has increased the Intelligence