Book : Walpole

CH # 08

Section : 8.4

Extension of Normal Dist:

* Central Limit Theorem:

R.V : $\overline{X} \rightarrow$ (Random Sample Mean).

Parameters: $\boxed{\mu, \sigma}$, $\boxed{\overline{X}, n}$

Pop^n Parameters

Sample mean & sample size

1) $P(\bar{x}_1 < \overline{X} < \bar{x}_2)$
2) $P(\overline{X} < \bar{x})$
3) $P(\overline{X} > \bar{x})$

$$\Rightarrow \boxed{Z = \frac{\overline{X} - \mu}{\frac{\sigma}{\sqrt{n}}}}$$

Pg # 234

Theorem 8.2 : Central Limit Thm.

Do examples : 8.4 ; 8.5

By self

Hypothesis testing:-

There are three methods to solve Hypothesis test:-

1) Traditional Method
2) P- Value Method
3) Confidance Interval Method

Book: Elementary Statistics
(8.1, 8.2, 8.3)

* Introduction:-

1) State null & Alternative hypothesis & find type of test:-

There are two Hypothesis;

1) Null Hypothesis $\Rightarrow \boxed{(H_0) : \mu = \mu_0}$

ii) Alternative Hypothesis

$\Rightarrow$ $\boxed{H_1 : \text{Shows Inequality.} \ \{ \mu \neq \mu_0 \}}$

* Types of Hypothesis tests:-

There are ~~three~~ 2 types of possible Hypothesis:-

1) Two tail Test
2) One-tail Test

1) $H_0 : \mu = \mu_0 \longrightarrow$ claim $\{H_0\}$.

$H_1 : \mu \neq \mu_0$

where, μ is popln. mean. This is called $\boxed{\text{two-tail test}}$.

$\mu \neq \mu_0 \Rightarrow$ either $\mu < \mu_0$

or

$\mu > \mu_0$.

1) **Two-tail test :-**

$H_0 : \mu = \mu_0 \longrightarrow$ Claim. (fixed real no.)

$H_1 : \mu \neq \mu_0$

2-tail test; $\mu \neq \mu_0 \Rightarrow$ either $\mu < \mu_0$ or $\mu > \mu_0$.

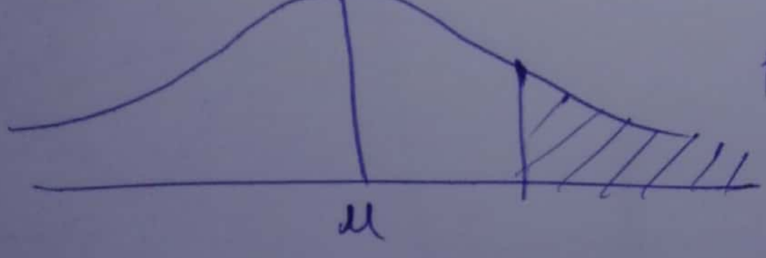
2). **One-tail test :-**

i) Right-tail test :-

$H_0 : \mu = \mu_0$

$H_1 : \mu > \mu_0$.

Normal Curve :-



Right-tail test

ii) Left - tail test:-

$H_0 : \mu = \mu_0$

$H_1 : \mu < \mu_0$

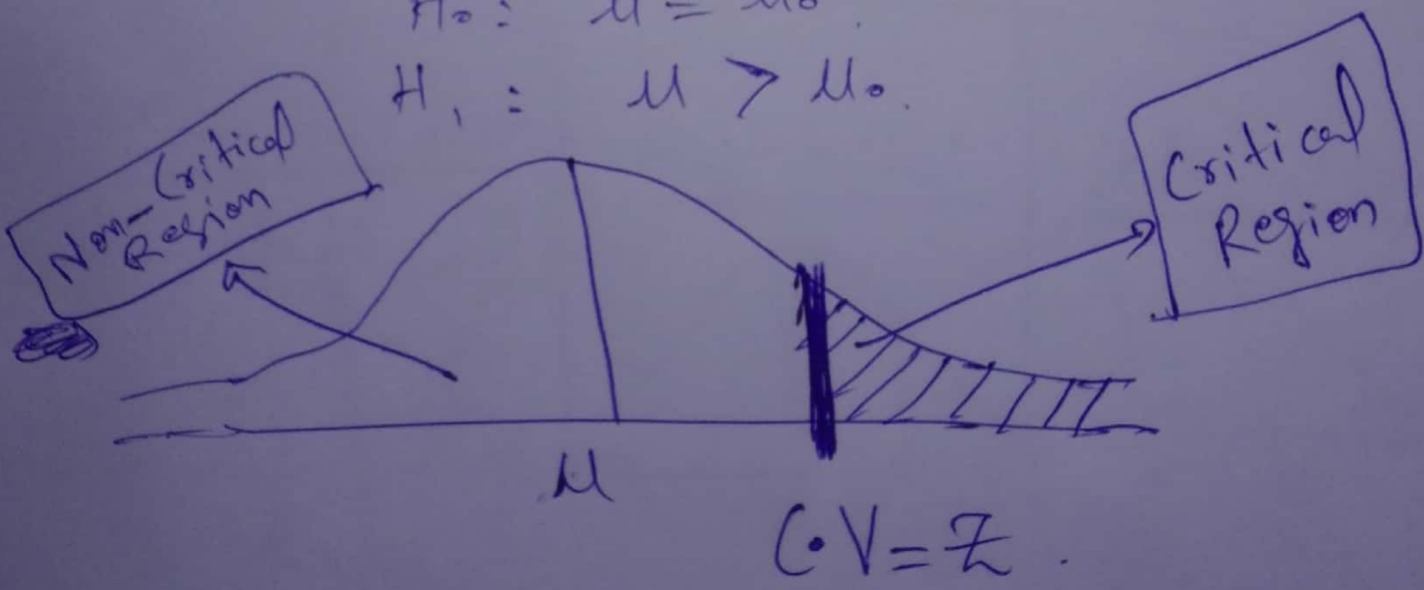
Normal Curve:-

* Critical Values & Critical & Non - Critical Regions:-

1) One - tail test:- (Right - tail)

$H_0 : \mu = \mu_0$

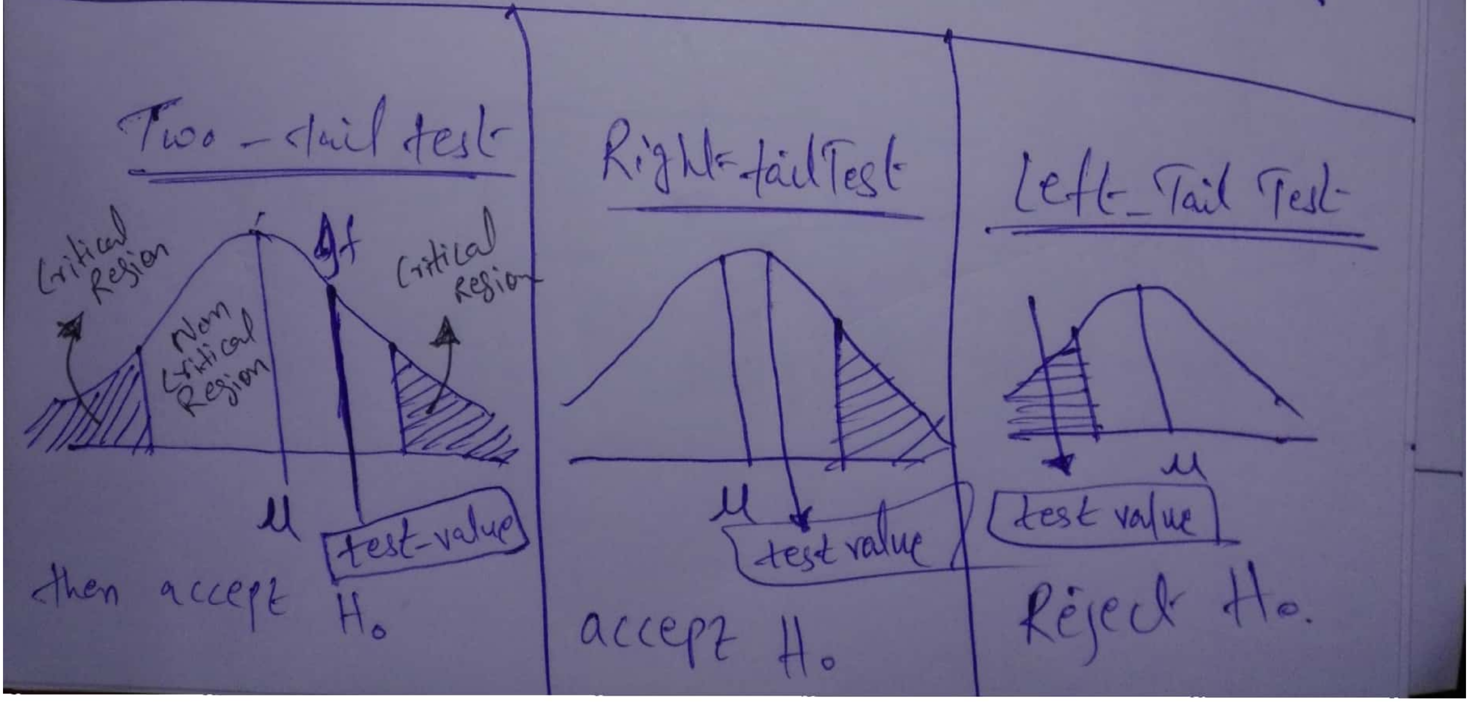
$H_1 : \mu > \mu_0$



1) Critical Value (C.V) is a value (Z) that separates critical & non-critical Regions.

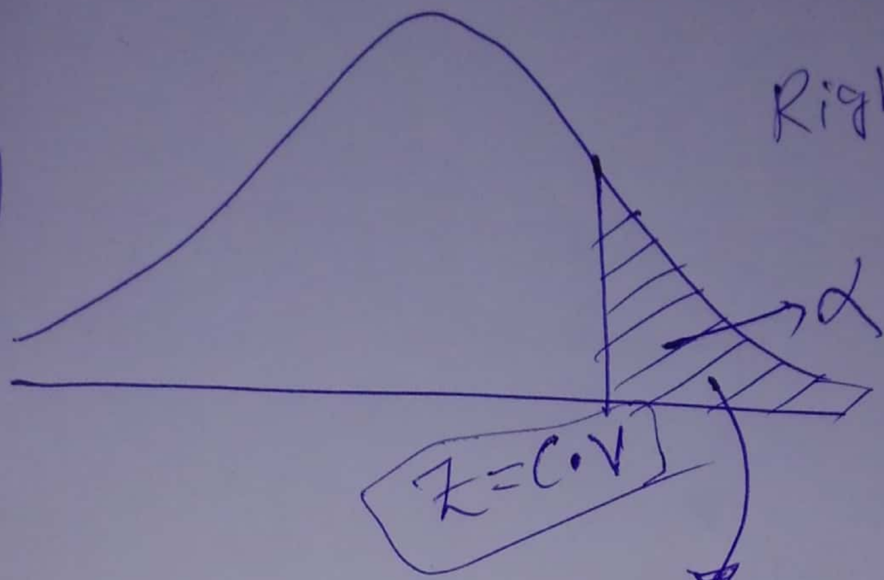
2) Critical Region: Shaded Region
If test value lies in critical Region then Reject H_0 as claim is wrong

3) Non-Critical Region :- No Shaded Area.
If test value is in Non-Critical Region accept H_0 as claim is Right.



* level of significance (α) :-

① Right-tail test.



level of significance is the ~~are~~ area of critical Region under the curve -

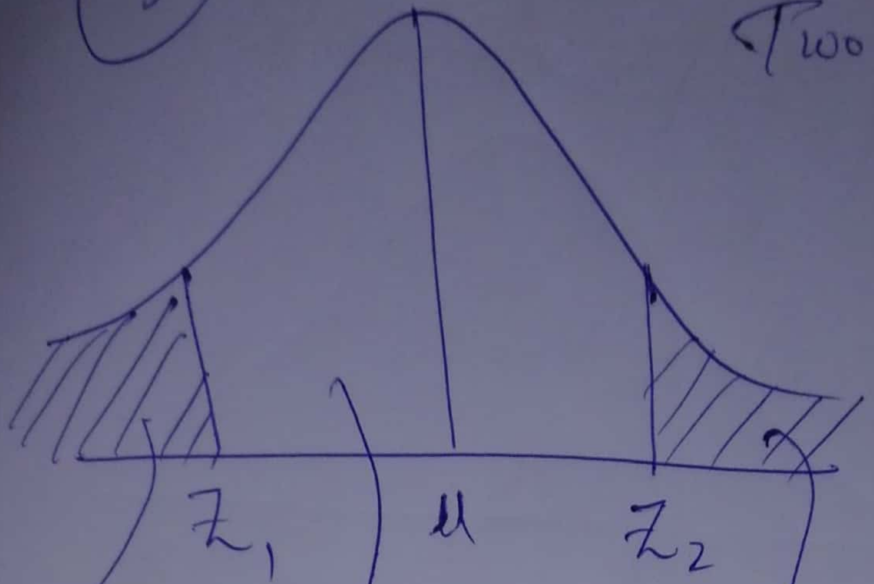
② Left-tail test

$\alpha =$

Area of non-critical Region $= 1 - \alpha$

3.

Two-tail Test.



$$\boxed{= \frac{\alpha}{2}}$$

Area / Prob.

$$= \boxed{1 - \frac{\alpha}{2}}$$

$$\boxed{P(Z \le z_1) = \frac{\alpha}{2}}$$

$$P(Z > z_2) = 1 - P(Z < z_2)$$

$$\Rightarrow \frac{\alpha}{2} = 1 - P(Z < z_2)$$

$$\Rightarrow P(Z < z_2) = 1 - \frac{\alpha}{2} \Rightarrow \boxed{z_2 = ?}$$

* Steps of Hypothesis test.

1) $H_0 : \mu = \mu_0$
$H_1 : \mu \neq \mu_0$ } 2-tail test

or

2) $H_0 : \mu = \mu_0$
$H_1 : \mu > \mu_0$ } Right-tail test.

or

3) $H_0 : \mu = \mu_0$
$H_1 : \mu < \mu_0$ } Left-Tail Test.

1). State Null (H_0) & Alternative Hypo. (H_1)
& decide the type of Test.

2). find C.V's (Z-values) that separates critical & Non-Critical Region.

3) find test value using formula.

4) <u>Make Decission:-</u>

If test value lies in Non-Critical Region:

5) <u>Result:-</u>

Accept H_o.

<u>or</u>

If test lies in Critical (Shaded) Region.

5) <u>Result:-</u>

Do not accept H_o

<u>or</u>

Reject H_o.

All work is reffered to section 8.1 of Elementary Sctatistics; (pg # 401).