

Name = M. Saleem

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Section = B

ID = 7859

Subject = Prob and Statistics

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"Question No 1"Solution:-

Group frequency di

Larg value = 10

smallest value = 0

Range = $10 - 0 = 10$

Take 5 classes of equal size

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

$$h = 2$$

Class weight	Real class boundary	Mid Point	Tally	frequency	C. frequency
0 - 2	0.05 - 2.05	1		13	13
2.1 - 4.1	2.05 - 4.05	3.1		21	34
4.2 - 6.2	4.15 - 6.15	5.2		9	43
6.3 - 8.3	6.25 - 8.25	7.3		5	48
8.4 - 10.4	8.35 - 10.35	9.4		2	50
				total = 50	

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ungrouped frequency distribution

Number of children	Tally	frequency	C. frequency
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
		<hr/> Total 50	

Grouped data frequency distribution

Mode

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

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$$l = 2.05$$

$$f_m = 21$$

$$f_1 = 13$$

$$f_2 = 9$$

$$h = 2.1$$

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

$$M = 2.89 \approx 3$$

$$\text{Mode} = 3$$

Median:-

$$\text{first we have } \frac{n}{2} = \frac{50}{2}$$

so

$$l = 2.05$$

$$h = 2.1$$

$$f = 21$$

$$c = 13$$

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$$\begin{aligned} \text{median} &= 1 + \frac{h}{f} \left(\frac{n}{2} - c \right) \\ &= 2.05 + \frac{2.1}{21} \left(\frac{50}{2} - 13 \right) \\ &= 3.25 \approx 3 \end{aligned}$$

median = 3.

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"Question No 2"

Calculate Quartiles and deciles

class	x	f	fc
2-4	3	3	3
6-8	17	13	16
10-12	11	6	22
14-16	15	10	32
18-20	19	5	37
22-24	23	3	40
26-28	27	5	45
30-32	31	3	48
34-36	35	2	50

As we know data

$$Q_1 = \left[\frac{n}{4} \right] \quad \because n = 50$$

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

12.5 lies in 5-9 class boundary

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

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

$$= 5 + 30 (12.5 - 3)$$

$$= 5 + 30(9.5)$$

$$Q_1 = 7.85$$

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

25 lies in 13-17 class boundary

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

$$= 13 + \frac{4}{10} \left(\frac{2 \times 50}{4} - 28 \right)$$

$$= 13 + \frac{4}{10} (25 - 28)$$

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

$$Q_2 = 14.2$$

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

37.5 lies in 21-25 class boundary

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

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

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

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

$$Q_3 = 21.67$$

Deciles

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

4 lies in 5-9 class boundary

Hence

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

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

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

$$D_1 = 5.61$$

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$$D_2 = \frac{24}{10} \Rightarrow \frac{2 \times 50}{10} \Rightarrow 10$$

10 lies in 5-9

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

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

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

$$D_2 = 7.15$$

$$D_3 = \frac{34}{10} \Rightarrow \frac{3 \times 50}{10} = 15$$

15 lies in 5-9

Hence

$$D_3 = 2 + \frac{4}{f} \left(\frac{34}{10} - c \right)$$

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

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

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

$$D_3 = 8.69$$

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$$D_u = \frac{u_n}{10} \Rightarrow \frac{4 \times 50}{10} \Rightarrow 20$$

20 lies in 9 - 13

$$\text{Hence } D_u = l + \frac{h}{f} \left(\frac{u_n}{10} - c \right)$$

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

$$D_u = 9 + 2.67$$

$$\boxed{D_u = 11.67}$$

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

25 lies in 13 - 17 class boundary

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

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

$$D_5 = 13 + \frac{4}{10} (25 - 22)$$

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

$$\boxed{D_5 = 14.7}$$

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

30 lies in 13 - 17

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

$$= 13 + \frac{4}{10} \left(\frac{6 \times 50}{10} - 28 \right)$$

$$= 13 + \frac{4}{10} \left(\frac{6 \times 50}{10} - 28 \right)$$

$$= 13 + \frac{4}{10} (30 - 28)$$

$$= 13 + \frac{4}{10} (2)$$

$$D_6 = 13 + 3.2$$

$$D_6 = 16.2$$

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

35 lies in 17 - 21

$$D_7 = l + \frac{h}{f} \left(\frac{7 \times 50}{10} - 32 \right)$$

$$D_7 = 17 + \frac{4}{5} (3)$$

$$D_7 = 17 + 2.9$$

$$D_7 = 19.4$$

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

40 lies in 21 - 25

Hence

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

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

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

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

$$D_8 = 25$$

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

45 lies in 25 - 29

Hence

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

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

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

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

$$Da = 25 + 4$$

$$Da = 29$$

'Question no 3'

① Descriptive statistics :-

Descriptive Statistics can be define 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

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

② 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 in non-numerical form.

OR

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

③ ⇒ Random statistics :-

A random variable is a numerical description of the outcome of a statistical experiment. A random variable that may assume only a finite number or an infinite sequence of values is said to be discrete, one that may assume any value in some interval on the real number line is said to be continuous.

OR

⇒ The fields of mathematics, probability and statistics use formal definitions of randomness. In statistics, a random variable is an assignment of a

numerical value to each possible outcome of an event space. this association facilitates the identification and the calculation of probabilities of the event.

4) Sources of Primary Data:-

- ① Direct personal investigation.
- ② Indirect investigation
- ③ Interview method
- ④ collection through local sources
- ⑤ collection through enumerators.
- ⑥ Questioner method
- ⑦ computer interview method.

5) Nominal scale:-

It can be define as "The classification of the observation into mutually exclusive qualitative classes is said to be ~~no~~ nominal scale"

E.g

- (i) students are classified as male and

Female. we may use number 1 and 2

(ii) Rainfall may be classified as heavy, moderate and light. we may use number 1, 2 and 3

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