Name : Ahmad Faraz khan.

ID : 7313

Paper : Probability & Statistics.

Q No 1: compute and analyse..... ..... outcome of SPSS?

Temperature	53	62	57	71	78	13	86	87	96	91	94	94
Chips Per minute	20	32	45	60	80	100	120	140	160	180	200	210

The estimate regression line of Y on X is.

$(\hat{Y} = a + bX)$.

Two normal equation are.

$$\Sigma Y = na + b\Sigma X.$$
$$\Sigma XY = a\Sigma X + b\Sigma X^2.$$

To compute the necessary summation we arrange the computations in the table given below.

	X	Y	XY	X^2
	53	20	1060	2704
	62	32	1984	3844
	57	45	2565	3249
	71	60	4260	5041
	78	80	6240	6084
	13	100	1300	169
	86	120	10320	7396
	87	140	12180	7569
	96	160	15360	9216
	91	180	16380	8281
	94	200	18800	8836
	94	210	19740	8836.
Total	882	1347	103949	71225

Now $\bar{X} = \frac{\Sigma X}{n} = \frac{882}{12} = 73.5.$

$\bar{Y} = \frac{\Sigma Y}{n} = \frac{1347}{12} = 112.25.$

$$b = \frac{n\Sigma XY - (\Sigma X)(\Sigma Y)}{n\Sigma X^2 - (\Sigma X)^2}$$

$$b = \frac{12(103949) - (882)(1347).}{12(71225) - (882)^2}$$

$$= \frac{1247388 - 1188054.}{854700 - 777924.}$$

$$= \frac{59334}{76776} = 0.772.$$

$$a = \bar{Y} - b\bar{x} = 112.25 - 0.772 \times 73.5$$

$$= 112.25 - 56.762.$$

$$= 55.50.$$

Hence the desired estimated regression line of Y on X is

$$\hat{Y} = 55.50 + 0.772X$$

$$\hat{Y} = 56.28.$$

The estimated regression co-efficient $b_1 = 0.772$ which indicates that the value of Y increase by 0.772 units for an unit increase in X..

ANS:- A) A box 4 red 4 white and 5 green. . . . . all of the same colours.

Solution:-

$$n(S) = \binom{13}{3} = 286.$$

Let A = Denote all balls are of different colours.

$$n(A) = \binom{4}{1}\binom{4}{1}\binom{5}{1} = 4 \times 4 \times 5 = 80.$$

$$P(A) = \frac{nA}{n(S)} = \frac{80}{286} = 0.28.$$

Interpretation:

There are 28% chances that all balls are of different colours.

ii):- Let B = Denote all balls of same colours.

Red white Green.

$$n(B) = \binom{4}{3} \text{ or } \binom{4}{3} \text{ or } \binom{5}{3}$$

$$= \binom{4}{3} + \binom{4}{3} + \binom{5}{3} = 4 + 4 + 10 = 18.$$

$$P(B) = \frac{nB}{n(S)} = \frac{18}{286} = 0.063.$$

Interpretation:

There are 6.3% chances that all balls of same colours.

Q.No2.B:- Of 12 eggs in a refrigerator..... At least one is bad?

Solution:-

$$n(S) = \binom{12}{4} = 495$$

Let A = denote the even that exactly one egg is bad.

$$n(A) = \binom{2}{1}\binom{10}{3} = 2 \times 120 = 240.$$

$$P(A) = \frac{n(A)}{n(S)} = \frac{240}{495} = 0.48.$$

Interpretation:-

There are 48% chances that exactly one egg is bad.

ii):-

Let B = be the event that at least one bad egg is selected.

$$n(B) = \binom{2}{1}\binom{10}{3} + \binom{2}{2}\binom{10}{2}$$

$$= 2 \times 120 + 1 \times 45 = 240 + 45 = 285.$$

$$P(B) = \frac{n(B)}{n(S)} = \frac{285}{495} = 0.58.$$

Interpretation:-

There are 58% chances that at least one bad egg is selected.

Q3: The following are the score made by the three batsman A, B and C in a series of innings.

Batsman A	12	15	6	73	7	13	199	36	84	29
Batsman B	47	12	76	48	4	13	37	48	13	3
Batsman C	15	23	52	4	24	13	74	52	13	4

i) Find range of A, B & C.

ii) Who is more constant.

iii) Compare A with B, B with C, A with C.

Solution:-

A	B	C.
12	47	15
15	12	23
6	76	52
73	84	4
7	4	24
13	13	13
199	37	74
36	48	52
84	13	13
29	3	4

Range = $X_m - X_o$.

Range of X = $X_m - X_o$.

199 - 6. $\Rightarrow$ 193.

Range of B = $X_m - X_o$.

= 88 - 3. ⇒ 85

Rang of C = $x_m - X_o$.

88 - 4 ⇒ 84.

Batsman A		Batsman B		Batsman C	
X	X^2	Y	Y^2	Z	Z^2
12	144	47	2209	15	225
15	225	12	144	23	529
6	36	76	5776	52	2704
73	5329	68	2304	4	16
7	49	4	16	24	576
13	169	13	169	13	169
199	39601	37	1369	74	5476
36	1296	48	2304	52	2704
84	7056	13	169	13	169
29	841	3	9	4	16
$\Sigma X = 474$	$\Sigma X^2 = 54746$	$\Sigma Y = 301$	$\Sigma Y^2 = 14469$	$\Sigma Z = 274$	$\Sigma Z^2 = 12584$.

Batsman A =

$$\bar{X} = \frac{\Sigma x}{n.} \qquad \because n = 10$$

$$\bar{X} = \frac{474}{10} = 47.4.$$

$$S_x = \sqrt{\frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2}$$

$$\sqrt{\frac{54746}{10} - \left(\frac{474}{10}\right)^2}$$

$$S\bar{x} = 56.81.$$

$$C.V = \frac{56.81}{x} \times 100 \Rightarrow \frac{56.81}{47.4} \times 100$$

$$C.V = 119.85\ \%.$$

Batsman B:

$$Y = \frac{\Sigma Y}{n} = \frac{301}{10} = 30.1$$

$$S_y = \sqrt{\frac{\Sigma Y^2}{n} - \left(\frac{\Sigma Y}{n}\right)^2}$$

$$= \sqrt{\frac{14469}{10} - \left(\frac{301}{10}\right)^2}$$

$$= 23.25.$$

$$C.V = \frac{23.25}{30.1} \times 100.$$

$$C.V = 77.24\%$$

Batsman C:

$$\bar{z} = \frac{\Sigma z}{n} = \frac{274}{10} = 27.4.$$

$$S_z = \sqrt{\frac{\Sigma z^2}{10} - \left(\frac{\Sigma z}{10}\right)^2}$$

$$= \sqrt{\frac{12584}{10} - \left(\frac{274}{10}\right)^2}$$

$$S_z = 22.53.$$

$$C.V = \frac{S_z}{\bar{z}} \times 100.$$

$$C.V = \frac{22.53}{27.4} \times 100.$$

$$= 82.22\%.$$

Compearing:

Compare A with B.

B is constant.

Compare B with C

B is constant.

Compare A with C.

C is more constant.

Constant player:

Bateman B is more constant as it value of co-efficient of varience is smallest.