Final Term Summer 2020

Subject: probability & Statistics. : Duration is 04 hours.

Instructor: Anwar Shamim : Total marks = 50

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Department of CED.

Q No# 01 ?

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Sol:-

Temperature	Chips per min	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
ID 220	100	2260	484	10000
86	120	10320	7396	14400
87	140	12180	7569	19622
96	160	15360	4216	25690
91	180	16380	8281	32400
94	200	18800	8836	40000
94	210	19740	8836	44100
891	1347	111089	67892	199549
Σx 891	$\Sigma y = 1347$	$\Sigma xy = 111089$	Σx^2 67645	y^2

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

$\bar{x} = \frac{891}{12}$

$\bar{x} = 74.25$

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

$\bar{y} = \frac{1347}{12}$

$\bar{y} = 112.25$

$n = 12$

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

$$b = \frac{12(111059) - (891)(1347)}{12(67645) - (891)^2}$$

$$\boxed{b = 7.44}$$

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

$$a = 112.25 - 7.44(74.25)$$

$$a = 112.25 - 552.42$$

$$\boxed{a = -440.17}$$

$$\bar{y} = a + bx$$

$$\boxed{y = -440.17 + 7.44x}$$

Regression line Equation.

(B) Coefficient correlation Y on x:-

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

$$r = \frac{12(111059) - (891)(1347)}{\sqrt{12(67645) - (891)^2}\sqrt{12(149524) - (1347)^2}}$$

$$r = \frac{112\,895}{12508\,2.23} = 0.90$$

Hence the Estimated regression coffecient b = 7.44 which indicated that the value of y increases by 7.44 unit increases in x

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Q No # 02 ? (Part a)

Solution:

~~4 + 4 + 5 = 13~~

4 – R
4 – W
5 – Gn
13 ball

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

Let A = Demote all ball of different Colour.

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

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

2 × 2 × 2 = 8	3 × 2 × 2 = 12	3 × 3 × 2 = 18
even × even × even = even	odd × even × even = even	odd × odd × even = even

Interpretation

= = = there are 28% Chances that all ball are of different Colours

II let B = Demote all ball of Same Colours Red white green

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

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

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

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

Interpretation: there are 6.3% Chances that all ball of Same colours.

Part B Qno#02?

Solution:

(I)

2	B
10	G
12	egg

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

let A = demote 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 Exactly 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.

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Q.NO3?

Sol:-

A	B	C
12	47	15
15	12	23
6	76	52
73	48	4
7	4	24
22	22	22
199	37	74
36	48	52
84	13	13
29	3	4

Range = $X_{maximum} - X_{minimum}$

Rang of A = $x_m - x_0$

= 199 − 6

= 193

of A column range =

Range of B = Xm − x0

= 76 − 3

= 73 | Range of column B

Range of C = Xm − x0

= 74 − 4 = 70

= 70 | Range of column C

	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
	22	484	22	484	22	484
	199	39601	37	1369	74	5476
	36	1296	48	2304	52	2704
	84	7056	13	169	13	169
	29	841	3	9	4	16
	EX =	EX^2 =	EY =	EY^2 =	EZ =	EZ^2 =
	483	55061	310	14384	283	12599

Batsman A

$\bar{x} = \frac{\Sigma x}{n}$: $n = 10$

$= \frac{483}{10}$

$\boxed{= 48.3}$

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

$\sqrt{\frac{55061}{10} - \left(\frac{483}{10}\right)^2}$

$S_x = 56.33$

$C.V = \frac{56.33}{48.3} \times 100 = \frac{56.33}{\bar{x}} \times 100$

$C.V = 1.16 \times 100$

$\boxed{C.V = 116.62}$

Batsman B $\bar{y} = \frac{\Sigma y}{n} = \frac{310}{10}$

$\boxed{= 31}$

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

$$S_y = \sqrt{\frac{14384}{10} - \left(\frac{310}{10}\right)^2}$$

$$S_y = 21.84$$

$$C.V = \frac{21.84}{31} \times 100 = 70.45$$

Batsman C

$$\bar{z} = \frac{\Sigma z}{n} = \frac{283}{10} = 28.3$$

$$S_z = \sqrt{\frac{\Sigma z^2}{n} - \frac{(\Sigma z)^2}{n}}$$

$$= \sqrt{\frac{12599}{10} - \left(\frac{283}{10}\right)^2}$$

$$= 21.42$$

$$C.V = \frac{21.42}{28.3} = 0.75 \times 100$$

$$C.V = 75$$

Batsman in B is more consistant as it value of coffi cint of Varius is Smallest.

Compare A with B

B is consistant.

Comp B with C:

B is 5% consistant

Compare A with C

C is more consistant

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