

Name

Sajid Saleem

ID#

7793

Subject

Probability & Statistics

Submitted to

Sir Anwar Shamim

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Ans  
(1)

1) Group frequency Distribution

By Scanning the data we find that largest number of baby born is "10" & the smallest number of baby is "0" So that the range is

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

Suppose we take 6 class of equal size

So width of equal class interval would be  $10/6 = 1.66 \Rightarrow \textcircled{d}$

Frequency Distribution of Number of children <sup>born</sup>

Class	Class Boundaries	Tally	Frequency
0-1	-0.5 - 1.5		5
2-3	1.5 - 3.5		22
4-5	3.5 - 7.5		7
8-9	7.5 - 9.5		3
10-11	9.5 - 11.5		1
			<u>50</u>

$$p=2$$

25/10

## 1) Ungroup Frequency Distribution

By Scanning the data we find that the number of children born is a discrete variable & the range is small, so that the data can be converted as sorted by taking the values of class

as 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 the frequency distribution is then constructed 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

$$p=3$$

b)

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

Putting the values

$$\frac{n}{2} \text{ th term} \quad \frac{50}{2} = 5$$

Lower class boundary 1.5

Upper class boundary 3.5

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

$$f = 22$$

$$c = 5$$

Put the values

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

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

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$$p = 4$$

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

$$= 1.5 + 1.82$$

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

Median of Ungroup data.

Arrange the 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 3 3  
4 4 4 4 4 4 5 5 5 5 5 6 6 6 6  
7 7 7 8 8 9 10

$$\text{Median} = \frac{15}{2} \Rightarrow \frac{50}{2}$$

$$\text{Median} = 25^{\text{th}} \text{ Value} = \textcircled{3}$$

$$p=5$$

## Mode of Ungroup data

Maximum number of the Ungroup data is called mode

Mode = 3  $\rightarrow$  which is used 14 times

## Mode of group data

Formula

$$\frac{l + f_m - f_0}{2f_m - f_1 - f_0} \times h$$



$$\frac{1.5 + (22 - 5)}{2(22) - (12.5 - 5)}$$

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

$$\text{Mode} = 2.76$$

$$P = 6$$

A

2)	Class	Class bound	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

$$\Sigma = 50$$

$$p = 7$$

b

## Quartiles

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

12.5 lies in 5-9 class boundary  
So,

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

$$Q_1 = 7.85$$

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

25 lies in 13-17 class boundary  
so

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



$$p=8$$

c

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

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

$$Q_2 = 14.2$$

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

37.5 lies in 21-25 class boundary

So

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

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

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

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

$$Q_3 = 21.67$$

Deciles

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

5 lies in 5-9 class boundary

hence

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

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

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

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

$$\boxed{D_1 = 5.61}$$

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

10 lies in 5-9

hence

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

$$p = 10$$

2

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

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

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

$$D_2 = 5 + 2.15$$

$$D_2 = 7.15$$

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

15 lies in 5-9 class boundary

$$\text{Hence } D_3 = 5 + \frac{h}{f} \left( \frac{3n}{10} - c \right)$$

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

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

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

$$D_3 = 8.69$$

$$P = 11$$

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

20 lies in 9-13 class boundary

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

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

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

$$D_4 = 9 + 2.67$$

$$\boxed{D_4 = 11.67}$$

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

25 lies in 13-17 class boundary

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

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

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

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

$$D_5 = 14.2$$

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

30 lies in 13-17 class boundary  
hence

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

$$D_6 = 13 + \frac{4}{10} \left( \frac{6 \times 50}{10} - 22 \right)$$

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

$$D_6 = 16.2$$

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

35 lies in 17-21 class

hence

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

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

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

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

$$\boxed{D_7 = 19.4}$$

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

40 lies in 21-25 class boundary

hence

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

$$= 21 + \frac{4}{3} \left( \frac{8 \times 50.37}{10} \right)$$

$$= 21 + \frac{4}{3} (40.37)$$

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

$$\boxed{D_8 = 25}$$

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

45 lies in 25-29 class boundary

hence

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

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

$$p=15 \quad 5$$

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

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

$$Dq = 25 + 4$$

$$Dq = 29$$



③

Ans

# INFERENTIAL STATISTICS

Inferential Statistics deals with procedures for making inferences about the characteristics that describe the large group of data or the whole, called the Population, from the knowledge derived from only part of data, known as Sample. This area includes the estimation of Population parameters & testing of statistical hypothesis.

This phase of statistics is based on probability theory as the inferences which are made on the basis of sample evidence, cannot be absolutely certain.

# DESCRIPTIVE STATISTICS

Descriptive Statistics is that branch of Statistics which deals with concept & methods concern with summarization & description of the important aspects of numerical data.

This area of study consists of the condensation of data, their graphical display & the computation of a few numerical quantities that provide information about the centre of the data & indicate the spread of the observation.

## NOMINAL SCALE

The classification or grouping of the observation into mutually exclusive qualitative categories or class is said to constitute a nominal scale.

For Example:-

Students are classified as male & female. Number 1 & 2 may also be used to identify these two categories of the given scale.

Similarly Rainfall may be classified as heavy, moderate & light.

We may use number 1, 2 & 3 to denote the three classes of rainfall.

## Sources of Primary Data

### 1) Personal Investigation:-

The research conducts the experiment or survey himself & collect data from it.

### 2) Through Investigation:-

The trained investigators are employed to collect the required data.

### 3) Through Questionnaire:-

The require information is obtain by sending a questionnaire to the selected individuals who fill in the questionnaire & return it to the investigator.

### 4) Through local Sources

### 5) Through Telephone

### 6) Through Internet

### 7) Through local Sources

## Random Statistics:-

In the common parlance, randomness is the apparent lack of pattern or predictability in events.

A random sequence of events, symbols or steps often has no order & does not follow an intelligible pattern or combination.