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LECTURE - 38

→ NULL HYPOTHESIS ⇒ $=, \geq, \leq$.

→ ALTERNATIVE HYPOTHESIS ⇒ $\neq, >, <$.

QUESTION: PISTA HOUSE SELLING BIRYANI.

SOLUTION:

→ Always start with Alternative hypothesis (H_1) and then with the Null hypothesis (H_0).

⇒ $H_1 : \mu \neq 500$ gms

⇒ $H_0 : \mu = 500$ gms.

→ Test-Statistics:

* CASE-I: If standard deviation is known, then

test-statistic is Z-score $= \dfrac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

* CASE-II: If standard deviation is unknown, then

test-statistic is t-score $= \dfrac{\bar{x} - \mu}{s/\sqrt{n}}$

Sample collection $\bar{x} = 450$ gms from 10 packets

$\Rightarrow$ $\bar{x} = 450$ gms

$\sigma = 50$ gms

$n = 10$ packets

$\mu = 500$ gms

As variance is given, we go with the Case-I i.e., Z-score.

$$\Rightarrow Z\text{-score} = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{450 - 500}{50/\sqrt{10}} = -3.16$$

→ Decide the Significance level (α):

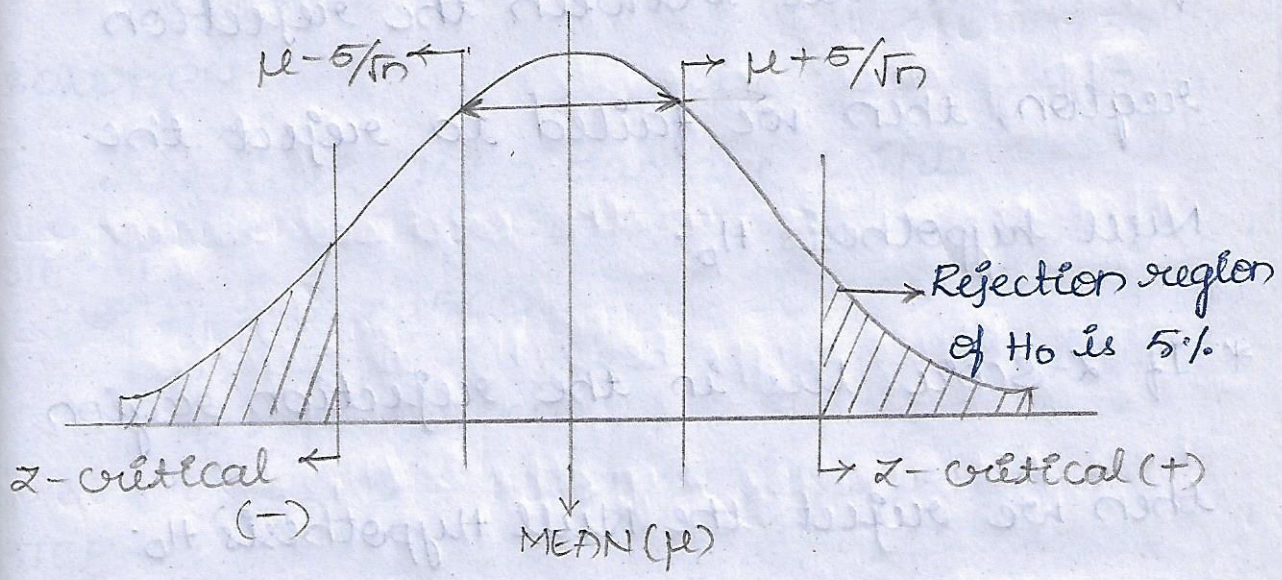
If the confidence level is 95%, then

$\alpha = 100\% - 95\%$

$\alpha = 5\% \rightarrow 0.05$

* If $\alpha < 5\%$ → reject the Null hypothesis which falls under 5%.

∴ Deciding $\alpha = 0.05$ or 5% then,



→ Apply Decision rule - P-value:

* If P(Test statistic | H_0) = 0.04 we reject the Null Hypothesis.

* If P(Test statistic | H_0) = 0.08 we failed to reject the Null Hypothesis i.e., reject H_0 the ~~Alternative hypothesis~~.

⇒ Z- Value - ACCEPTANCE (OR) REJECTION REGION.

so, if rejection region of H_0 comes in the acceptance region, we failed to reject the Null hypothesis H_0.

* If Z-score lies between the rejection region, then we failed to reject the Null hypothesis H_0.

* If Z-score lies in the rejection region, then we reject the Null Hypothesis H_0.

* IF Z-SCORE LIES CLOSEST TO MEAN :

↳ A +ve Z-score - the data point is above average.

↳ A -ve Z-score - the data point is below average.

↳ A Z-score close to 'zero' - the data point is close to the average.

*↳ A data point can be considered unusual if its Z-score is above 3 or below -3.

QUESTION: PUBG

SOLUTION:

Atleast 1500 damage points.

STEP-1:

$\Rightarrow H_1 : \mu > 1500$

$\Rightarrow H_0 : \mu \leq 1500$

STEP-2:

Collect the sample 'n'

$n = 5$ games.

$\Rightarrow \bar{x} = 1505$

STEP-3:

As the σ is not given, t-score is calculated.

$$\Rightarrow \text{t-score} = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{1505 - 1500}{s/\sqrt{5}}$$

STEP-4:

Decide $\alpha = 0.05$

$\Rightarrow$ One tailed test towards right is done since it is greater.

STEP-5:

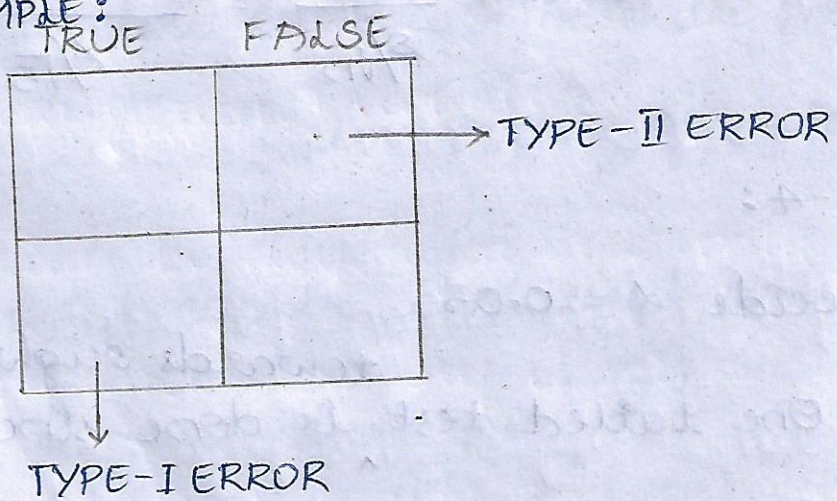
Apply decision rule.

If t-score lies in the critical region, then Null Hypothesis (H_0) is rejected i.e., Alternative hypothesis (H_1) is accepted.

*→ LIBRARIES NEEDED TO BE IMPORTED :

```
import numpy as np
import matplotlib.pyplot as plt
from scipy.stats import norm
from scipy.stats import t
```

DECISION SAMPLE:



** NULL HYPOTHESIS CAN BE TRUE OR FALSE