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Section: A

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M- Sulaiman - 7995

Q#1 The following are the scores made by three batsman A, B and C in a series 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 as better as a run getter?

Who is more consistant player?

which one player most more variate?

Find the Empirical Relation for player A:

Solution

Batsman A		Batsman B		Batsman B	
x (score)	x^2	x (score)	x^2	x (score)	x^2
12	144	3	9	5	25
15	225	13	169	14	196
6	36	43	1849	36	1296
73	5329	102	10404	105	11025
7	49	175	30625	99	9801
19	361	220	48400	20	400
199	39601	204	41616	15	225
36	1296	139	19321	96	9216
84	7056	69	4761	13	169
65	4225	30	900	45	2025

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$\Sigma x = 516$	$\Sigma x^2 = 58322$	$\Sigma x = 998$	$\Sigma x^2 = 15805$	$\Sigma x = 448$	$\Sigma x^2 = 34378$

$n = 10$

Batsman A

Mean Score $= \bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{516}{10} = 51.6$

$$S_x = \sqrt{\frac{\Sigma x_i^2}{n} - \left(\frac{\Sigma x_i}{n}\right)^2} = \sqrt{\frac{58322}{10} - \left(\frac{516}{10}\right)^2}$$

$$S_x = \sqrt{5832.2 - (51.6)^2} = \sqrt{5832.2 - 2662.57}$$

$$S_x = \sqrt{3169.64} = 56.299$$

Now co-efficient of variation

$C.V = \frac{S_x}{\bar{x}} \times 100$ putting the values

$C.V = \frac{56.299}{51.6} \times 100 = 109.10\ \%$

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Batsman B

Mean Score $= \bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{998}{10} = \boxed{99.8}$

Now

$$S_x = \sqrt{\frac{\sum_{i=1}^{n} x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2}$$ putting the value from the table

$$S_x = \sqrt{\frac{1580549}{10} - \left(\frac{998}{10}\right)^2} = \sqrt{15805.4 - (99.8)^2}$$

$$S_x = \sqrt{15804.5 - 9960.04} = \sqrt{5845.34}$$

$$S_x = 76.454$$

No co-efficient of variation

$$C.V = \frac{S_x}{\bar{x}} \times 100$$ putting the values

$$C.V = \frac{76.454}{99.8} \times 100 = \boxed{76.607\%}$$

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Batsman C :.

Mean Score $= \bar{x} = \dfrac{\sum_{i=1}^{n} x_i}{n} = \dfrac{448}{10} = \boxed{44.8}$

Now for batsman 'C'

$$S_x = \sqrt{\frac{\sum_{i=1}^{n} x_i}{n} - \left(\frac{\sum x_i}{n}\right)^2}$$ putting the values

$$S_x = \sqrt{\frac{34378}{10} - \left(\frac{448}{10}\right)^2} = \sqrt{3437.8 - (44.8)^2}$$

$$S_x = \sqrt{3438.8 - 2007.04} = \sqrt{1430.76}$$

$$\boxed{S_x = 37.82}$$

No co-efficent of variation

$$C.V = \frac{S_x}{\bar{x}} \times 100 = \frac{37.82}{44.8} \times 100$$

$$C.V = 84.43\%$$

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i) Better run getter

Batsman B is a better run getter becomes the mean of B is greather than mean of A and C

ii) More consistant player:

The co-efficient of variation for Batsman B is smaller than Batsman A and C So the Batsman B is the more constant player

iii) More variable player:

The greater the co-efficient of variable the more it variate variable, so the co-efficient of variation of A is greater than that of Batsman B and C.

iv) Empirical Relation for player A:

As we know that

Mode (A) = 3 Median − 3 Mean

Now

Median for A

$$\text{Median} = \left(\frac{n}{2}\right)^{th} = \left(\frac{10}{2}\right)^{th} = 5^{th}$$

mode = 1

Q#2 The following is the distribution of wages per thousands 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 symmetrical and skewness characteristics.

Solution

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

Required

1) Mean
2) Mode
3) Median

(1) Mean $= \bar{x} = \frac{\Sigma f_i x_i}{n} = \frac{\Sigma f_i x_i}{n}$

$\Rightarrow \frac{778}{50} = 15.56$

(2) Mode $\Rightarrow \left(\frac{n}{2}\right)^{th} = \left(\frac{50}{2}\right)^{th} = 25^{th}$

$$\text{Mode} = l + \frac{f_m - f_o}{2f_m - f_o - f_i} \times h$$

$l = 13$, $f_m = 10$, $f_o = 6$, $f_i = 5$

$n = 4$

$$\text{Mode} = 13 + \frac{10-6}{2(10)-6-5} \times 4$$

Mode = **14.47**

median $\left(\frac{n}{2}\right)^{th} = \left(\frac{50}{2}\right)^{th} = (25^{th})$

median $\Rightarrow l + \frac{h}{f}\left(\frac{n}{2} - cf\right)$

$l = 13,\ h = 4,\ f = 10 \quad cf = 22$

$= 13 + \frac{4}{10}\left(\frac{50}{2} - 22\right)$

$\Rightarrow \boxed{14.2}$

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Q#3 Discuss merit and demirit, of Median and Geometric Mean?

Answer:

1) The median

Advantages of Median:

1) it is easily calculated and understood

2) it is Located even when the values are not capable of of quantitative measurement

3) It is not effected by extreme values, It is can be computed even when a frequency involves "open, end" closes like those of income and prices.

Disadvantages

1) it is not rigorously defined.

2) It is not capable of lending itself to further statistical treatment

3) It necessitates the arrangment of data into an array which can be tedious and time for large body of data.

The Geometric mean

i) it is rigorously defined a mathematics formula.

2) it is based on all observed values

3) It is amenable to mathematical treatment in certain cases.

4) It give eaual weightage to all the observation

5) It is not much effected by sampling variability.

Disadvantages:

i) It is neither easy to calculate nor to understand.

2) It vanishes if any observation is zero

3) In case of negative values, it cannot to computed at all.