"IQRA NATIONAL UNIVERSITY"

FINAL PAPER

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SEC : "A"

SUBJECT : 'PROB nd STATISTICS'

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① Compute and analyse the result of the least Squares regression equation and coefficient of correlation of y on x for the following data. compare your normal result with the outcome of spss ?

Temperature	53	62	57	71	78	Last two digit of your id	86	87	96	91	94	94
Chirps per minute	20	32	45	60	80	100	120	140	160	180	200	210

Estimated regresion Y on X

By formula

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

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

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

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

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
12	100	1200	144	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
$\Sigma x = 881$	$\Sigma y = 1347$	$\Sigma xy = 110089$	$\Sigma x^2 = 71332$	$\Sigma y^2 = 199549$

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

$\bar{x} = \frac{881}{12}$

$\boxed{\bar{x} = 73.41}$

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

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

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

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

$b = \dfrac{12(110089) - (881)(1347)}{12(71332) - (881)^2}$

$\boxed{b = 1.68}$

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

$a = 112.25 - (1.68)(73.41)$

$\boxed{a = -11.07}$

Now we find coefficient of correlation.

$r = \dfrac{n\Sigma XY - \Sigma X \Sigma X}{\sqrt{(n\Sigma X^2 - (\Sigma X)^2)(n\Sigma Y^2 - (\Sigma Y)^2)}}$

$r = \dfrac{12(110089) - (881)(1347)}{\sqrt{12(71332 - (881)^2)(12(199549 - (1347)^2}}$

$r = \dfrac{134361}{12802375.67}$

$$\gamma = 0.0104$$

Q2

(b) of 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?

ns occur

$$\binom{12}{4} = 495$$

(i) exactly one is bad

A can occur in $\binom{2}{1}\binom{10}{3} = 240$

$$P(A) = \frac{m}{n}$$

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

$$P(A) = \frac{16}{33} = 0.48$$

(ii) At least one is bad

$$\binom{2}{0}\binom{10}{4} = 210$$

$$P_A = \frac{m}{n}$$

$$P_A = \frac{210}{495} = \frac{14}{33} = 0.42$$

Q2 (a) A box contain 4 red, 4 white 5 green balls. Three ball are drawn from the box together find the probability that they may be

(i) all of different colours.

(ii) all of the same colours.

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

(i) all of different colours

$$\binom{4}{1}\binom{4}{1}\binom{5}{1} = 80$$

$$P(A) = \frac{m}{n}$$

$$P(A) = \frac{80}{286} = \frac{40}{143} = 0.28$$

(ii) all of the same colours.

$$\binom{4}{3}\binom{4}{3}\binom{5}{3} = 160$$

$$PA = \frac{m}{n} = \frac{160}{286} = 0.55$$

Q3) The following are the scores made by three batsmen A, B, and C in a series of innings.

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

(a) find the range of batsmen A B and C?

(b) who is more consistent player?

(c) compare A with B, B with C and A with C?

P-T-O

Solution:

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

Range = $X_m - X_0$

Range of A = $X_m - X_0$

= ~~1996~~ 199 - 6

Range = 193

Range of B = $X_m - X_0$

88 - 3

Range = 85

Range of C = $x_m - x_0$

= 88 - 4

Range = 84

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
12	144	12	144	12	144
199	39601	37	1369	74	5476
36	1296	48	2304	52	2704
84	7056	13	169	13	169
29	841	3	9	4	16
$\Sigma x = 473$	$\Sigma x^2 = 59721$	$\Sigma y = 300$	$\Sigma y^2 = 1444$	$\Sigma z = 273$	$\Sigma z^2 = 12559$

Batsman A:

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

$$\bar{X} = \frac{473}{10} \qquad \bar{X} = 47.3$$

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

$$= \sqrt{\frac{54721}{10} - \left(\frac{473}{n}\right)^2}$$

$$S_{\bar{x}} = \sqrt{56.87}$$

$$C.V = \frac{\sqrt{56.87} \times 100}{\bar{X}}$$

$$C.V = \frac{\sqrt{56.87}}{473} \times 100$$

$$C.V = 12.02$$

Batsman B

$$Y = \frac{\Sigma Y}{n}$$

$$Y = \frac{300}{10}$$

$$Y = 30$$

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

$$S_y = \sqrt{\frac{1444}{10} - \left(\frac{300}{10}\right)^2}$$

$$\boxed{S_y = 27.48}$$

$$C.V = \frac{27.48}{47.3} \times 100$$

$$C.V = 58.09\%$$

Batsman C:

$$\bar{z} = \frac{\Sigma z}{n} = \frac{273}{10} = 27.3$$

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

$$S_z = \sqrt{\frac{12559}{10} - \left(\frac{273}{10}\right)^2}$$

$$S_z = 22.59$$

$$C.V = \frac{22.59}{47.3} \times 100$$

$$\boxed{C.V = 47.75}$$

Batsman B is more consistant as it value of coefficient of varience is smallest

compare A with B

B is consistant

compare B with A

B is more consistant

compare A with C

C is more consistent

The End.