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Section :- B

Subject :- Probability & Statistics

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Question No 01:- ①

The following figure gives the number of children born to 50 women

2	6	1	5	4	3	3	8	3	1
4	3	3	0	5	2	1	4	3	3
5	3	3	6	3	3	2	2	7	3
1	4	2	4	4	4	6	8	10	7
7	5	6	5	3	2	3	9	2	2

$$\text{Range} = X_m - X_0$$

$$10 - 0$$

$$\frac{10}{5} = 2$$

Class limit	Tally	Frequency
0 - 2		13
2 - 4		21
4 - 6		9
6 - 8		5
8 - 10		2

Ungrouped

(2)

$$\text{Median} = \left(\frac{n}{2}\right)$$

$$= \left(\frac{50}{2}\right)$$

$$= 25$$

Mode is the most repeated number 3.

group

(3)



Median

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

d = lower class boundary

h = class interval

f = frequency

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

$$\text{Median} = 3$$

$$\text{Mode} = \frac{d + f_m - f_0 \times h}{2 f_m - f_0 - f_1}$$

(4)

Question No 02:

The following is the distribution of wages per thousand employee 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 all Quartiles and Deciles?

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

$\Sigma f = 50$

(5)

Quartiles

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

12.5 lies in 5-9 class boundary

so

$$\begin{aligned} Q_1 &= J + \frac{h}{f} \left(\frac{n}{4} - c \right) \\ &= 5 + \frac{4}{13} \left(\frac{50}{4} - 3 \right) \\ &= 5 + 30 (12.5 - 3) \\ &= 5 + 30 (9.5) \\ &= 7.85 \end{aligned}$$

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

25 lies in 13-17 class boundary

so

$$\begin{aligned} Q_2 &= J + \frac{h}{f} \left(\frac{2n}{4} - c \right) \\ &= 13 + \frac{4}{10} \left(\frac{2 \times 50}{4} - 22 \right) \end{aligned}$$

(6)

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

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

$$= 13 + 1.2$$

$$Q_2 = 14.2$$

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

37.5 lies in 21-25 class boundary

so

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

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

$$= 21 + \frac{4}{3} (37.5 - 37)$$

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

$$= 21 + 0.67$$

$$Q_3 = 21.67$$

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Decides

$$D_1 = \frac{n}{10} = \frac{50}{10} = 5$$

5 lies in 5-9 class boundary

Hence

$$\begin{aligned} D_1 &= L + \frac{h}{f} \left(\frac{n}{10} - c \right) \\ &= 5 + \frac{4}{13} \left(\frac{50}{10} - 3 \right) \\ &= 5 + \frac{4}{13} (2) \\ &= 5 + 0.61 \end{aligned}$$

$$D_1 = 5.61$$

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

10 lies in 5-9

Hence

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

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

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

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

$$D_2 = 5 + 2.15$$

$$D_2 = 7.15$$

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

15 lies in 5-9 class boundary

Hence

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

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

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

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

(9)

$$D_3 = 5 + 3.69$$

$$D_3 = 8.69$$

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

20 lies in 9-13 class boundary

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

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

$$D_4 = 9 + \frac{4}{6} (20 - 16)$$

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

$$D_4 = 9 + 2.67$$

$$D_4 = 11.67$$

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

25 lies in 13-17 class boundary

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

(10)

$$\begin{aligned} D_5 &= 13 + \frac{4}{10} \left(\frac{5 \times 50}{10} - 22 \right) \\ &= 13 + \frac{4}{10} (25 - 22) \\ &= 13 + \frac{4}{10} (3) \\ &= 14.2 \end{aligned}$$

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

30 lies in 13-17 class boundary

Hence

$$\begin{aligned} D_6 &= 1 + \frac{4}{f} \left(\frac{6n}{10} - c \right) \\ &= 13 + \frac{4}{10} \left(\frac{6 \times 50}{10} - c \right) \\ &= 13 + \frac{4}{10} (30 - 22) \\ &= 13 + \frac{4}{10} (8) \\ &= 13 + 3.2 \\ &= 16.2 \end{aligned}$$

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

35 lies in 17 - 21 class

Hence

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

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

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

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

$$= 17 + 2.4$$

$$= 19.4$$

(12)

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

40 lies in 21 - 25 class boundary

Hence

$$\begin{aligned} D_8 &= d + \frac{h}{f} \left(\frac{8n}{10} - c \right) \\ &= 21 + \frac{4}{3} \left(\frac{8 \times 50}{10} - 37 \right) \\ &= 21 + \frac{4}{3} (40 - 37) \\ &= 21 + \frac{4}{3} (3) \\ &= 21 + 4 \end{aligned}$$

$$D_8 = 25$$

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

45 lies in 25 - 29 class boundary

Hence

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

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

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

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

$$Dq = 25 + 4$$

$$Dq = 29$$



(14)

Question No 03

Define the following.

a) Random Statistics :-

A numeric sequence is said to be statistically random when it contains recognizable patterns or regularities, sequences such as the result of an ideal dice roll or the digits of exhibit statistical randomness.

b) Inferential Statistics:

Inferential statistics is a branch of statistics through which we collect the data, analysis the data, summarize the data, interpretate the data and tabulate the data to get precise result is non-numerical form.

OR

The process of reaching generalization about the whole by examining a portion is called inferential statistics.

c) Descriptive statistics

Descriptive statistics can be defined as the collection of data, analysis of data, summarization of data, interpretation of data, tabulation of data at last we get a precise result in numerical form is called descriptive statistics.

OR

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Descriptive statistics is concerned with the summarization and describing a body of data

Source 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.

Nominal Scale :

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

- Eg:-
- i) students are classified as male and female, we may use number 1 and 2.
 - ii) Rain fall may be classified as heavy moderate and light, we may use number 1, 2 and 3.