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Q No 1 ①

Temperature	53	62	57	71	78	39	86	87	96	91	94	94
Chirps Per minute	20	32	45	60	80	100	120	140	160	180	200	210

Solution:-

X	Y	XY	X^2
53	20	1060	2809
62	32	1984	3844
57	45	2565	3249
71	60	4260	5041
78	80	6240	6084
39	100	3900	1521
86	120	10320	7396
87	140	12180	7569
96	160	15360	9216
91	180	16380	8281
94	200	18800	8836
94	210	11280	8836
$\Sigma 908$	$\Sigma 1347$	$\Sigma 98,720$	$\Sigma 72,888$

$y = a + bx$ — (i)

$a = \bar{y} - b\bar{x}$ — (ii)

So $\bar{y} = \frac{\Sigma y}{n} = \frac{1347}{12} = 112.25$ — (iii)

$\bar{x} = \frac{\Sigma x}{n} = \frac{908}{12} = 75.66$ — (iv)

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

Putting value.

$$b = \frac{12(98720) - (908)(1347)}{12(72688) - (824,464)}$$

$$b = \frac{1184640 - 1223076}{872256 - 824,464}$$

$$b = \frac{38436}{47792}$$

$$\boxed{b = 0.804}$$ — (v)

Putting Eq (iii), (iv) and (v) in Eq (ii)

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

Putting value

$$a = 112.25 - (0.804)(75.66)$$

$$a = 11.25 - 60.83$$

$$\boxed{a = 49.58}$$

Hence the desired estimated regression Y on X is

$$\hat{y} = 49.58 + 0.804x$$

The estimated regression Co-efficient b , which indicates that the value of Y increases by 0.765 units for a unit increase in x

Q No 2

a)

Ans:

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

Let A = Denot all balls are of different Colours.

4 - R
4 - W
5 - G

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

$$\boxed{n(A) = 80}$$

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

$$\boxed{P(A) = 0.28}$$

There are 28% changes that all balls are of different Colours.

ii)

Let B = Denote all balls of Same Colours

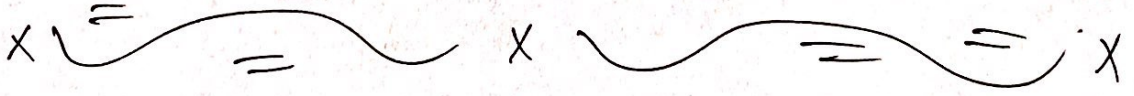
$$n(B) = \binom{4}{3} \text{ or } \binom{4}{3} \text{ or } \binom{5}{3}$$

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

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

$$P(B) = 0.063$$

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



Q No 2 (6)

(b) Of 12 eggs 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?

Sol:-

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

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

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

$$\boxed{n(A) = 240}$$

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

$$P(A) = 0.48$$

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

ii) 7839 (7)

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

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

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

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

$$\boxed{P(B) = 0.58}$$

There are 58% Chances that al least one bad egg is selected.

Q No 3 (8)

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

(a) Find the range of batsmen A, B and 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
39	39	39
199	37	74
36	48	52
84	13	13
29	3	4

Range = $X_m - X_0$

Range of A = $X_m - X_0$

= 199 - 6

Range of A = 193

Range of B = $X_m - X_0$

= 76 - 3

Range of B = 73

Rang of C = $X_m - X_0$

= 74 - 4

Range of C = 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
39	1521	39	1521	39	1521
199	39601	37	1369	74	5476
36	1296	48	2304	52	2704
84	7056	13	169	13	169
29	841	3	9	4	16
$\Sigma x = 500$	$\Sigma x^2 = 56097$	$\Sigma y = 327$	$\Sigma y^2 = 15821$	$\Sigma z = 262$	$\Sigma z^2 = 13936$

Batsman A =

$$\bar{x} = \frac{\Sigma x}{n} = \frac{500}{10} \qquad n = 10$$

$$\bar{x} = 50$$

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

Putting value.

$$S_x = \sqrt{\frac{56097}{10} - \left(\frac{500}{10}\right)^2}$$

$$S_x = \sqrt{5609.7 - \frac{250000}{100}}$$

$$= \sqrt{5609.7 - 2500}$$

$$= \sqrt{3109.7}$$

$$S_x = 55.76$$

$$C.v = \frac{55.76}{\bar{x}} \times 100 = \frac{55.76}{50} \times 100$$

$$C.v = 1.1152 \times 100$$

$$\boxed{Cv = 111.52}$$

Batsman B

$$\bar{y} = \frac{\Sigma y}{n} = \frac{327}{10} = 32.7$$

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

Putting value.

$$S_y = \sqrt{\frac{15821}{10} - \left(\frac{327}{10}\right)^2}$$

$$S_y = \sqrt{1582.1 - \frac{106929}{100}}$$

$$= \sqrt{15821 - 1069.29}$$

$$= \sqrt{512.81}$$

$$\boxed{S_y = 22.64}$$

$$C.v = \frac{22.64}{327} \times 100$$

$$C.v = 0.069 \times 100$$

$$\boxed{C.v = 6.9}$$

Batsman C:-

$$2 = \frac{\Sigma_2}{n} = \frac{262}{10} = 26.2$$

$$S_2 = \sqrt{\frac{\Sigma 2^2}{n} - \left(\frac{\Sigma 2}{n}\right)^2}$$

Putting value

$$= \sqrt{\frac{13936}{10} - \frac{63644}{100}}$$

$$\sqrt{1393.6 - 636.44}$$

$$\sqrt{707.16}$$

$$S_2 = \sqrt{707.16}$$

$$\boxed{S_2 = 26.59}$$

$$C.V = \frac{26.59}{262} \times 100$$

$$C.V = 0.10148 \times 100$$

$$C.V = 10.148$$

Batsman B is more Consistant as it value of co-efficient of variance is Smallest

Compare A with B

B is Consistant

Compare B with A

B is more Consistant

Compare A with C

C is more Consistant