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Subject :- Probability And Statistics

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Ans : 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:

$$\text{Range} = \text{Largest value} - \text{Smallest value}$$

$$= 10 - 0$$

$$= 10$$

Suppose we take "6" class of equal size

So width of equal classes interval

$$\text{would be } 10/6 = 1.66 \text{ --- (2)}$$

Class	Class Boundary	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

Ungrouped frequency Distribution: -

By Scanning the data, But we find the number of children born, is a discrete variable 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 classes of the frequency distribution is then constructed as:

Number of children: Born	Tally	Frequency
0		1
1		4
2		8
3		14
4		7
5		5
6		4
7		3
8		2
9		1
10		1
		50

Median for group data:-

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

$l$  = lower Class boundary

$h$  = Class interval

$f$  = frequency

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

low Class boundary = 1.5

upper " " = 3.5

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

$$f = 22$$

$$c = 5$$

Putt the value.

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

$$= 1.5 + \frac{2}{22} (20)$$

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

$$= 1.5 + 1.82$$

$$\text{Median} = \boxed{3.32} \quad (\text{grouped data})$$

Median of ungrouped data:-

Arrange data in Ascending order:-

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

$$\begin{aligned} \text{Median} &= \frac{n}{2} \\ &= \frac{50}{2} \end{aligned}$$

$$\boxed{\text{Median} = 25^{\text{th}} \text{ value}}$$

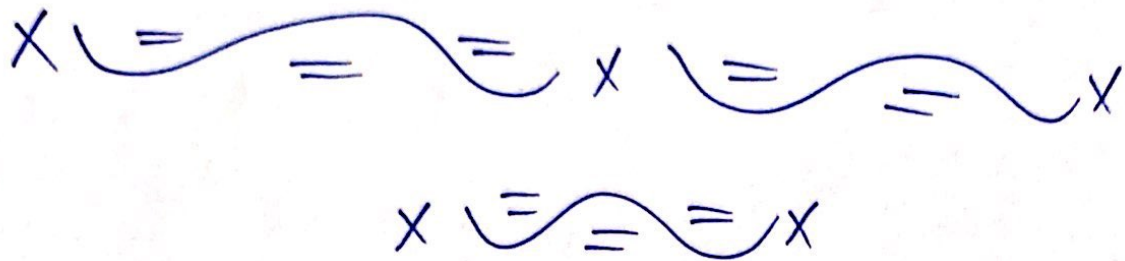
Mode of group data

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

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

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

$$\text{Mode} = 2.76$$





Q No 2 Calculate Quartiles And Deciles:-

(Given) Class	$x$	(Given) $f$	$Cf$
2-4	3	3	3
6-8	7	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

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

∴ n=50

12.5 lies in 5-9 class boundary

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

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

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

$$= 5 + 0.30 (9.5)$$

$$Q_1 = 7.85$$

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

$$Q_2 = 25$$

25 lies in 13-17 class boundary

$$\text{So } Q_2 = l + \frac{h}{f} \left( \frac{2n}{4} - c \right) \text{ --- (1)}$$

l=13, h=4, f=10, c=22

Putting these value in eq (1)

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

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

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

$$= 13 + 1.2$$

$$\boxed{Q_2 = 14.2}$$

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

37.5 lies in 21-25 class boundary

So

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

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

$$= 21 + 0.67$$

$$\boxed{Q_3 = 21.67}$$

To find Deciles:-

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(11)

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

4 lies in 5-9 class boundary

Hence

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

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

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

$$= 5 + 0.61$$

$$\boxed{D_1 = 5.61}$$

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

10 lies in 5-9

Hence

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

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

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

$$D_2 = 5 + 2.15$$

$$\boxed{D_2 = 7.15}$$

$$D_3 = \frac{3n}{10} \Rightarrow \frac{3 \times 50}{10} \Rightarrow 15 \quad 7839 \quad (12)$$

15 lies in 5-9 class boundary

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

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

$$\textcircled{B} D_3 = 5 + 0.307(12)$$

$$D_3 = 5 + 3.69$$

$$\boxed{D_3 = 8.69}$$

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

20 lies in 9-13 class boundary

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

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

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

$$D_4 = 9 + 2.67$$

$$\boxed{D_4 = 11.67}$$

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

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25 lies in 13-17 class boundary

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

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

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

$$\boxed{D_5 = 14.2}$$

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

30 lies in 13-17 class boundary

Hence

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

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

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

$$\boxed{D_6 = 16.2}$$

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

35 lies in 17-21 class

Hence

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

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

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

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

$$= 17 + 2.4$$

$$\boxed{D_7 = 19.4}$$

$$D_8 = \frac{3+50}{10} = 40$$

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(15)

40 lies in 21-25 class boundary

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

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

$$= 21 + 4$$

$$\boxed{D_8 = 25}$$

$$D_9 = \frac{9+50}{10} = 45$$

45 lies in 25-29 class boundary

Hence

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

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

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

$$D_9 = 25 + 4$$

$$\boxed{D_9 = 29}$$





QNo3

Ans:-

(a)

### Random Statistics:-

In Statistics a Random Variable is an assignment of numerical value to each possible outcome of a event Space. This association facilitated the identification and the calculation of Probability of the events.

(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 in non-numerical form.

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

## (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 in numerical form is called descriptive statistics.

OR:

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

(d) 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.

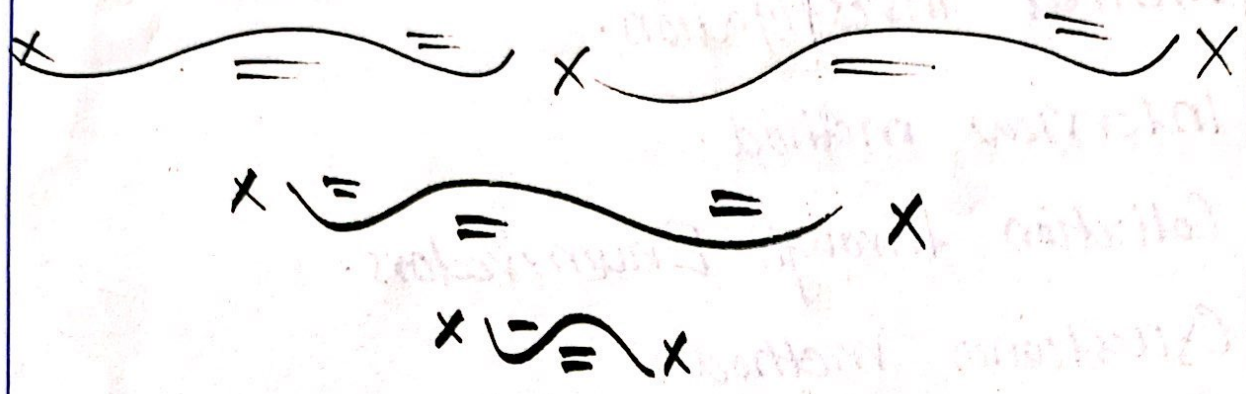
(e) Nominal Scale:-

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



Nominal Scale

It can be defined as the classification of the observations into mutually exclusive qualitative classes. It is the lowest level of measurement.

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