

Name = Aazaz Ahmad
I'D = 7705
Sec = B
Subject = Probability and Statistics
Submitted to = Engr Anwar Shameem
Date 19/August 2020

Q.No 1

(1)

The following figures gives the number of children born of 50 women

Sol. (Grouped frequency Distribution)

Largest value = 10

Smallest = 0

Range = $10 - 0 = 10$

we decide to take 5 classes of equal size

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

$$h = 2.1$$

Class weight	Class boundaries	Mid point	Tally	Frequency
0 - 2	-0.05 - 2.05	1		13
2.1 - 4.1	2.05 - 4.15	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
				50

C. Frequency

13
34
43
48
50

Underground frequency distribution: (3)

Number of children	Tally	Frequency	C.F
0		1	1
1		4	5
2	##	8	13
3	##	8	27
4	##	7	34
5		5	39
6	##	4	43
7		3	46
8		2	48
9		1	49
10		1	50
Total		50	

(b)

(4)

Grouped data frequency
distribution

Mode

$$M = l + \frac{f_m - f_1}{(f_m - f_1) + (f_m - f_2)} \times h \quad \text{--- (1)}$$

$$l = 2.05$$

$$f_m = 21$$

$$f_1 = 13$$

$$f_2 = 9$$

$$h = 2.1$$

⑤

$$M_1 = 2.05 + \frac{(21-13)}{(21-13)+(21-9)} \times 2.1$$

$$M_1 = 2.89 \approx 3$$

$$\text{Mode} = 3$$

Median

⑧

First we check $\frac{22}{2}$

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

So:

$$l = 2.05$$

$$h = 2.1$$

$$f = 21$$

$$C = 13$$

⑦

$$\text{Median} = 1 + \frac{h}{f} \left(\frac{h}{2} - c \right)$$

$$= 2.05 + \frac{2.1}{21} \left(\frac{50}{2} - 13 \right)$$

$$= 3.25 \approx 3$$

$$\text{Median} = 3$$

Ungrouped frequency distribution ⁽⁸⁾

Mode

In ungrouped data the highest frequency is 14. So the number of children in front of 14 is

3

$$\text{Mode} = 3$$

Median

our data is even as it is 50

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

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

$$= 25$$

Q. NO (02)

(9)

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

Classes	2-4	6-8	10-12	14-16	18-20	22-24	26-28	30-32	34-36
F.	3	13	6	10	5	3	5	3	2

Calculate all Quartiles and Deciles

(10)

Classes	Class boundaries	frequency	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 48
34-36	33-37	2	50

$$\Sigma = 50$$

(11)

Quar tiles

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

So 12.5 dies in 5-9 class boundary

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

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

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

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

$$= 7.85$$

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

25 dies in 13-17 class boundary

So

(12)

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

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

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

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

$$= 13 + 1.2$$

$$Q_2 = 14.2$$

(13)

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

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

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

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

$$= 21 + 0.67$$

$$Q_3 = 21.67$$

(14)

Decides

$$D_1 = \frac{h}{f} = 7 \frac{50}{10} = 4$$

4 Dies in 5-9 (Class boundary)

Hence

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

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

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

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

$$= 5 + 0.61$$

$$D_1 = 5.61$$

(15)

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

10 lies in 5-9

Hence

$$D_2 = 5 + \frac{h}{f} \left(\frac{2h - c}{10} \right)$$

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

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

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

$$D_2 = 5 + 2.15$$

$$D_2 = 7.15$$

(16)

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

15 lies in 5-a class
boundary

Hence $D_3 = Q + \frac{h}{f} \left(\frac{3n}{10} - C \right)$

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

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

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

$$D_3 = 5 + 3.69$$

$$D_3 = 8.69$$

(17)

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

20 lies in 9-13 (class boundary)

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

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

$$D_4 = 9 + 2.67$$

$$D_4 = 11.67$$

(18)

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

25 lies in 13-17 (class boundary)

Hence

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

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

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

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

$$= 14.2$$

(19)

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

30 lies in 13-17 (class boundary)

Hence

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

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

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

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

$$= 13 + 3.2$$

$$= 16.2$$

$$D7 = \frac{7n}{10} = 7 \frac{7 \times 50}{10} = 35$$

35 lies in 17-21 class

Hence

$$D7 = l + \frac{h}{f} \left(\frac{7n}{10} - C \right)$$

$$D7 = 17 + \frac{4}{5} \left(\frac{7 \times 50}{10} - 32 \right)$$

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

$$= 17 + 2.4$$

$$= 19.4$$

$$D_8 = \frac{8n}{10} \Rightarrow \frac{8 \times 50}{10} = 740$$

40 dies in 21-25 (class boundary)

Hence

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

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

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

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

$$= 21 + 4$$

$$D_8 = 25$$

(22)

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

45 lies in 25-29 class boundary

Hence

$$D_9 = \cancel{a} + h \left[1 + \frac{h}{f} \left(\frac{an}{10} - C \right) \right]$$

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

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

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

$$D_9 = 25 + 4$$

$$D_9 = 29$$

Q.3 No

Q3

Define the following

(a) Random Statistics

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

(b) Inferential Statistics

By using inferential statistics we draw inference about the characteristics of related problem & our ~~inference~~ inference gives non-numerical result.

241 Descriptive Statistics:

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.

Sources of primary data

- 1) Direct personal investigation
- 2) Indirect investigation
- 3) Interview method
- 4) Collection through Enumerators

25

5

Questioner method

6

Collection through local
sources

7

Computer interview
method

Nominal Scale:

It can be define

as the classification of the observation
into mutually exclusive qualitative
classes is said to be nominal scale

26

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 use number 1, 2 and 3