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Sec - B

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Sub - Probability & Statistics.

To,

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Q No (01)

The following are the series made by three batsmen, A, B & C in a seriese of innings

A	12	15	6	73	7	19	199	36	84	65
B	3	13	43	102	175	220	204	139	69	30
C	5	14	36	105	99	20	15	96	13	45

Who is better as a run getter?

Who is more consistent player?

Which one is more variate?

Find the empevical Relation for player A.

A/x	B/y	C/z	x^2	y^2	z^2
12	3	5	144	9	25
15	13	14	225	169	196
6	43	36	36	2401	1296
73	102	105	5329	10404	11025
7	175	99	49	30625	9801
19	220	20	361	48400	400
199	204	15	39601	41616	225
36	139	96	1296	19321	9216
84	69	13	7056	9761	169
65	30	45	4225	900	2025
Σ 516	998	448	58322	158606	34,378

a) Better run getter

Arthimatic mean of Batsman A,

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

$$= \frac{516}{10}$$

$$\bar{x}_A = 51.6$$

Arthimetic mean of Batsman B,

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

$$= \frac{998}{10}$$

$$\bar{x}_B = 99.8$$

Arthimetic mean of Batsman C,

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

$$= \frac{448}{10}$$

$$\bar{x}_c = 44.8$$

The batsman with more arithmetic mean is better run getter,

So, Batsman B with arthimetic mean of 99.8 is better run getter.

b) More consistent player

→ Co-efficient of relation, C.V of batsman A

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

Standared daviation of A

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

$$S = \sqrt{\frac{58322}{10} - \left(\frac{516}{10}\right)^2}$$

$$S = \sqrt{5832.2 - 2662.56}$$

$$S = \sqrt{3169.64}$$

$$S = 56.29$$

→ C.V of A = $\frac{S}{\bar{x}_A} \times 100$

= $\frac{56.29}{51.6} \times 100$

= 109.08 %

→ C.V of B = $\frac{S_B}{\bar{x}_B} \times 100$

Standard daviation of B

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

$S_B = \sqrt{\frac{158606}{10} - \left(\frac{998}{10}\right)^2}$

$S_B = \sqrt{15860.6 - 9960.04}$

$S_B = 76.81$

C.V of B = $\frac{76.81}{99.8} \times 100$

= 76.96 %

Standard deviation of C

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

$$= \sqrt{\frac{34378}{10} - \left(\frac{448}{10}\right)^2}$$

$$= \sqrt{3437.8 - 2007.04}$$

$$= \sqrt{1430.79}$$

$$= 37.82$$

C.V of C $= \frac{S_c}{\bar{x}_c} \times 100$

$$= \frac{37.82}{44.8} \times 100$$

$$= 84.41\ \%$$

The batsman with least co-efficient of variation is more consistant player so batsman B with C.V = 76.96 is more consistent player.

c) More variate player,

A large value of co-efficient of variation indicates that it is more varite.

Hence C.V of A = 109.08

So batsman.

Q No (02)

The following is the distribution of wages per thousand employes in a certain factory.

classes	2-4	6-8	10-12	14-16	18-20	22-24	26-28	30-32	34-36
F	3	13	6	10	5	3	5	3	2

Calculate Mean, Mode and Median? Discuss the symmetrical and skewness characteristics.

Ans:

Classes	f	class boundry	x	fx	cf
2-4	3	1-5	3	9	3
6-8	13	5-9	7	91	16
10-12	6	9-13	11	66	22
14-16	10	13-17	15	150	32
18-20	5	17-21	19	95	37
22-24	3	21-25	23	69	40
26-28	5	25-29	27	135	45
30-32	3	29-33	31	93	48
34-36	2	33-37	35	70	50
	50			778	

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f}$$

$$= \frac{778}{50}$$

Mean = 15.56

Median = ? , Mid class $= \frac{\Sigma f}{2} = \frac{50}{2} = 25$

$$\text{Median} = l + \frac{h}{f}\left(\frac{n}{2} - c\right)$$

$$= 13 + \frac{4}{6}\left(\frac{50}{2} - 22\right)$$

$$= 13 + \frac{4}{6}(25 - 22)$$

$$= 13 + \frac{4^2}{6_3}(3)$$

Median = 15

$$\text{Mode} = l + \frac{f_2}{f_1 + f_2} \times h$$

$$= 5 + \frac{6}{3+6} \times 4$$

$$= 5 + \frac{24}{9}$$

$$= 5 + 2.67$$

Mode = 6.67

or

Mode = 7

Mean + Median = Mode

So data is skewed.

Q. No (03)

Disscuss merits and demerits of Median and Geometric mean.

Ans

Median:

Merits:

- It is easily calculated and understood.
- It is located even when the values are not capable of quantitative measurment.
- It is not affected by extreme values.
- It can be computed when a frequency distribution involves "open-end" classes like those of income and price.
- In a highly skewed distribution, median is an appropriated average to use.

Demerits:

. It is not vegorously defined.
. It is not capable of lending itself to further statistical treatment.
. It necessitates the arrangment of data into an array which can be tedious and time consuming for a large body of data.

Geometric Mean:

Merits:

. It is rigidly defined and its value is a precise figure.
. It is based on all observation.
. It is capable of future algebraic treatment.
. It is not much affected by fluctuation of sampling.

. It is not affected by extreme values.

Demevits:

. It cannot be calculated if any one of the observation is negative or zero.

. Its calculation is vather difficult.

. It is not easy to understand.

. It may not coincide with any of the observation.