



Ref. No.: DBC/BS

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## B.COM. PART 1

### CORE CONCEPT OF BUSINESS MATHMATICS & STATISTICS

**Example-37:** The heights of ten children selected at random from a given colony had a mean 63.5cms. And variance 6.25cms. Test, at 5% level of significance, the hypothesis that the children of the given colony are on the average less than 65 cm. in all. (The value of t for 8 d.f. at 5% level of significance is 2.262)

**Solution- 37:** Given:  $n= 10, \bar{x} = 63.5, \mu = 65, \text{variance} = 6.25 (\sigma=2.5)$

**Null hypothesis:** The average height of the children is 65 cm.

$H_0: \mu = 65$ , Alternative Hypothesis  $H_1 : \mu < 65$

**Test Statistic:**  $t = \frac{\bar{x} - \mu}{\sigma} \sqrt{n - 1} = \frac{63.5 - 65}{2.5} \sqrt{10 - 1} = \frac{-1.5 \times 3}{2.5} = -1.8$

**Critical Value:** 2.262

**Decision:** The calculated value of t is -1.8 is less than its critical value 2.262, the null hypothesis is accepted. It means that the average height of the children is 65 cm.

**Example-38:** Ten individuals are chosen at random from a population and their heights are found to be in inches, 63, 63, 64, 65, 66, 69, 69, 70, 70, 71. In the light of these data, discuss the suggestion that the mean height in the universe is 65 inches. (The value of t at 5% for 9 d.f. is 2.262)

**Solution- 38:**  $\bar{x} = \sum x/n$

$$\bar{x} = 670/10$$

$$\bar{x} = 67$$

$$S = \sqrt{\frac{(\sum dx)^2}{n-1}}$$



$$S = \sqrt{\frac{88}{9}} \quad S = \sqrt{9.78} \quad S = 3.13$$

**Null Hypothesis:**  $H_0: \mu = 65$

$$\bar{x} = 67$$

x	dx (x - $\bar{x}$ )	(dx) <sup>2</sup>
63	-4	16
63	-4	16
64	-3	9
65	-2	4
66	-1	1
69	2	4
69	2	4
70	3	9
70	3	9
71	4	16
$\bar{x} = 67$	0	88

**Computation of Test Statistics:**

$$t = \frac{|\bar{x} - \mu|}{s} \sqrt{n} = \frac{|67 - 65|}{3.13} \sqrt{10} = \frac{2 * 3.16}{3.13} = \frac{6.32}{3.13} = 2.019$$

**Critical Value:** 2.262

**Decision:** The calculated value of t is 2.019 is less than its critical value 2.262, the null hypothesis is accepted. It means that the average height of the children is 65 cm.