

Q Calculating Independent samples t-test

Group 1

<u>X_1</u>	<u>$X-M$</u>	<u>x_1^2</u>
15	2	4
18	5	25
13	0	0
11	-2	4
8	-5	25
13	0	0

$$\sum X_1 = 78$$

$$\sum x_1^2 = 58$$

$$\bar{X}_1(M) = \frac{\sum X}{N} = \frac{78}{6} = 13$$

$$N_1 = 6$$

Group 2

<u>X_2</u>	<u>$X-M$</u>	<u>x_2^2</u>
9	0	0
14	5	25
11	2	4
8	-1	1
5	-4	16
8	-1	1
8	-1	1
10	1	1
8	-1	1

$$\sum X_2 = 81$$

$$\sum x_2^2 = 50$$

$$N_2 = 9$$

$$\bar{X}_2(M) = \frac{\sum X}{N} = \frac{81}{9} = 9$$

Numerical contains two data sets;
 X_1 and X_2 .

Formula:

$$t = \frac{|M_1 - M_2|}{\sqrt{\left(\frac{\sum x_1^2 + \sum x_2^2}{N_1 + N_2 - 2}\right) \left(\frac{N_1 + N_2}{N_1 \cdot N_2}\right)}}$$

Step 1: Obtain $\sum x_1$ and $\sum x_2$.

Step 2: Calculate the two Means for the two groups $\bar{X}_1$ and $\bar{X}_2$.

Step 3: Calculate the columns $(x_1 - \bar{X}_1)$ and $(x_2 - \bar{X}_2)$ respectively.

Step 4: Calculate x^2 for both the groups i.e x_1^2 and x_2^2 , to obtain $\sum x_1^2$ and $\sum x_2^2$ subsequently.

Step 5: Put all values in the formula.

$$t = \frac{|13 - 9|}{\sqrt{\left(\frac{50 + 50}{6 + 9 - 2}\right) \cdot \left(\frac{6 + 9}{6 \times 9}\right)}}$$

$$= 4$$

$$\sqrt{\left(\frac{100}{13}\right) \times \left(\frac{15}{54}\right)}$$

$$= 4$$

$$\sqrt{(8.31) \times (0.20)}$$

$$= 4$$

$$\sqrt{2.33}$$

$$= 4$$

$$1.53$$

$$= 2.61$$

$$t = 2.61$$