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Sec A

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Q1:-

i) Group Frequency Distribution.

Largest value = 10

Smallest value = 0

$$\text{Range} = 10 - 0 = 10$$

We decide to take 5 classes of equal size.

$$h = \frac{10}{5} = 2 \text{ say } 2.1$$

$$h = 2.1$$

Classes (weight)	Class boundaries	Mid point	Tally	Frequency
0 - 2	-0.05 - 2.05	1		13
2.1 - 4	2.05 - 4.15	3.1		21
4.2 - 6.2	4.15 - 6.25	5.2		9
6.3 - 8.3	6.25 - 8.35	8.3		5
8.4 - 10.4	8.35 - 10.45	9.4		2
Total				50

C. Frequency

13

34

43

48

50

Ungrouped frequency distribution.

Number of children	Tally	frequency	C.F
0		1	1
1		4	5
2	 	8	13
3	 	14	27
4	 	7	34
5		5	39
6		4	43
7		3	46
8		2	48
9		1	49
10		1	50

Total

50

b) Grouped frequency distribution

Mode:

$$M = l + \frac{f_m - f_1}{(f_m - f_1) + (f_m - f_2)} \times h$$

$$l = 2.05$$

$$f_m = 21$$

$$f_1 = 13$$

$$f_2 = 9$$

$$h = 2.1$$

$$M = 2.05 + \frac{(21 - 13)}{(21 - 13) + (21 - 9)} \times 2.1$$

$$M = 2.89 \approx 3$$

$Mode = 3$

Median:-

First we check $\frac{n}{2}$

$$\frac{n}{2} = \frac{50}{2} = 25$$

So,

$$l = 2.05$$

$$h = 2.1$$

$$f = 21$$

$$c = 13$$

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

$$= 2.05 + \frac{2.1}{21} \left(\frac{50}{2} - 13 \right)$$

$$= 3.25 \approx 3$$

$$\boxed{\text{Median} = 3}$$

Ans: 2)

Classes	Class boundaries	frequency (f)	Cumulative frequency (CF)
2-4	1-5	3	3
6-8	5-9	13	16
10-12	9-13	6	22
14-16	13-17	10	32
18-20	17-21	5	37
22-24	21-25	3	40
26-28	25-29	5	45
30-32	29-33	3	48
34-36	33-37	2	50

Quartiles.

$$Q_1 = \frac{n}{4} \Rightarrow \frac{50}{4} = 12.5$$

12.5 lies in 5-9 class boundary

So,

$$Q_1 = l + \frac{h}{f} \left(\frac{n}{4} - c \right)$$

$$= 5 + \frac{4}{13} \left(\frac{50}{4} - 3 \right)$$

$$= 5 + 0.30 (12.5 - 3)$$

$$= 5 + 0.30 (9.5) = 7.85$$

$$Q_2 = \frac{2n}{4} = \frac{2 \times 50}{4} = 25$$

25 lies in 13-17 class boundary

So,

$$Q_2 = l + \frac{h}{f} \left(\frac{2n}{4} - c \right)$$

$$Q_2 = 13 + \frac{4}{10} \left(\frac{2 \times 50}{4} - 22 \right)$$

$$= 13 + \frac{4}{10} (25 - 22)$$

$$= 13 + \frac{4}{10} (3)$$

$$Q_2 = 14.2$$

$$Q_3 = \frac{3n}{4} \Rightarrow \frac{3 \times 50}{4} = 37.5$$

37.5 lies in 21-25 class boundary

So,

$$Q_3 = l + \frac{h}{f} \left(\frac{3n}{4} - c \right)$$

$$= 21 + \frac{4}{3} \left(\frac{3 \times 50}{4} - 37 \right)$$

$$= 21 + \frac{4}{3} (0.5)$$

$$= 21 + 0.67$$

$$Q_3 = 21.67$$

Deciles:-

$$D_1 = \frac{n}{10} \Rightarrow \frac{50}{10} = 4$$

4 lies in 5-9 class boundary

Hence.

$$D_1 = l + \frac{h}{f} \left(\frac{n}{10} - 3 \right)$$

$$= 5 + \frac{4}{13} \left(\frac{50}{10} - 3 \right)$$

$$= 5 + \frac{4}{13} (2)$$

$$= 5 + 0.61$$

$$D_1 = 5.61$$

$$D_2 = \frac{2n}{10} = \frac{2 \times 50}{10} = 10$$

10 lies in 5-9

Hence

$$D_2 = l + \frac{h}{f} \left(\frac{2n}{10} - c \right)$$

$$D_2 = 5 + \frac{4}{13} \left(\frac{2 \times 50}{10} - 3 \right)$$

$$D_2 = 5 + \frac{4}{13} (10 - 3)$$

$$D_2 = 5 + \frac{4}{13} (7)$$

$$D_2 = 5 + 2.15$$

$$D_2 = 7.15$$

$$D_3 = \frac{3n}{10} = \frac{3 \times 50}{10} = 15$$

15 lies in 5-9 class boundary

$$\text{Hence } D_3 = l + \frac{h}{f} \left(\frac{3n}{10} - c \right)$$

$$D_3 = 5 + \frac{4}{13} \left(\frac{3 \times 50}{10} - 3 \right)$$

$$D_3 = 5 + \frac{4}{13} (15 - 3)$$

$$D_3 = 5 + 0.307(12)$$

$$D_3 = 8.69$$

$$D_4 = \frac{4n}{10} \Rightarrow \frac{4 \times 50}{10} = 20$$

20 lies in 9-13 class boundary

Hence

$$D_4 = l + \frac{h}{f} \left(\frac{4n}{10} - c \right)$$

$$D_4 = 9 + \frac{4}{6} \left(\frac{4 \times 50}{10} - 16 \right)$$

$$D_4 = 9 + \frac{4}{6} (4)$$

$$D_4 = 9 + 2.67$$

$$D_4 = 11.67$$

$$D_5 = \frac{5n}{10} \Rightarrow \frac{5 \times 50}{10} = 25$$

25 lies in 13-17 class Boundary

Hence

$$D_5 = l + \frac{h}{f} \left(\frac{5n}{10} - c \right)$$

$$D_5 = 13 + \frac{4}{10} \left(\frac{5 \times 50}{10} - 22 \right)$$

$$D_5 = 13 + \frac{4}{10} (3)$$

$$D_5 = 14.2$$

$$D_6 = \frac{6n}{10} \Rightarrow \frac{6 \times 50}{10} = 30$$

30 lies in 13-17 class boundary.

Hence

$$D_6 = l + \frac{h}{f} \left(\frac{6n}{10} - c \right)$$

$$= 13 + \frac{4}{10} \left(\frac{6 \times 50}{10} - 22 \right)$$

$$= 13 + \frac{4}{10} \cdot (30 - 22)$$

$$= 13 + \frac{4}{10} (8)$$

$$D_6 = 16.2$$

$$D_7 = \frac{7n}{10} = \frac{7 \times 50}{10} = 35$$

35 lies in 17-21 class boundary

Hence

$$D_7 = l + \frac{h}{f} \left(\frac{7n}{10} - c \right)$$

$$D_7 = 17 + \frac{4}{5} \left(\frac{7 \times 50}{10} - 32 \right)$$

$$D_7 = 17 + \frac{4}{5} (35 - 32)$$

$$= 17 + \frac{4}{5} (3)$$

$$D_7 = 19.4$$

$$D_8 = \frac{8n}{10} = \frac{8 \times 50}{10} = 40$$

40 lies in 21-25 class boundary

Hence

$$D_8 = l + \frac{h}{f} \left(\frac{8n}{10} - c \right)$$

$$D_8 = 21 + \frac{4}{3} \left(\frac{8 \times 50}{10} - 37 \right)$$

$$= 21 + \frac{4}{3} (40 - 37)$$

$$= 21 + \frac{4}{3} (3)$$

$$D_8 = 25$$

$$D_9 = \frac{9n}{10} \Rightarrow \frac{9 \times 50}{10} = \frac{450}{10} = 45$$

45 lies in $25-29$ class boundary.

Hence

$$D_9 = l + \frac{h}{f} \left(\frac{9n}{10} - c \right)$$

$$D_9 = 25 + \frac{4}{5} \left(\frac{9 \times 50}{10} - 40 \right)$$

$$= 25 + \frac{4}{5} (45 - 40)$$

$$= 25 + \frac{4}{5} (5)$$

$$= 25 + 4$$

$$D_9 = 29$$

Ans:-³⁾ i) Descriptive statistics:

The collection of data analysis of data. Summarization of data interpretation of data tabulation of data at least we get a precise result in numerical form is called descriptive statistics.

ii) Inferential statistics:-

Using inferential statistics we draw inference about the characteristics of related problem by our inference gives non-numerical result.

iii) Sources of primary data:-

- i) Direct personal investigation.
- ii) Indirect investigation.
- iii) Interview method.
- iv) Collection through Enumerators.
- v) Questioner method.
- vi) Collection through local sources.
- vii) Computer interview method.

iv) Nominal scale:-

It can be define as "The classification of the observation into mutually exclusive qualitative classes is said to be nominal scale".

i) Students are classified as male & female we may use number 1 & 2.

ii) Rainfall may be classified as heavy, moderate & light. We may use number 1, 2 & 3.

The numbers when they are used, only identify the categories in this scale no particular order is used.

v) Random statistics:-

In statistics a random variable is an assignment of numerical value to each possible outcome of a event space. This association facilitates the identification & the calculation of probabilities of the events.