

Student's t - distribution / t distribution

z test \rightarrow Z score

$\rightarrow \sigma$ (population standard deviation) is already given

\rightarrow Sample Size > 30

But in majority of the case σ (pop std) will not be known.

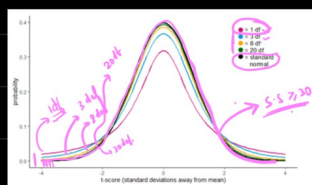
Then what analysis you will do?

* Whenever $S.S < 30$, and σ (pop std) not given

then use t-test.

\Downarrow
t distribution.

$S.S < 30 \rightarrow$ t distribution.



df \rightarrow degree of freedom

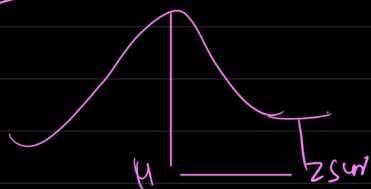
$S.S < 30$

df = $S.S - 1$

$S.S = 28$
df = $28 - 1 = 27$

$$Z_{\text{statistic}} = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}}$$

Z score

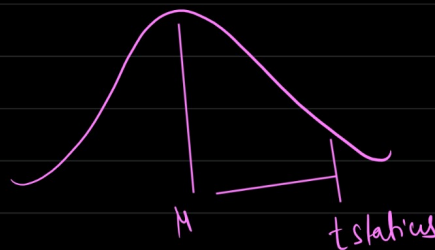


t distribution

$$t_{\text{statistic}} = \frac{\bar{x} - \mu}{S / \sqrt{n}}$$

t score

Sample's standard deviation



t table \leftarrow t score

$$\text{dof} = n - 1$$

Unconstrained

$$\begin{array}{ccccccc} \downarrow & \downarrow & \downarrow & \downarrow & \nearrow & \text{constrained} \\ 2 & 8 & 10 & 10 & (20) & = & 20 \\ \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & & \\ & & (\text{avg}) & & & & \end{array}$$

$$5 - 1 = 4$$

$$(n-1)$$

$$2 + 8 + 10 + 10 + x = 20$$

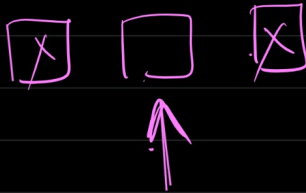
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$$\begin{array}{ccc} 12 & 8 & 10 \\ \hline \uparrow & \uparrow & \text{avg.} \\ & 2-1=1 & \end{array}$$

$$40 + x = 20 + 5$$

$$x = 100 - 40 = 60$$

3 people



degree of freedom

$$3 - 1 = 2$$

$$(n-1)$$