

Name

Zosak Rehman

T.ID

7666

SUBJECT

Probability & Statistics

Submitted To

Eng. Anwar Shamim

Final Paper

Summer 2020

Que 2 a:-

A box contains 4 red .....  
 ..... all of the same  
 colour?

Solution :-

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

Let

A = Denote all balls are of different colours

$$n(A) = \begin{bmatrix} 4 \\ 1 \end{bmatrix} \begin{bmatrix} 4 \\ 1 \end{bmatrix} \begin{bmatrix} 5 \\ 1 \end{bmatrix} = 4 \times 4 \times 5 = 80$$

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

$2 \times 2 \times 2 = 8$	$3 \times 2 \times 2 = 12$	$3 \times 3 \times 2 = 18$
even $\times$ even $\times$ even = even	odd $\times$ even $\times$ even = even	odd $\times$ odd $\times$ even = even

Interpretation :-

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

(18) Let

$$B = \text{Denote all balls of same colour}$$

$$n(B) = \overset{\text{Red}}{\binom{4}{3}} \text{ or } \overset{\text{white}}{\binom{4}{3}} \text{ or } \overset{\text{Green}}{\binom{5}{3}}$$

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

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

Interpretation:

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

Ques 2 b:

of 12 eggs ..... on is bad?

Solution:-

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

(i) 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.

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

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

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

\* Interpretation :-

These are 58% chances that at least one bad egg is effected.

Quest :- 3

The following are the ..... of  
innings?

Soln-

A	B	C
12	47	15
15	12	23
6	76	52
73	48	4
7	4	24
66	66	66
199	37	74
36	48	52
84	13	13
29	3	14

Range of A =  $x_m - x_0$

$$= 199 - 6$$

$$\Rightarrow 193$$

$$\begin{aligned} \text{Range of B} &= X_m - x_0 \\ &= 66 - 3 \\ &= 63 \end{aligned}$$

$$\begin{aligned} \text{Range of C} &= x_m - x_0 \\ &\Rightarrow 66 - 4 \\ &\Rightarrow 62 \end{aligned}$$

Batsman A		Batsman B		Batsman C	
x	x <sup>2</sup>	x	y <sup>2</sup>	z	z <sup>2</sup>
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
66	4356	66	4356	66	4356
199	39601	37	1369	74	5476
36	1296	48	2304	52	2704
84	7056	13	169	13	169
29	841	3	9	4	16
$\Sigma x = 527$	$\Sigma x^2 = 58933$	$\Sigma y = 354$	$\Sigma y^2 = 18577$	$\Sigma z = 327$	$\Sigma z^2 = 16771$
527	58933	354	16577	327	16771

Batsman A =

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

$$\therefore n = 10$$

$$\bar{x} = \frac{527}{10}$$

$$\bar{x} = 52.7$$

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

$$\sqrt{\frac{58933}{10} - \left(\frac{527}{10}\right)^2}$$

$$\sqrt{3116.01}$$

$$S_x = 55.82$$

$$C.V = \frac{55.82 \times 100}{\bar{x}}$$

$$= \frac{55.82}{52.7} \Rightarrow 1.05 \times 100$$



$$\boxed{C.V = 105}$$

Bateman B

$$Y = \frac{\sum y}{n} = \frac{354}{10} \Rightarrow 35.4$$

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

$$\sqrt{\frac{18577}{10} - \left(\frac{354}{10}\right)^2}$$

$$\Rightarrow \sqrt{1857.7 - 1253.16}$$

$$= 20.11$$

$$C.V \Rightarrow \frac{20.11}{35.4} \times 100$$

$$\Rightarrow 0.568 \times 100$$

$$\Rightarrow \boxed{56.8\%}$$

Batman C

$$\bar{z} = \frac{\sum z}{n} = \frac{327}{10} \Rightarrow 32.7$$

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

$$= \sqrt{\frac{16771}{10} - \left(\frac{327}{10}\right)^2}$$

$$\Rightarrow \sqrt{1677.1 - 1069.29}$$

$$\Rightarrow 24.65$$

$$C.V = \frac{24.65}{32.7} \times 100$$

$$0.75 \times 100$$

$$= 75\%$$

Batsman  $b$  is more constant  
as it variance value is of Co-efficient  
of smallest.

Compare A and b

B is constant

Compare B with A

B is more constant

Compare A with C

C is constant

## Question 1

Compute

SPSS ?

Temperature	Chips per min
53	20
62	32
57	45
71	60
78	80
66	100
86	120
87	140
96	160
91	180
94	200
94	210

## (A) Least Square Regression Equation

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

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

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

x	y	xy	x <sup>2</sup>	y <sup>2</sup>
53	20	1060	2809	400
62	32	1934	3844	1024
57	45	2565	3249	2025
71	60	4260	5041	3600
78	80	6240	6084	6400
66	100	6600	4356	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
$\sum x = 935$	$\sum y = 1347$	$\sum xy = 15439$	$\sum x^2 = 75517$	$\sum y^2 = 199549$

Pg 13

$$\bar{x} = \frac{\sum x}{n} = \frac{935}{n}$$

As we take  $n = 12$

$$\frac{935}{12} = 77.91$$

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

Putting value

$$\Rightarrow \frac{1347}{12} \Rightarrow 112.25$$

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

$$\Rightarrow \frac{12(115439) - 935(1347)}{12(75517) - (935)^2}$$

$$12(75517) - (935)^2$$

14

$$= \frac{1385268 - 1259445}{906204 - 874225}$$

$$= \frac{125882}{31979}$$

$$b = 3.93$$

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

$$a = 112.25 - 3.93(77.91)$$

$$a = 112.25 - 306.186$$

$$a = -193.936$$

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

$$\bar{y} = -193.936 + 3.93x$$

Regression line equation.

Coefficient

Correlation

Y on X

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

$$r = \frac{12(115439) - (935)(1437)}{\sqrt{12(75517) - (935)^2} \sqrt{12(199549) - (1347)^2}}$$

$$r = \frac{1385268 - 1343595}{\sqrt{906204 - 874225} \sqrt{2394588 - 1814409}}$$

$$r = \frac{41673}{\sqrt{31979} \sqrt{580179}}$$

$$r = \frac{41673}{103751514.4}$$

$$r = 0.000402$$

$$r = 0.000402$$

$$r = 0.000402$$



16

$x_2 = 4.016$

ISI AMIA BOOK AGENCY