

Q1 (a)

(1)

(i) Grouped frequency distribution :-

By scanning the data, we find that the largest number of baby born is "10" and the smallest number is "0" so that the range is

$$\begin{aligned} \text{Range} &= \text{largest value} - \text{smallest value} \\ &= 10 - 0 \\ &= \underline{\underline{10}} \end{aligned}$$

Suppose we take "6" class of equal size, so width of equal class interval would be

$$= \frac{10}{6} \Rightarrow 1.66 \Rightarrow \underline{\underline{2}}$$

Frequency distribution of Number of children born

class	class boundaries	Tally	Frequency
0-1	-0.5 - 1.5		5
2-3	1.5 - 3.5		22
4-5	3.5 - 5.5		12
6-7	5.5 - 7.5		7
8-9	7.5 - 9.5		3
10-11	9.5 - 11.5		1
			50

i) Ungrouped frequency distribution:-

By scanning the data, we find that the number of children born is a discrete variables and the range is small, so that the data can be conveniently sorted by taking the values of classes as 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. The frequency distribution then construct as;

Number of children born	Tally	Frequency (f)
0		1
1		4
2		8
3		14
4		7
5		5
6		4
7		3
8		2
9		1
10		1
		50

Q1(b) Median for grouped data:-

(13)

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

l = lower class boundary

n = class interval

f = frequency

Putting the values

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

$$\text{low class boundary} = 1.5$$

$$\text{upper " " " } = 3.5$$

$$\text{class boundary } h = 3.5 - 1.5 = 2$$

$$f = 22$$

$$c = 5$$

Put the values

$$= 1.5 + \frac{2}{22} (25 - 5)$$

$$= 1.5 + \frac{20}{11}$$

$$= 1.5 + 1.82$$

Median = (3.32) grouped data

*1) Median of ungrouped data :-

(4)

Arrange data in ascending order

0 1 1 1 1 2 2 2 2 2 2 3 3 3 3 3 3 3 3

3 3 3 4 4 4 4 4 5 5 5 5 6 6 6 6 7 7 7 8 8 9

10.

$$\text{Median} = \frac{n}{2}$$

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

$$= 25^{\text{th}} \text{ value} = 3$$

*2) Mode of ungrouped data :-

Maximum number of the ungrouped data is called mode.

Mode = 3 → which is used 14 times.

*3) Mode of ungrouped data :-

$$\text{Formula} = l + \frac{f_m - f_o}{2f_m - f_1 - f_1} \times h$$

$$= 1.5 + \frac{22 - 5}{2(22) - 12 - 5} \times 2$$

$$= 1.5 + \frac{17}{27} \times 2$$

$$\text{Mode} = 2.76$$

Q2)

(5)

Ans):

Classes	classes 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
		$\Sigma = 50$	

+1) Quartiles:-

(6)

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

12.5 lies in 5-9 class boundary So,

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

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

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

$$= 5 + .30 (9.5)$$

$$Q_1 = \mathbf{7.85}$$

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

25 lies in 13-17 class boundary So,

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

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

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

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

$$= 13 + 1.2$$

$$Q_2 = \mathbf{14.2}$$

$$Q_3 = \frac{3n}{4} \Rightarrow \frac{3 \times 50}{4} \Rightarrow 37.5 \quad 17$$

37.5 lies in 21-25 C.B So,

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

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

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

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

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

$$= 21 + 0.67$$

$$Q_3 = 21.67$$

+) Deciles:-

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

5 lies in 5-9 C.B

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

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

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

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

$$= 5 + 0.61$$

$$D_1 = 5.61$$

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

10 lies in 5-9 hence

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

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

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

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

$$D_2 = 5 + 2.15$$

$$D_2 = 7.15$$

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

19)

15 lies in 5-19 hence c.B

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

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

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

$$= 5 + 0.307 (12)$$

$$= 5 + 3.69$$

$$D_3 = 8.69$$

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

20 lies in 9-13 c.B

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

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

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

$$D_4 = 9 + 2.67$$

$$D_4 = 11.67$$

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

25 lies in 13-17 c.B

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

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

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

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

$$D_5 = 14.2$$

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

30 lies in 13-17 c.B

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

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

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

(11)

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

$$= 13 + 3.2$$

$$D_6 = 16.2$$

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

35 lies in 17-21 class

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

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

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

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

$$D_7 = 17 + 2.4$$

$$D_7 = 19.4$$

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

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40 lies in 21-25 c.B

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

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

$$D_8 = 21 + \frac{4}{3} (40 - 37)$$

$$D_8 = 21 + \frac{4}{3} (3)$$

$$D_8 = 21 + 4$$

$$D_8 = 25$$

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

45 lies in 25-29 c.B

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

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

$$D_9 = 25 + \frac{4}{5} (45 - 40)$$

$$D_9 = 25 + 4$$

$$D_9 = 29$$

$$D_{10} = \frac{10n}{10} = \frac{10 \times 50}{10} = 50$$

S_0 lies in 33 - 37 c.B

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

$$D_{10} = 33 + \frac{4}{2} \left(\frac{10 \times 50}{10} - 50 \right)$$

$$D_{10} = 33 + \frac{4}{2} (50 - 50)$$

$$D_{10} = 33 + \frac{4}{2} (0)$$

$$D_{10} = 33 + 0$$

$$D_{10} = 33$$

Q3) Define the following

(14)

1) Random Statistics :-

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

2) Inferential statistics :-

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

*) By using inferential statistics we draw inference about the characteristics of related problems in our inference gives non-numerical results.

3) 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 data in numerical form is called descriptive statistics.

OR

"Descriptive Statistics is concerned with the summarization and describing a body of data.

4) Source of Primary data:-

- 1) Direct personal investigation.
- 2) Indirect investigation.
- 3) Interview method.
- 4) collection through Enumerators.
- 5) Questioner method
- 6) collection through local sources
- 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 nominal scale.

E.g. :-

- 1) Students are classified as male and female, we may use number 1 and 2.
- 2) Rainfall may be classified as heavy, moderate and light, we may used number 1, 2 and 3.

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