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%

Ans) $\mu = 100$ $n = 30$ $\bar{x} = 140$ $\sigma = 20$ C.I = 0.95

$\alpha = 0.05$

① Null Hypothesis $H_0 : \mu = 100$

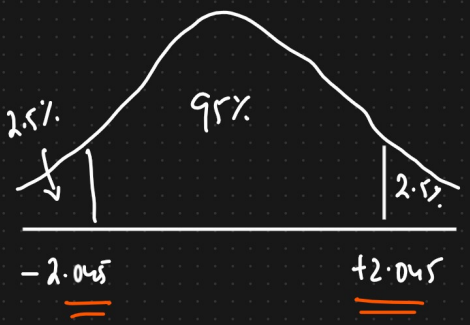
Alternate " $H_1 : \mu \neq 100$ {2 Tail Test}

② $\alpha = 0.05$

③ Degree of freedom

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

④ Decision Rule



If t test is less than -2.045 and greater than 2.045, Reject the Null Hypothesis

⑤ Calculate t test statistics

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

⑥ Conclusion

Decision Rule : If t is less than $-2.045^{<2}$ and greater than $2.045^{<2}$, reject the Null Hypothesis

$t = 10.96 > 2.045^{<2} \Rightarrow$ Rejecting the Null Hypothesis

Answer

Conclusion : Medication has increased the Intelligence.