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Section " "A"

Subject " Probility & statistic

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Q No # 01

Compute and analyse the result of atleast squares regration equation and coffient of corelation of Y on X for the following data. Compare your manual result with out some of SPSS?

Temprature : 53, 62, 57, 71, 78, 19, 86, 87, 96, 91, 94

Chirps per minute: 20, 32, 45, 60, 80, 100, 120, 140, 160, 180, 200

Solution:-

Estimated regression

Y on X

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

$\bar{x} = \frac{\Sigma x}{n}$

$\bar{y} = \frac{\Sigma y}{n}$

$b = \frac{n\Sigma xy - \Sigma x \Sigma y}{n\Sigma x^2 - (\Sigma x)^2}$

$\hat{Y} = a + bx$

$\Sigma y = na + b\Sigma x$

$\Sigma xy = a\Sigma x + b\Sigma x^2$

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

$b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$

X	Y	XY	X^2	Y^2
53	20	1060	2809	400
62	32	1984	3844	1024
57	45	2565	3249	2025
71	60	4260	5041	3600
78	80	6240	6084	6400
19	100	1900	361	10000
86	120	10320	7396	14400
87	140	12180	7569	19600
96	160	15360	9216	25600
91	180	16380	8281	32400
94	200	18800	8836	40000
94	210	19740	8836	44100
Total $\Sigma x = 888$	$\Sigma y = 1347$	$\Sigma xy = 110789$	$\Sigma x^2 = 71549$	$\Sigma y^2 = 199549$

Now $\bar{X} = \frac{\Sigma x}{n} = \frac{888}{12} = 74$

$$\boxed{\bar{X} = 74}$$

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

$$\boxed{\bar{Y} = 112.25}$$

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

$$b = \frac{12(110789 - (888)(1347)}{12(71549) - (888)^2}$$

$$b = 1.903$$

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

$$a = 112.25 - 1.903(74)$$

$$a = -28.572$$

Co-efficient of correction.

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

$$r = \frac{12(110789) - (888)(1347)}{12(71549) - (71549^2)\left(12(199549)(1347)^2\right)}$$

$$r = \frac{13332}{858588 - 3.108 \times 10^{17}}$$

$$r = 0.0321$$

Hence the desired estimed regression Y on X is

$$\hat{Y} = 49.58 + 0.904 - x$$

This estimated regression Co-efficient b which indicates that the value y increases by 0.7685 units for a unit increase in X.

(SNo# 02 (A")

(A) A box contains 4 red, 4 white, 5 green ball find the probability that they may be

(1) All different colour

2) All of the same colour.

Solution:

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

(1) All different colour.

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

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

$$P(A) = 0.28$$

(2) all same colour

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

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

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

$$P(B) = 18/286 = 0.063$$

$$\boxed{P(B) = 0.063}$$

Part "B"

(b) Of 12 eggs in a refrigerator, 2 are bad. from these four eggs are chosen at random to make a cake. what are probility that

(1) exactly one is bed

(2) At least one is bad

Solution:-

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

(1) Exactly one is bed

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

$$P(A) = \frac{n(A)}{n(S)} = 240/495 = 16/33$$

$$\boxed{P(A) = 16/33}$$

(b) At least one is bad egg.

$$n(B) = \binom{2}{1}\binom{10}{3} + \binom{2}{2}\binom{10}{2} = 285$$

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

$$\boxed{P(B) = 19/33}$$

Q No # 03

Following are the ~~Score~~ Score made by batsman A, B, & C.

A = 12, 15, 6, 73, 7, 19, 199, 36, 84, 29

B = 47 12, 76, 48, 4, 19, 37, 48, 13, 34

C = 15 23, 52, 4, 24, 19, 74, 52, 13, 4

Solution.

A	B	C
12	47	15
15	12	23
6	76	52
73	48	4
7	4	24
19	19	19
199	37	74
36	48	52
84	13	13
29	3	4

Range = $X_m - X_0$

Rang of A = $X_m - X_0$
= 199 - 6
= 193

Rang of B = $X_m - X_0$
= 76 - 3
= 73

Rang of C = $X_m - X_0$
= 74 - 4
= 70

Batman 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
19	361	19	361	19	361
199	39601	37	1369	74	5476
36	1296	46	2304	52	2704
84	7056	13	169	13	169
29	841	3	9	4	16
$\Sigma x = 480$	$\Sigma x^2 = 54938$	$\Sigma y = 307$	$\Sigma y^2 = 1488$	$\Sigma z = 280$	$\Sigma z^2 = 12776$

Batsman A =

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

$$= \frac{480}{10} = 48$$

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

$$= \sqrt{\frac{54938}{10} - \left(\frac{480}{10}\right)^2}$$

$$S\bar{x} = 55.72$$

$$C.V = \frac{55.72}{48} \times 100$$

$$\boxed{C.V = 116.08}$$

Batsman "B"

$$\bar{Y} = \Sigma Y / n = 307/10 = 30.7$$

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

$$S\bar{Y} = \sqrt{\frac{14661}{10} - \left(\frac{307}{10}\right)^2}$$

$$S\bar{Y} = 22.88$$

$$C.V = \frac{22.88}{30.7} \times 100$$

$$\boxed{C.V = 74.52}$$

Batsman "C"

$$\bar{Z} = \frac{\Sigma z}{n} = \frac{280}{10} = 28$$

$$S\bar{Z} = \sqrt{\frac{\Sigma z^2}{n} - \left(\frac{\Sigma z}{n}\right)^2}$$

$$= \sqrt{\frac{12776}{10} - \left(\frac{280}{10}\right)^2}$$

$$S\bar{Z} = 22.217$$

$$C.V = \frac{S\bar{Z}}{\bar{Z}} = \frac{22.217}{28} \times 100$$

$$\boxed{C.V = 79.34}$$

Batsman B is more consistent as it value of co-efficient of variance is smallest

⇒ Compare A with B
B is constant

B with A

B is more constant

⇒ Compare A with C

C is more constant

⇒ Compare B and C

B is more constant.