TESTING OF HYPOTHESIS

BASIC DEFINITIONS :

Population :-

A population is used to refer any collection of individual it may be finite or infinite.

Sample :-

A sample is a small portion selected (or drawn) from the population and the process of drawing a sample from a population is called sampling.

Sample size :-

The no. of individual in a selected sample is called the sample size.

parameter and statistics :-

Any statistical method computed from population data is known as parameter and Any statistical method computed from sample data is known as statistics.

NOTATIONS :-

MEASURE	POPULATION	SAMPLE
Size	$\rightarrow$ N	$\rightarrow$ n
Mean	$\rightarrow$ μ	$\rightarrow$ $\bar{x}$
Standard deviation	$\rightarrow$ σ	$\rightarrow$ s
Proportion	$\rightarrow$ P	$\rightarrow$ P'
Variance	$\rightarrow$ σ^2	$\rightarrow$ s^2

Sampling Distribution :-

The various value of statistics so obtained may be arrange as a frequency distribution which is known as sampling distributions.

Standard Error :-

The standard deviation of sampling distribution of a statistic is known as its standard error, abbreviated as s.e. (i.e. avg. amount of variability from the observation of a sampling distribution).

Statistical Hypothesis :—

In attempting to reach decision about population on the basis of sample observations, we make assumptions about population, which are not necessarily true, are called statistical hypothesis.

Null Hypothesis :—

Null hypothesis is the hypothesis which is tested for possible rejection under the assumption that it is true and is denoted by H_0.

[(i) hypothesis of no difference].

Alternative Hypothesis :—

A hypothesis that is complementary to null hypothesis is called alternative hypothesis and is denoted by H_1.

A procedure for deciding whether to accept or reject the null hypothesis is called the test of hypothesis.

Level of Significance :—

It is the probability level below which the null hypothesis is rejected. generally 5% and 1% level of significance are used.

Critical region (or) Region of rejection :—

The critical region of a test of statistical hypothesis is that region of the normal curve which corresponds to the rejection of null hypothesis, Ho. Those region which lead to the acceptance of Ho is called acceptance region.

Error in Sampling :—

Errors are Type I, Type II errors.

Type I error: Reject Ho when it is true.

Type II error: Accept Ho when it is false.

$P(\text{Type I error}) = \alpha$ & $P(\text{Type II error}) = \beta$.

One tail & two tail test :—

If μ_0 is population parameter & μ is the sample statistics, then the null hypothesis is given by $H_0 : \mu = \mu_0$

Alternative hypothesis is given by,

$H_1 : \mu \neq \mu_0$ (two-tailed)

$H_1 : \mu > \mu_0$ (Right tailed) (one tail)

$H_1 : \mu < \mu_0$ (Left tailed) (,,)

PROCEDURE FOR TESTING A HYPOTHESIS :-

1) Formulate H_0 and H_1
2) choose the level of significance α
3) compute the test statistic, using the data available.
4) pick out the critical value from the tabulation
5) Conclusion: compare the computed value of the test statistic with the critical value at the given level of significance.
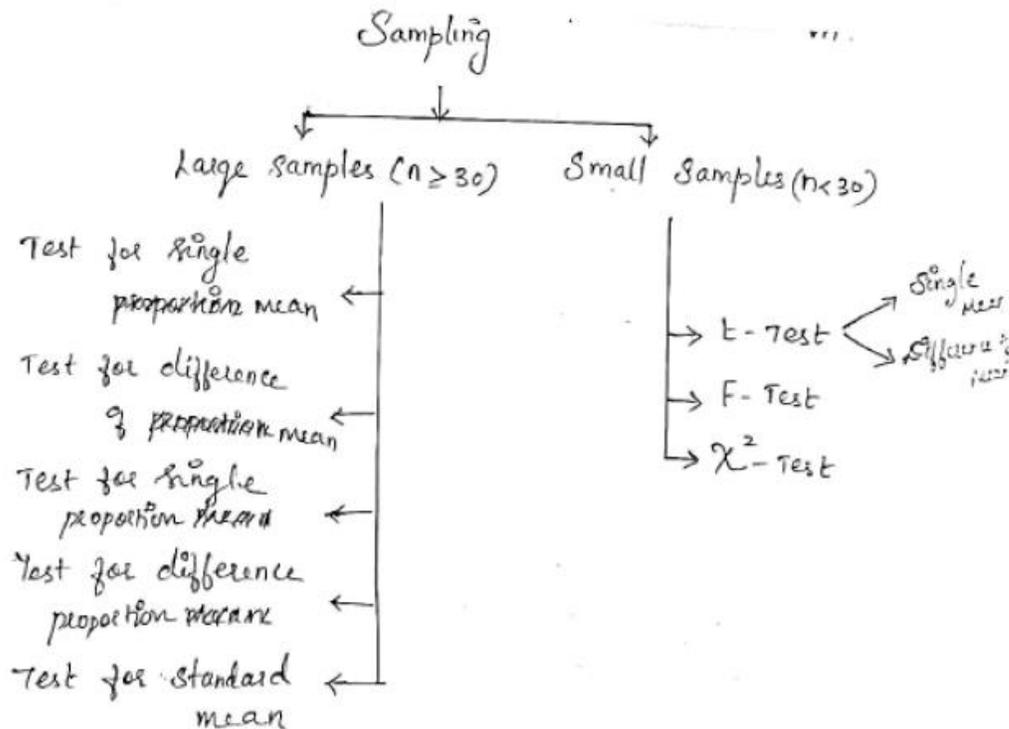
Sampling

Large samples ($n \geq 30$)   Small Samples ($n < 30$)

Test for single proportion mean

Test for difference of proportion mean

Test for single proportion mean

Test for difference proportion variance

Test for standard mean

→ t-Test → Single mean
         → difference mean
→ F-Test
→ χ^2-Test

Large samples $(n \geq 30)$

Critical values (or) Significant values:-

The sample values of the statistic beyond which the null hypothesis will be rejected are called critical values or significant values.

Natures of Test	Level of significance		
	1 %	5 %	10 %
Two tailed test (z_α):	2.58	1.96	1.645
One tailed test (z_α):	2.33	1.645	1.28 (right)
	-2.33	-1.645	-1.28 (left)