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Sec :- "A"

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Q No 01

Compute and analyse the results of the least Square regression eqy and Coefficent of Correlation of Y on X for the following data. Compare your manual result with the outcome of SPSS....?

Temp	53	62	57	71	78	ID = 37	86	87	96	91	94	94
Chirps/min	20	32	45	60	80	100	120	140	160	180	200	210

Solution The estimated regression line of Y on X is

$$\hat{Y} = a + bX$$

and the two normal Eqn are;

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

To Compute the necessary Summation we arrange the Compulation in the table

P(2)

X	Y	XY	X^2
53	20	1060	2809
62	32	1984	3844
57	45	2565	3249
71	60	4260	2601
78	80	6240	6084
37	100	3700	1369
86	120	10320	7396
87	140	12180	7469
96	160	15360	9210
91	180	16380	8281
94	200	18800	8836
94	210	19740	8836
Σ = 906	1347	112589	69984

$$\bar{X} = \frac{\Sigma X}{n} = \frac{906}{12} = 75.5$$

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

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

$$= \frac{(12)(112589) - (906)(1347)}{(12)(69984) - (906)}$$

$$= \frac{1351068 - 1220382}{839808 - 906}$$

$$\boxed{b = 0.75}$$

P(3)

$$a = \bar{y} - b\bar{x}$$

$$a = -112.25 - (2.745)(75.5)$$

$$a = -94.9975$$

Hence the desired estimated regression line of Y on X is.

$$\hat{Y} = (a + bx)$$

$$= (-94.9975) + (0.75)x$$

$$\boxed{\hat{Y} = 0.75x - 94.997}$$

Hence $\hat{Y} = 0.75x - 94.997$ is the essential regression Eq approperiate for predicting the Y, given the X.

P(4)

Q No (02)

(a) A box Contain 4 red, 4 white, and 5 green balls. three balls drawn from the box together. Find the Probability that may be (i) all of different Colours, (ii) All of the Same Colour.

(b) off 12 egg in a refrigerator, 2 are bad, from these 4 eggs are Chosen at random to make a Cake, what are the Probabilities that (i) exactly one is bad (ii) At least one is bad.

P(5)

QNo2) Part (a)

4 – R
4 – W
5 – G
13 – balls

Solution :- (i) $n(S) = \binom{13}{3} = 286$

let A = Denote all balls are different Colours.

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

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

$2 \times 2 \times 2 = 8$
even x even x even = even

$3 \times 2 \times 2 = 12$
odd x even x even = even

$3 \times 3 \times 2 = 18$
odd x odd x even = even

Interpretation :- There are 28% Chances that all balls are of diff Colours.

(ii) let B = Denote all balls of Same Colours.

Red White Green

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

P(6)

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

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

Interpretation :- There are 6.3% chances that all balls of Same Colours.

P(7)

Part (b)

Solution :- (i) $n(S) = \binom{12}{4} = 495$

let A = denote the event 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.

Q No (03)

The following are the Scores made by three batsmen A, B and C in a Series of Innings.

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

(a) Find the range of batsman A, B & C...?
(b) Who is more Consistant Player.?
(c) Compare A with B, B with C and A with C...?

Solution

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

Range of A

So, Range $= X_m - X_o$
$= 199 - 6$
$= 193$

Range of B =

Range $= X_m - X_o$
$= 76 - 3$
$= 73$

Range of C $= X_m - X_o$
$= 74 - 4$
$= 70$

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	48	2304	4	16
7	49	4	16	24	576
37	1369	37	1369	37	1369
199	37601	37	1369	74	5476
36	1296	48	2304	52	2704
84	7056	13	169	13 (13)	169
29	841	3	9	4	16
Σx	Σx^2	Σy	Σy^2	Σz	Σz^2
498	53946	325	15669	298	13784

P(10)

Batsman A

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

$$= \frac{498}{10} = 49.8$$

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

$$= \sqrt{\frac{53946}{10} - \left(\frac{498}{10}\right)^2}$$

$$\boxed{S_x = 53.98}$$

$$C.V = \frac{53.98}{49.8} \times 100 =$$

$$\boxed{C.V = 108.39}$$

Batsman B

$$Y = \frac{\Sigma Y}{x} = \frac{325}{10} = 32.5$$

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

$$= \sqrt{\frac{15669}{10} - \left(\frac{325}{10}\right)^2}$$

$$\boxed{S_Y = 22.59}$$

P(11)

$$C.V = \frac{S.V}{32.5} \times 100$$

$$= \frac{22.59}{32.5} \times 100 = \boxed{69.50 = C.V}$$

Batsman C

$$\bar{z} = \frac{\Sigma z}{n} = \frac{298}{10} = 29.8$$

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

$$= \sqrt{\frac{13784}{10} - \left(\frac{298}{10}\right)^2}$$

$$\boxed{S_z = 22.14}$$

$$C.V = \frac{S_z}{29.8} \times 100 = \frac{22.14}{29.8} \times 100$$

$$\boxed{C.V = 74.29}$$

P(12)

Batsman B is more Consistant as H Value of Coefficent of Variance is Smallest

Compare A with B

B is Consistant

Compare B with A

B is more Constant

Compare A with C

C is more Consistant

The End of Paper