

Day: MTWTF S

Date: / /

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Subject

Probability & Statistic

Submitted To

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Date

19-Aug-2020

Q1

Solution (Geographical Frequency Distribution)

Largest Value = 10

Smallest $u = 1$

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

We decide to take 5 classes of equal size 2

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

$$h = 2.1$$

Class width	Class boundaries	Mid Point	Tally	Frequency
0-2	-0.05-2.05	1		4
2.1-4.1	2.05-4.15	3.1		4
4.2-6.2	4.15-6.25	5.2		4
6.3-8.3	6.25-8.35	8.3		4
8.4-10.4	8.35-10.45	9.4		2
				20

C-Frequency.

13

34

43

48

50

ungrouped Frequency distribution

Number of children.	Tally	Frequency	C.F
0		1	1
1		4	5
2	 	8	13
3	 	14	27
4	 	7	34
5	 	5	39
6		4	43
7		3	46
8		2	48
9		1	49
10		1	50

50

(b) Grouped data Frequency distribution

Mode

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

$$l = 2.05$$

$$f_m = 21$$

$$f_1 = 13$$

$$f_2 = 9$$

$$h = 2.1$$

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

$$M = 2.89 = 3$$

Mode 3

Median.

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

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

So,

$$l = 2.05$$

$$h = 2.1$$

$$f = 21$$

$$c = 13$$

$$\begin{aligned} \text{Median} &= \frac{l + h}{f} \left(\frac{h - c}{2} \right) \\ &= \frac{2.05 + 2.1}{21} \left(\frac{50 - 12}{2} \right) \\ &= 3.25 = 3 \end{aligned}$$

Median 3

Ungrouped Frequency Distribution

Mode

In Ungrouped data the highest frequency is 12 so the number of children in front of 10 is 3

$$\text{Mode} = 3$$

Median

Our data is even as 14 is 50 so

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

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

$$= 25$$

25th value is equal to 3.

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Q No # 2.

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
F	3	13	6	10	5

22-24	26-28	30-32	34-36
3	5	3	2

Calculate all Quartile & deciles -

classes	c-boundries	Frequency	C-F
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2-4	1-5	3	3
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6-8	5-9	13	16
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10-12	9-13	6	22
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14-16	13-17	10	32
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18-20	17-21	5	37
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22-24	21-25	3	40
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26-28	25-29	5	45
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30-32	29-33	3	48
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34-36	33-37	2	50
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Quartiles.

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

12.5 lies in 5-9 class bound

So

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

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

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

$$= 5 + 30(9.5)$$

$$= 7.85$$

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

25 lies in 13-17 class bound

So

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

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

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

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

$$= 13 + 1.2$$

$$\Phi_2 = 14.2$$

$$\Phi_3 = \frac{3n}{4} \Rightarrow \frac{3 \times 50}{4} = 37.5$$

37.5 lies in 21-25 class boundary

So,

$$\Phi_3 = \frac{l+h}{F} \left(\frac{3h}{4} - C \right)$$

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

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

$$= 21 + 0.67$$

$$\Phi_3 = 21.67.$$

Deciles

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

4 lies in 5-9 class-b

Hence

$$\begin{aligned}
 D_1 &= \frac{l+b}{F} \left(\frac{h}{10} - c \right) \\
 &= \frac{5+4}{13} \left(\frac{50}{10} - 3 \right) \\
 &= \frac{5+4}{13} (5-3) \\
 &= \frac{5+4}{13} (2) \\
 &= 5 + 0.61 \\
 D_1 &= 5.61
 \end{aligned}$$

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

10 lies in 5-9

Hence

$$D_2 = \frac{l+b}{F} \left(\frac{2n}{10} - c \right) \Rightarrow 10$$

10 lies in 5-9

Hence

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

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

$$D_2 = 7.15$$

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

15 lies in 5-9 class boundary

Hence

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

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

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

$$D_3 = 8.69$$

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

20 lies in 9-13 class boundary

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

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

$$D_4 = 11.67$$

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

25 lies in 13-17 class boundary

Hence

$$D_5 = L + \frac{h}{F} \left(\frac{5n}{10} - C \right)$$

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

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

$$= 14.2$$

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

30 lies in 13-17 class boundary

Hence

$$D_6 = L + \frac{h}{F} \left(\frac{6n}{10} - C \right)$$

$$= 13 + \frac{4}{10} \left(\frac{6 \times 30}{10} - 22 \right)$$

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

$$= 16.2$$

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

35 lies in 17-21 class

Hence

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

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

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

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

$$= 17 + 2.4$$

$$= 19.4$$

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

40 lies in 21-25 class boundary

Hence

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

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

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

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

$$= 21 + 4$$

$$D_9 = 25$$

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

45 lies in 25-29 class boundary

$$\text{Hence } D_9 = 25 + \frac{4}{5} (9n - 40)$$

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

$$D_9 = 25 + \frac{4}{5} (450 - 40)$$

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

$$D_9 = 25 + 4$$

$$D_9 = 29$$

Q No 3

Define the following.

① Random Statistics.

The field of mathematics Probability & 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.

② Descriptive Statistics.

Descriptive statistic 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.

* Inferential Statistics.

"Inferential Statistic is the branch of Statistics through which we collect the data, Analysis of data, Summarization of data, Interpretate the data and tabulate the data to get Precise result in non-numerical form.

* Source of Primary data

- Direct Personal Investigation
- Indirect Investigation
- Interview Method
- Collection Through Enumerators
- Questioner Method
- Collection Through Local Sources.
- Computer Interview method.

• 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 number 1 & 2.

(2) Rainfall may be classified as heavy, moderate & light.