PSMOD(Test-2)

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Q1.

C.I	Midpoint (x)	f	c.f	x^2	fx	fx^2
9.5 – 19.5	14.5	8	8	210.25	116	1682
19.5 – 29.5	24.5	16	24	600.25	392	9604
29.5 – 39.5	34.5	21	45	1190.25	724.5	24995.25
39.5 – 49.5	44.5	11	56	1980.25	489.5	21782.75
49.5 – 59.5	54.5	4	60	2970.25	218	11881
		$\sum f = 60$			$\sum fx = 1940$	$\sum fx^2 = 69945$

a.

Solution:

Correction factor = $\frac{20-19}{2} = 0.5$

i. Class Midpoint (x)

C.I	Class Midpoint (x)
9.5 – 19.5	14.5
19.5 – 29.5	24.5
29.5 – 39.5	34.5
39.5 – 49.5	44.5
49.5 – 59.5	54.5

ii. Fx

f	x	fx
8	14.5	116
16	24.5	392
21	34.5	724.5
11	44.5	489.5
4	54.5	218
$\sum f = 60$		Σfx = 1940

iii. fx^2

f	x	x^2	fx^2
8	14.5	210.25	1682
16	24.5	600.25	9604
21	34.5	1190.25	24995.25
11	44.5	1980.25	21782.75
4	54.5	2970.25	11881
$\sum f = 60$			$\Sigma fx^2 = 69945$

b.

i. Mean

Solution:

We have,

$\sum fx = 1940$

$\sum f = 60$

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

Mean $= \frac{1940}{60} = 32.33$

Hence, Mean is 32.33

ii. Mode

Solution:

Mode class is the corresponding class of highest frequency

And in above table highest frequency is 21

So, according to formula,

L = 29.5

$f_1 = 21$

$f_2 = 11$

$f_0 = 16$

$\Delta_1 = f_1 - f_o = 21 - 16$

$\Delta_2 = f_1 - f_2 = 21 - 11 = 10$

$h = 10$

Now, using formula

Mode $(M_0) = L + \frac{\Delta_1}{\Delta_1 + \Delta_2} xh$

Mode $(M_0) = 29.5 + \frac{5}{5+10} \times 10$

Mode $((M_0) = 32.833$

Hence, Mode is 32.8333

iii. Median

Solution:

Md class = $\left(\frac{N}{2}\right)^{th}$ class = $\left(\frac{60}{2}\right)^{th}$ class = 30^{th} class

So, it lies in between 29.5 – 39.5^{th} class

Where, L = 29.5

$\frac{N}{2}$ = 30

$c.f$ = 24

f = 21

h = 10

Using formula,

Median = $L + \frac{\frac{N}{2} - c \cdot f}{f} \times h$

Median = $29.5 + \frac{30-24}{21} \times 10$

Median = $29.5 + \frac{60}{21}$

Median = 32.357

Hence, Median is 32.357

iv. Standard Deviation, s

Solution:

$\sum f$ = 60

$\sum fx$ = 1940

Σfx^2 = 69945

Now,

Standard Deviation (s) = $\sqrt{\frac{\sum fx^2 - \left(\frac{\Sigma fx}{\sum f}\right)^2}{\Sigma f - 1}}$

Standard deviation (s) = $\sqrt{\frac{69945-\left(\frac{1940}{60}\right)^2}{60-1}}$

Standard deviation (s) = $\sqrt{\frac{7218.33}{59}}$

Standard deviation (s) = 11.06

Hence, Standard deviation is 11.06

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GENERAL COMMENTS

Instructor

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