

NAME "ZARAK REHMAN"

SECTION "C"

ID # 7666

SUBJECT "PROBABILITY
AND
STATISTICS"

SIR "ANWAR SHAMIM"

(1)

QUESTION: 1 (a)

Construct a grouped and ungrouped frequency distribution of these data?

i GROUPED FREQUENCY DISTRIBUTION:

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

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

Suppose we take "6" classes of equal size

So, width of equal class interval would be $10/6 = 1.66$

(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

ii UNGROUPED FREQUENCY DISTRIBUTION

By scanning the data, we find that 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 frequency distribution is then constructed as:

num of children	Tally	frequency
1		1
2		4
3		5
4		5
5		5
6		5
7		5
8		4
9		2
10		1
		50



QUESTION: 1 (b)

Find mode and median from grouped and ungrouped frequency distribution?

MEDIAN FOR GROUPED DATA:

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

l = lower class boundary

h = class interval

f = frequency

Putting value

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

low class boundary = 15

Upper = 3.5

class boundary = $3.5 - 1.05 = 2$

$$f = 22$$

$$c = 5$$

Putting values

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

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

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

$$= 1.5 + 1.82$$

median = 3.32 (grouped data)

MEDIAN OF UNGROUPED DATA:

Arrange data in ascending order

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

median $\frac{n}{2}$

6

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

$$= 25 \text{ value}$$

mode of ungrouped data

Max frequency num of the ungrouped data is ~~called~~ called mode

mode = 3 \rightarrow which is used 14 time

mode of grouped data

$$\text{formula } \frac{l + fm - f_0}{2fm - f_1 - f_0} \times h$$

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

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

$$\text{mode} = 276$$

(7)

QUESTION: 2 (a):

The following is the distribution of wages per thousand employees in a certain factory.

class	class boundary	f	C.f
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

Quartiles :-

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

12.5 lies in 5-9 class boundary

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

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

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

$$= 7.85$$

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

25 lies in 13-17 class boundary

So

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

9

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

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

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

$$= 13 + 1.2$$

~~$$Q_2 = 13 + 1.2$$~~

$$Q_2 = 14.2$$

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

37.5 lies in 21-25 class boundary

So \Rightarrow

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

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

(10)

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

$$= 21 + 0.67$$

$$Q_3 = 21.67$$

Deciles

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

4 lies in 5-9 classes boundary

Hence

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

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

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

$$= 5 + 0.61$$

(11)

$$D_1 = 5.61$$

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

10 lies in 5-9

Hence

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

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

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

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

$$D_2 = 5 + 2.15$$

$$D_2 = 7.15$$

(12)

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

15 lies in 5-9 class boundary

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

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

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

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

$$D_3 = 5 + 3.69$$

$$D_3 = 8.69$$

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

20 lies in 9-13 class boundary

(13)

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

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

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

$$D_4 = 9 + 2.67$$

$$D_4 = 11.67$$

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

25 lies in 13-17 class boundary

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

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

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

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

$$= 14.2$$

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

30 lies in 13-17 class boundary

Hence

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

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

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

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

$$= 13 + 3.2$$

15

$$= 16.2$$

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

35 lies in 17-21 class

Hence

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

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

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

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

$$= 17 + 2.4$$

$$= 19.4$$

(10)

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

40 lies in 21-25 class boundary

Hence

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

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

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

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

$$= 21+4$$

$$D_8 = 25.$$

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

(17)

45 lies in 25-29 class boundary

Hence

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

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

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

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

$$D_9 = 25 + 4$$

$$D_9 = 29$$

Question :- 3 :-

Define the following?

1. INFERENTIAL STATISTICS:

- Inferential statistics is the 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!

2. DESCRIPTIVE STATISTICS:-

Descriptive statistics can be defined as:

- The collection of data, analysis of data, summarization of data, tabulation of data at last we get a precise

Result in numerical form is called descriptive data.

OR.

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

3 SOURCES 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.

4 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:

- 1 Students are classified as male and female we may use one and two.
- 2 Rain fall may be classified as heavy, moderate, and light. we may use number one two and three.

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

5 RANDOM STATISTICS:-

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

QUESTION: 2 b)

Calculate the Quartiles & Decile?
 (Given) (Given)

Class	n	f	f cf
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

$$Q_1 = \left[\frac{n}{4} \right]^{\text{th}} \quad \therefore n = 50$$

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

So, the considered class is (6-8)

$$L = 6, \quad h = 2, \quad C.F = 3, \quad n = 50$$

As we know :-

$$Q_1 = L + \frac{h}{7} \left[\frac{n}{4} - C.F \right]$$

Putting values

$$Q_1 = 6 + \frac{2}{7} \left[\frac{50}{4} - 3 \right]$$

$$Q_1 = 12.33.$$
