

T-stats \div T test \rightarrow 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? $CI=95\%$ $\alpha=0.05$

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

① Null Hypothesis $H_0: \mu=100$

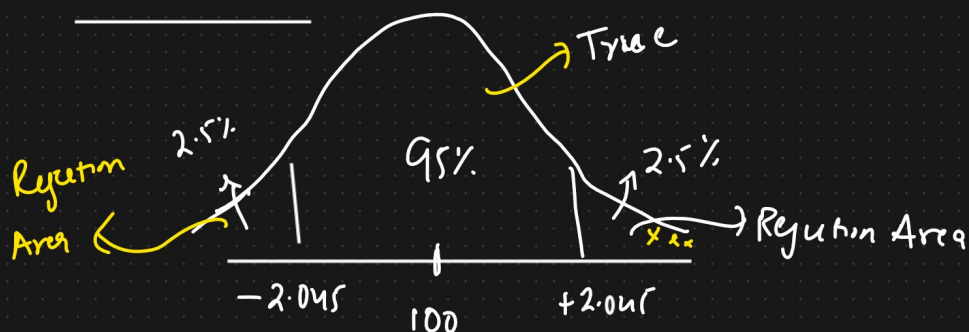
Alternate Hypothesis $H_1: \mu \neq 100$ {2 Tail Test}

② $\alpha=0.05$

③ Degree of freedom

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

④ Decision Rule



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

$$t = 10.96 > 2.045 \quad \{ \text{Reject the Null Hypothesis} \}.$$

Conclusion : Medication used has affected the Intelligence

Medication has increased the Intelligence