Hypothesis

It is a statement about one or more populations. It is usually concerned with the parameters of the population.

Example → The hospital administrator may want to test the hypothesis that the average length of stay of patients admitted to the hospital in 5 days.

Definition

They are hypothesis involved in that are stated in such a way that they may be evaluated by appropriate statistical techniques.

They are two hypothesis involved in hypothesis testing.

Null hypothesis (H_0)

It is the hypothesis to be tested.

Alternative hypothesis (H_1)

It is a statement of what we believe is true if our sample data cause us to reject the null hypothesis.

Level of Significance

The level of significance 'α' is the probability of rejecting a true null hypothesis.

Types of Errors

		Condition of Null Hypothesis	
		True	False
Possible Action	Accept H_0	Correct Action	Type II error
	Reject H_0	Type I error	Correct Action

Testing hypothesis for the mean μ :

$n \geq 30$

σ is known

$$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$$

σ is not known

$$Z = \frac{\bar{x} - \mu}{S/\sqrt{n}}$$

$n < 30$

σ is known

$$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$$

σ is not known

$$T = \frac{\bar{x} - \mu}{S/\sqrt{n}}$$

Problems on Z-test and t-test

① A random sample of 29 were weighted and had gained an average of 6.7 pounds. If the S.D of weight gain for the entire herd is 7.1, test the hypothesis that the average weight gain per steer for the month was more than 5 pounds.

Step-1 Given $\mu = 5$, $\bar{x} = 6.7$, $n = 29$, $\sigma = 7.1$

$\alpha = 5\%$.

Null hypothesis : $H_0 : \mu = 5$

Alternative hypothesis : $H_1 : \mu > 5$ (One tailed)

step-2

$$Z = \frac{\bar{X} - \mu}{\sigma/\sqrt{n}} = \frac{6.7 - 5}{7.1/\sqrt{29}} = \frac{1.7}{1.318}$$

$$Z = 1.289$$

$$Z_{tab\,(\alpha = 5\%)} = 1.645$$

step-3

$$Z_{cal} < Z_{tab}$$

∴ H_0 is accepted. i.e) the average weight gain per steer for the month can not be more than 5 pounds.

② In national use, a vocabulary test is known to have a mean score of 68 and a S.D of 13. A class of 19 students takes the test and has a mean score of 65. Is the class typical of others who have taken the tests? (use $\alpha = 0.05$)

Given $\mu = 68$, $\sigma = 13$, $\bar{x} = 65$, $n = 19$

$\alpha = 0.05$

step-1

Null hypothesis : $H_0 : \mu = 68$

Alternative hypothesis : $H_1 : \mu \neq 68$ (Two tailed)

step-2

$$Z = \frac{\bar{X} - \mu}{\sigma/\sqrt{n}} = \frac{65 - 68}{13/\sqrt{19}} = \frac{-3}{2.982}$$

$$Z = -1.006$$

$$Z_{tab} = 1.96$$

step-3

$Z_{cal} < Z_{tab}$ $\therefore$ H_0 is accepted.

i.e) there is no evidance that this class can be considered different from others who have taken the tests.

③ A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Identify the sample not upto the mark.

Given $n = 26$, $\bar{x} = 990$, $S = 20$, $\mu = 1000$

$\alpha = 5\%$

step-1

Null hypothesis $H_0 : \mu = 1000$

Alternative hypothesis $H_1 : \mu < 1000$ (one tailed)

step-2

$$t = \frac{\bar{x} - \mu}{S/\sqrt{n}} = \frac{990 - 1000}{20/\sqrt{26}} = \frac{-10}{3.922}$$

$$t = -2.55$$

$t_{tab} = 1.708$ (5%, one tailed)

step-3

$|t|_{cal} > t_{tab}$ $\therefore$ H_0 is rejected.

i) The sample not upto the mark.

A random sample of 10 boys had the ollowing IQ's : 70, 120, 110, 101, 88, 83, 95, 98 07 and 100. Does these data support the ssumption of the population mean IQ of 100.

Given $n = 10$, $\mu = 100$

x	$x - \bar{x}$ $x - 97.2$	$(x-\bar{x})^2$
70	-27.2	739.84
120	22.8	519.84
110	12.8	163.84
101	3.8	14.44
88	-9.2	84.64
83	-14.2	201.64
95	-2.2	4.84
98	0.8	0.64
107	9.8	96.04
100	2.8	7.84
972		1833.6

$$\bar{x} = \frac{972}{10}$$

$$\bar{x} = 97.2$$

$$S = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}}$$

$$= \sqrt{\frac{1833.6}{9}}$$

$$S = 14.274$$

$$\alpha = 5\%$$

step - 1

Null hypothesis $H_0 : \mu = 100$

Alternative hypothesis $H_1 : \mu \neq 100$ (Two tailed)

Step - 2

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{97.2 - 100}{14.274/\sqrt{10}}$$

$$t = \frac{-2.8}{4.514} = -0.620$$

$$t_{tab} = 2.262 \quad (5\% \text{ two tailed})$$

Step - 3

$|t| < t_{tab}$ $\therefore$ H_0 is accepted.

i.e) there is no significant difference between sample mean and population mean.

(5) Researchers are interested in the mean age of a certain population. A random sample of 10 individuals drawn from the population of interest has a mean of 27. Assuming that the population is approximately normally distributed with variance 20, can we conclude that the mean is different from 30 years? ($\alpha = 0.05$).

Given $n = 10$, $\bar{x} = 27$, $\sigma^2 = 20$, $\mu = 30$

$\sigma = 4.472$

Step - 1

Null hypothesis $H_0 : \mu = 30$

Alternative hypothesis $H_1 : \mu \neq 30$ (Two t.

step - 2

$$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{27 - 30}{4.47\cancel{00}/\sqrt{10}} = \frac{-3}{1.414}$$

$$Z = - 2.122$$

$$Z_{tab} = 1.96 \text{ (5\% Two tailed)}$$

step - 3

$|Z| > Z_{tab}$ $\therefore$ H_0 is ~~accepted~~ rejected

i.e.) there is a significant difference between sample mean and population mean.

6) Among 157 African - American men, the mean systolic blood pressure was 146 mm Hg with a SD of 27. We wish to know if on the basis of these data, we may conclude that the mean systolic blood pressure for a population of African - American is greater than 140. Use $\alpha = 0.01$.

Given $n = 157$, $\bar{x} = 146$, $S = 27$, $\mu = 140$, $\alpha = 0.01$

step - 1

Null hypothesis $H_0 : \mu = 140$

(b) Alternative hypothesis $H_1 : \mu > 140$ (one tailed)

step-2

$$Z = \frac{\bar{x} - \mu}{S/\sqrt{n}} = \frac{146 - 140}{27/\sqrt{157}} = \frac{6}{2.155}$$

$$Z = 2.784$$

$$Z_{tab} = 2.33 \text{ (1\% one tailed)}$$

step-3

$Z > Z_{tab}$ $\therefore$ H_0 is rejected.

ii) the mean systolic blood pressure for a population of African - American is greater than 140.

(7). For the 76 women classified with sever hip pain. The WOMAC mean function score was 70.7 with SD of 14.6, we wish to know if we may conclude that the mean function score for a population of similar women subjects with sever hip pain is less than 75. Let $\alpha = 0.01$.

Given $n = 76$, $\bar{x} = 70.7$, $S = 14.6$, $\mu = 75$

$\alpha = 0.01$

Step-1

Null hypothesis $H_0 : \mu = 75$

Alternative hypothesis $H_1 : \mu < 75$ (one tailed)

Step-2

$$Z = \frac{\bar{X} - \mu}{S/\sqrt{n}} = \frac{70.7 - 75}{14.6/\sqrt{76}} = \frac{-4.3}{1.675}$$

$$Z = -2.567$$

$$Z_{tab} = 2.33 \text{ (1\% one tailed)}$$

Step-3

$|Z| > Z_{tab}$ $\therefore$ H_0 is rejected

ii) the mean function score for a population of similar women subjects with sever hip pain is less than 75.

8) In a sample of 18 patients, the mean DMFT index value was 10.3 with SD of 7.3. Is This suffiuent evidence to allow us to conclude that the mean DMFT index is greater than 9 in a population of similar subjects? Let $\alpha = 0.1$.

Given $n = 18$, $\bar{x} = 10.3$, $S = 7.3$, $\mu = 9$, $\alpha = 0.1$

step - 1

Null hypothesis $H_0 : \mu = 9$

Alternative hypothesis $H_1 : \mu > 9$ (one tailed)

step - 2

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{10.3 - 9}{7.3/\sqrt{18}} = \frac{1.3}{1.721}$$

$t = 0.755$

$t_{tab} = 1.333$ (10% one tailed, $n-1 = 17$)

step - 3

$t < t_{tab}$ $\therefore$ H_0 is accepted.

i.e) there is no significant difference between sample mean and population mean.

9) A manufacturer of running shoes knows that the average lifetime for a particular model of shoes is 15 months. New product was worn by 30 individuals and lasted on average for 17 months. The variability of the original shoe is estimated based on the SD of the new group which is 5.5 months. Is the designer's claim of a better shoe supported by the trial results? Please base your decision on a 2 tailed testing using $\alpha = 0.05$.

Given $\bar{x} = 17$, $n = 30$, $\mu = 15$, $S = 5.5$, $\alpha = 0.05$

step-1

Null hypothesis $H_0 : \mu = 15$

Alternative hypothesis $H_1 : \mu \neq 15$

step-2

$$t = \frac{\bar{x} - \mu}{S/\sqrt{n}} = \frac{17 - 15}{5.5/\sqrt{30}} = \frac{2}{1.004}$$

$$t = 1.992$$

$$t_{tab} = 2.045$$

step-3

$t < t_{tab}$ $\therefore$ H_0 is accepted.

i.e) there is no difference between population mean and sample mean.

⓪ Average heart rate for Americans is 72 beats/min. A group of 25 individuals participated in an aerobics fitness program to lower their heart rate. After six months the group was evaluated to identify that the program had significantly slowed their heart. The mean heart rate for the group was 69 beats/min with a S.D of 6.5. Was the aerobics programm efficitive in lowering heart rate?

Given $\mu = 72$, $\bar{x} = 69$, $S = 6.5$, $n = 25$, $\alpha = 0.05$

step-1

Null hypothesis $H_0 : \mu = 72$

Alternative hypothesis $H_1 : \mu \neq 72$ (Two tailed)

step-2

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{69 - 72}{6.5/\sqrt{25}} = \frac{-3}{1.3}$$

$$t = -2.308$$

$t_{tab} = 2.064$ (5%, Two tailed, $n-1 = 24$)

step-3

$|t| > t_{tab}$, $\therefore$ H_0 is rejected.

ii) There is a significant effect of the ind. var. of fitness.

(11) A research team wants to investigate the usefulness of relaxation training for reducing levels of anxiety in individuals experiencing stress. They identify 30 people at random from a group of 100 who have "high stress" jobs. The 30 people are divided into two groups. One group acts as the control group - they receive no training. The second group of 15 receive the relaxation training. The subjects in each group are then given an

nxiety inventory. The summarized results appear below where higher scores indicate greater anxiety.

Control	Relaxation
$\bar{x} = 30$	$\bar{x} = 26$
$S = 6.63$	$S = 6.20$
$n = 15$	$n = 15$

Given $\bar{x}_1 = 30$, $\bar{x}_2 = 26$, $S_1 = 6.63$, $S_2 = 6.20$

$n_1 = 15$, $n_2 = 15$, $\alpha = 0.05$

Step-1

Null hypothesis $H_0 : \mu_1 = \mu_2$

Alternative hypothesis $H_1 : \mu_1 \neq \mu_2$ (Two tailed)

Step-2

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} = \frac{30 - 26}{\sqrt{\frac{6.63^2}{15} + \frac{6.20^2}{15}}}$$

$$= \frac{4}{2.344} = 1.707$$

$t_{tab} = 2.048$ (5%, Two tailed, 28)

Step-3

$t < t_{tab}$ $\therefore$ H_0 is accepted.

(ii) this outcome is not statistically significant.

(12) A sample of 64 students have a mean weight of 70 kgs. Can this regarded as a sample from a population with mean weight 56 kgs and SD 25 kgs.

Given $n = 64$, $\bar{x} = 70$, $\mu = 56$, $\sigma = 25$

$\alpha = 0.05$

Step-1

Null hypothesis is $H_0 : \mu = 56$

Alternative hypothesis $H_1 : \mu \neq 56$ (Two tailed)

Step-2

$$Z = \frac{\bar{X} - \mu}{\sigma / \sqrt{n}} = \frac{70 - 56}{25 / \sqrt{64}} = \frac{14}{3.125}$$

$Z = 4.48$

$Z_{tab} = 1.96$ (5%, Two tailed)

Step-3

$Z > Z_{tab}$ $\therefore H_0$ is rejected

i.e) there is a significant difference between sample mean and population mean.

(13) In a random sample of 60 workers, the average time taken by them to get to work is 33.8 min with the SD of 6.1 min. Can we reject the null hypothesis $\mu = 32.6$ min in favour of

alternative hypothesis $\mu > 32.6$ at $\alpha = 0.025$ level of significance.

Given $n = 60$, $\bar{x} = 33.8$, $\mu = 32.6$, $S = 6.1$

$\alpha = 0.025$

Step-1

Null hypothesis $H_0 : \mu = 32.6$

Alternative hypothesis $H_1 : \mu > 32.6$ (one-tailed)

Step-2

$$Z = \frac{\bar{x} - \mu}{S/\sqrt{n}} = \frac{33.8 - 32.6}{6.1/\sqrt{60}} = \frac{1.2}{0.788}$$

$$Z = 1.523$$

$$Z_{tab} = 1.96 \quad (2.5\% \text{ one tailed})$$

Step-3

$Z < Z_{tab}$ $\therefore$ H_0 is accepted.

$\therefore$ we accept the null hypothesis $\mu = 32.6$ min.

4) A sample of 400 items is taken from a population whose SD is 10. The mean of the sample is 4. Test whether the sample has come from a population with mean 38. Use $\alpha = 0.05$.

Given $n = 400$, $\sigma = 10$, $\bar{x} = 4$, $\mu = 38$, $\alpha = 0.05$

Step-1

Null hypothesis $H_0 : \mu = 38$

Alternative hypothesis $H_1 : \mu \neq 38$ (Two tailed)

step-2

$$Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{4 - 38}{10/\sqrt{400}} = \frac{-34}{0.5}$$

$$Z = -68$$

$Z_{tab} = 1.96$ (5% Two tailed)

step-3

$|Z| > Z_{tab}$ $\therefore$ H_0 is rejected.

i) there is a significant difference between sample mean and population mean.

(15) The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68 inches respectively. Can the samples be regarded as drawn from the same population of S.D 2.5 inches.

Given $n_1 = 1000$ $\bar{x}_1 = 67.5$ $\sigma = 2.5$

$n_2 = 2000$ $\bar{x}_2 = 68$ $\alpha = 0.05$

step-1

Null hypothesis $H_0 : \mu_1 = \mu_2$

Alternative hypothesis $H_1 : \mu_1 \neq \mu_2$

step-2

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma^2}{n_1} + \frac{\sigma^2}{n_2}}} = \frac{67.5 - 68}{\sqrt{\frac{2.5^2}{1000} + \frac{2.5^2}{2000}}}$$

$$Z = \frac{-0.5}{0.097} = -5.155$$

$Z_{tab} = 1.96$ (5%, Two-tailed)

step-3

$|Z| > Z_{tab}$ $\therefore$ H_0 is rejected

i) Two samples drawn from different population

(16) In a random ~~sample~~ sample of 125 cool drinkers, 68 said they prefer Thumsup to Pepsi. Test null hypothesis $P = 0.05$ against alternative hypothesis $P > 0.05$.

Given $p = \frac{68}{125} = 0.544$; $P = 0.05$; $n = 125$

step-1

Null hypothesis $H_0 : P = 0.05$

Alternative hypothesis $H_1 : P > 0.05$ (one-tailed)

Step-2

$$Z = \frac{p - P}{\sqrt{p(1-p)/n}} = \frac{0.544 - 0.05}{\sqrt{(0.544)(0.456)/125}}$$

$$Z = \frac{0.494}{0.045} = 10.978$$

$Z_{tab} = 1.645$ (5%, one-tailed)

step-3

$Z > Z_{tab}$ $\therefore H_0$ is rejected.

ii) $P > 0.05$

(17) Random samples of 400 men and 600 wo[men] were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that propositions of men and women in favour of the proposal are same, at 5% level.

Given $n_1 = 400$ $\quad P_1 = \frac{200}{400} = 0.5$

$n_2 = 600$ $\quad P_2 = \frac{325}{600} = 0.542$

$$P = \frac{200+325}{400+600} = \frac{525}{1000} = 0.525$$

step-1

Null hypothesis $H_0 : P_1 = P_2$

Alternative hypothesis $H_1 : P_1 \neq P_2$ (Two-tailed)

step-2

$$Z = \frac{P_1 - P_2}{\sqrt{P(1-P)\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} = \frac{0.5 - 0.542}{\sqrt{(0.525)(0.475)\left(\frac{1}{400}+\frac{1}{600}\right)}}$$

$$= \frac{-0.042}{0.032} = -1.313$$

$$Z_{tab} = 1.96 \quad (5\%, \text{two-tailed})$$

step-3

$|z| < Z_{tab}$ $\therefore$ H_0 is accepted.

i.e) the propositions of men and women in favour of the proposal are same.

(18) In two large populations there are 30% and 25% respectively of fair haired people. Identify this difference likely to be hidden in sample of 1200 and 900 respectively from the two populations.

Given $P_1 = 0.30$ $n_1 = 1200$

$P_2 = 0.25$ $n_2 = 900$

$$P = \frac{30+25}{200} = \frac{55}{200} = 0.275$$

step-1

Null hypothesis $H_0 : P_1 = P_2$

Alternative hypothesis $H_1 : P_1 \neq P_2$ (Two-tailed)

step-2

$$Z = \frac{P_1 - P_2}{\sqrt{P(1-P)\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} = \frac{0.30 - 0.25}{\sqrt{(0.275)(0.725)\left(\frac{1}{1200}+\frac{1}{900}\right)}}$$

$$= \frac{0.05}{0.02} = 2.5$$

$$Z_{tab} = 1.96 \quad (5\%, \text{ two-tailed})$$

Step-3

$$Z > Z_{tab} \quad \therefore H_0 \text{ is rejected}$$

ii) Two samples drawn from different populations.

(19) To examine the hypothesis that the Husbands are more intelligent than the wives, an investigator took a sample of 10 couples and administrated them a test which measures the I.Q the results are as follows :

Husbands	117	105	97	105	123	109	86	78	103	107
wives	106	98	87	104	116	95	90	69	108	85

Test the hypothesis with reasonable test at 0.05 LOS.

Given $n_1 = 10$, $n_2 = 10$, $\alpha = 0.05$

$$\bar{x} = \frac{\Sigma x}{n} = \frac{1030}{10} = 103$$

$$\bar{y} = \frac{\Sigma y}{n} = \frac{958}{10} = 95.8$$

$$S_1^2 = \frac{\Sigma(x-\bar{x})^2}{n_1 - 1} = \frac{1606}{9} = 178.44$$

x	y	$x-\bar{x}$ $x-103$	$y-\bar{y}$ $y-95.8$	$(x-\bar{x})^2$	$(y-\bar{y})^2$
117	106	14	10.2	196	104.04
105	98	2	2.2	4	4.84
97	87	-6	-8.8	36	77.44
105	104	2	8.2	4	67.24
123	116	20	20.2	400	408.04
109	95	6	-0.8	36	0.64
86	90	-17	-5.8	289	33.64
78	69	-25	-26.8	625	718.24
103	108	0	12.2	0	148.84
107	85	4	-10.8	16	116.64
1030	958			1606	1679.6

$$S_2^2 = \frac{\Sigma (y-\bar{y})^2}{n_2 - 1} = \frac{1679.6}{9} = 186.62$$

step - 1

Null hypothesis $H_0 : \mu_1 = \mu_2$

Alternative hypothesis $H_1 : \mu_1 > \mu_2$ (One-tailed)

step - 2

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} = \frac{103 - 95.8}{\sqrt{\frac{178.44}{10} + \frac{186.62}{10}}}$$

$$t = \frac{7.2}{6.042} = 1.192$$

$$t_{tab} = 1.734 \quad (5\%, \text{ one-tailed}, 18)$$

step-3

$t < t_{tab}$ $\therefore$ H_0 is accepted.

i) Husbands and wives are same level of intellegence.

(20) Two Horses A and B were tested according to the time (in seconds) to run a particular track with the following results. Test whether two hourses have same running capacity.

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	-

Given $n_1 = 7$, $n_2 = 6$, $\alpha = 0.05$

$$\bar{x}_1 = \frac{\Sigma x_1}{n_1} = \frac{219}{7} = 31.3$$

$$\bar{x}_2 = \frac{\Sigma x_2}{n_2} = \frac{169}{6} = 28.2$$

$$S_1^2 = \frac{\Sigma(x_1 - \bar{x}_1)^2}{n_1 - 1} = \frac{31.43}{6} = 5.24$$

x_1	x_2	$x_1 - \bar{x}_1$ $x_1 - 31.3$	$x_2 - \bar{x}_2$ $x_2 - 28.2$	$(x_1-\bar{x})^2$	$(x_2-\bar{x}_2)^2$
28	29	-3.3	0.8	10.89	0.64
30	30	-1.3	1.8	1.69	3.24
32	30	0.7	1.8	0.49	3.24
33	24	1.7	-4.2	2.89	17.64
33	27	1.7	-1.2	2.89	1.44
29	29	-2.3	0.8	5.29	0.64
34		2.7		7.29	
219	169			31.43	26.84

$$S_2^2 = \frac{\Sigma(x_2 - \bar{x}_2)^2}{n_2 - 1} = \frac{26.84}{5} = 5.37$$

step-1

Null hypothesis $H_0 : \mu_1 = \mu_2$

Alternative hypothesis $H_1 : \mu_1 \neq \mu_2$ (Two-tailed)

step-2

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} = \frac{31.3 - 28.2}{\sqrt{\frac{5.24}{7} + \frac{5.37}{6}}}$$

$$t = \frac{3.1}{1.282} = 2.418$$

$t_{tab} = 2.201$ (5%, two tailed, 11)

Step-3

$t > t_{tab}$ $\therefore$ H_0 is rejected.

ii) Two horses have different running capacity.

21) The variance of Delhi Head office customers is 31, and that for the Mumbai branch is 20. The sample size for Delhi Head office is 11 and that for the Mumbai branch is 21. Carry out a two-tailed F-test with a level of significance of 10%.

Given $n_1 = 11$ $\sigma_1^2 = 31$

$n_2 = 21$ $\sigma_2^2 = 20$

Step-1

Null hypothesis $H_0 : \sigma_1^2 = \sigma_2^2$

Alternative hypothesis $H_1 : \sigma_1^2 \neq \sigma_2^2$

Step-2

$$F = \frac{\sigma_1^2}{\sigma_2^2} = \frac{31}{20} = 1.55$$

$F_{tab} = 1.94$ (10, 20 10%)

Step-3

$F < F_{tab}$ $\therefore$ H_0 is Accepted.

v) there is no significant difference between two variances.

(22) In a sample of 8 observations, the entirety of squared deviations of things from the mean 94.5. In another specimen of 10 perceptions, the worth was observed to be 101.7. Test whether the distinction is huge at 5% level.