PSMOD(Test-2)

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Q1.

C.I	Midpoint (x)	f	c.f	<i>x</i> 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

 $\Sigma f = 60$

 $\sum fx = 1940 \ \sum fx^2 = 69945$

a.

Solution:

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

i. Class Midpoint (x)

	1
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

$$\sum f = 60 \qquad \qquad \Sigma f x = 1940$$

***	C
111.	fx^2

1111	170		
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

$$\sum f = 60 \qquad \qquad \sum f x^2 = 69945$$

b.

i. Mean

Solution:

We have,

$$\sum fx = 1940$$

$$\sum f = 60$$

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

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

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,

$$L = 29.5$$

$$f_1 = 21$$

$$f_2 = 11$$

$$f_0 = 16$$

$$\Delta_1 = f_1 - f_2 = 21 - 16$$

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

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

$$h = 10$$

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

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:

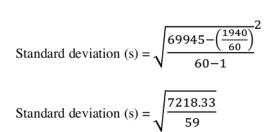
$$\Sigma f = 60$$

$$\sum_{} fx = 1940$$

$$\Sigma f x^2 = 69945$$

Now,

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



Standard deviation (s) = 11.06

Hence, Standard deviation is 11.06

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