

<b><i>Name</i></b>	<b><i>M Mamoon</i></b>
<b><i>ID</i></b>	<b><i>7690</i></b>
<b><i>Sec</i></b>	<b><i>c</i></b>
<b><i>Dep</i></b>	<b><i>civil engineering</i></b>
<b><i>Subject</i></b>	<b><i>Probability</i></b>
<b><i>Assignment</i></b>	<b><i>Mid term</i></b>
<b><i>Semester</i></b>	<b><i>8<sup>th</sup></i></b>
<b><i>Submitted to</i></b>	<b><i>Anwar shamim</i></b>

# Question No 1: <sup>①</sup>

Solution: (Grouped frequency Distribution)

$$\text{Largest value} = 10$$

$$\text{Smallest value} = 0$$

$$\text{Range} = 10 - 0 = 10$$

We decide to take 5 classes of equal

$$h = \frac{10}{5} = 2 \text{ say } 2.1$$

$$h = 2.1$$

Class (width)	Class boundaries	Mid Point	Tally	Frequency
0-2	-0.05 - 2.05	1		13
2.1 - 4.1	2.05 - 4.05	3.1		21
4.2 - 6.2	4.15 - 6.25	5.2		9
6.3 - 8.3	6.25 - 8.35	8.3		5
8.4 - 10.4	8.35 - 10.45	9.4		2
Total				50

(2)

C. frequency . . .

13

34

43

48

50.

On group frequency <sup>(3)</sup> distribution.

Number of children	Tally	frequency	C. frequency.
0		1	1
1		4	5
2	<del>    </del>	8	13
3	<del>    </del> <del>    </del>	14	27
4	<del>    </del>	7	34
5	<del>    </del>	5	39
6		4	43
7		3	46
8		2	48
9		1	49
10		1	50
Total		50	

(4)

Grouped frequency distribution.

Mode :

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

$$L = 2.05$$

$$f_m = 21$$

$$f_1 = 13$$

$$f_2 = 9$$

$$h = 2.1$$

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

$$M = 2.89 \approx 3$$

$$\text{Mode} = 3.$$

(5)

Median.

First we check  $\frac{n}{2}$

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

So

$$l = 2.05$$

$$h = 2.1$$

$$f = 21$$

$$c = 13$$

Median:

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

Median = 3.

(6)

Ungrouped frequency distribution.

Mode:

In Ungrouped data the highest frequency is 14 so the number of childrens in front of 14 is 3

Thus

$$\text{Mode} = 3$$

Median:

Our data is even as it is 50

So

$$\begin{aligned}\text{Median} &= \frac{n}{2} \\ &= \frac{50}{2} \\ &= \underline{\underline{25}}\end{aligned}$$

Question :- 2

①

Classes	Class 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

$\Sigma = 50$

(i)

Quartiles :-

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

12.5 lies in 5-9 class boundary

So,

$$\begin{aligned} Q_1 &= l + \frac{h}{f} \left( \frac{n}{4} - c \right) \\ &= 5 + \frac{2}{13} \left( \frac{50}{4} - 3 \right) \end{aligned}$$



$$Q_1 = 50 + 0.30 (12.5 - 3)$$

(2)

$$Q_1 = 50 + 0.30 (9.5)$$

$$Q_1 = 7.45$$

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

25 lies in 13-7 class boundary

So,

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

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

$$= 13 + \frac{2}{10} (25 - 22)$$

$$= 13 + \frac{2}{10} (3)$$

$$= 13 + 1.5$$

$$Q_2 = 14.5$$

$$Q_3 = \frac{3n}{4} = \frac{3 \times 50}{4} = 37.5 \quad (3)$$

37.5 lies in 21-25 class boundary

So,

$$Q_3 = l + \frac{h}{f} \left( \frac{3n}{4} - 37 \right)$$

$$= 21 + \frac{2}{3} \left( \frac{3 \times 50}{4} - 37 \right)$$

$$= 21 + \frac{2}{3} (37.5 - 35)$$

$$= 21 + \frac{2}{3} (0.5)$$

$$= 21 + 0.33$$

$$Q_3 = 21.33$$

Deciles:-

(4)

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

4 lies in 5-9 class boundary

Hence,

$$\begin{aligned} D_1 &= l + \frac{h}{f} \left( \frac{n}{10} - c \right) \\ &= 5 + \frac{2}{13} \left( \frac{50}{10} - 3 \right) \\ &= 5 + \frac{2}{13} (5 - 3) \\ &= 5 + 0.15 (2) \\ &= 5 + 0.30 \end{aligned}$$

$$D_1 = 5.30$$

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

10 lies in 5-9

Hence,

(5)

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

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

$$D_2 = 5 + 0.15 (10 - 3)$$

$$D_2 = 5 + 0.15(7)$$

$$\boxed{D_2 = 6.07}$$

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

15 lies in 5-9 class boundary

Hence

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

$$D_3 = 5 + \frac{2}{13} \left( \frac{3 \times 50}{10} - 3 \right)$$

$$D_3 = 5 + 0.15 (12)$$

$$D_3 = 6.8$$

(6)

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

20 lies in 9-13 class boundary

$$D_4 = 9 + \frac{2}{6} (20 - 16)$$

$$D_4 = 9 + 0.33(4)$$

$$D_4 = 10.32$$

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

25 lies in 13-17 class boundary

Hence

$$D_5 = 13 + \frac{2}{10} \left( \frac{5 \times 50}{10} - 22 \right)$$

$$D_5 = 13 + 0.2(25 - 22)$$

$$D_5 = 13 + 0.6 = 13.6$$

(7)

$$D_6 = \frac{6n}{10}$$

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

30 lies in 13-17 class boundary

Hence

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

$$= 13 + \frac{2}{10} \left( \frac{6 \times 50}{10} - 22 \right)$$

$$= 13 + \frac{2}{10} (30 - 22)$$

$$= 13 + 0.2 (8)$$

$$= 13 + 1.6$$

$$D_6 = 14.6$$

8

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

35 lies in 17-21 class boundary

Hence

$$\begin{aligned} D_7 &= l + \frac{h}{f} \left( \frac{7n}{10} - c \right) \\ &= 17 + \frac{2}{5} \left( \frac{7 \times 50}{10} - 32 \right) \\ &= 17 + \frac{2}{5} (3) \\ &= 17 + 1.2 \end{aligned}$$

$$D_7 = 18.2$$

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

40 lies in 21-25 class boundary

Hence,

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

$$D_8 = 21 + \frac{2}{3} \left( \frac{8 \times 50}{10} - 37 \right) \quad (9)$$

$$D_8 = 21 + \frac{2}{3} (40 - 37)$$

$$= 21 + 0.66 (3)$$

$$= 21 + 1.98$$

$$\boxed{D_8 = 22.98}$$

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

45 lies in 25-29 class boundary

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

$$D_9 = 25 + \frac{2}{5} \left( \frac{9 \times 50}{10} - 20 \right)$$

$$D_9 = 25 + \frac{2}{5} (45 - 20)$$

$$D_9 = 25 + 0.4(25)$$

$$\boxed{D_9 = 29}$$





### Question No : 3

Define the following.

(a)

#### **Random Statistics**

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 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.

OR

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

OR

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

(c)

### **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 result in numerical form is called descriptive statistics  
OR
- Descriptive statistics is concerned with the summarization and describing a body of data  
OR
- Descriptive statistics is that branch of statistics which deals with concepts and methods concerned with summarization and description of important aspect of numerical data.

(d)

## **Sources 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 define 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 numbers when they are used, only identify the categories. In this scale no particular order is used

