

MID TERM

(summer)

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SECTION "B"

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subject Probability & Statistics

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01

7855

Question # 01

Solution:

Largest value = 10

Smallest value = 0

Range = $10 - 0 = 10$

Take 5 classes of equal step size
thus,

$$h = \frac{10}{5} = 2$$

$h = 2$

Class width	Class Boundaries	Mid-point	Tally	Frequency (f)	C.F.
0 — 2	0.5 — 2.5	1.5		13	13
3 — 5	2.5 — 5.5	4	 	25	38
6 — 8	5.5 — 8.5	7		10	48
9 — 11	8.5 — 11.5	10		2	50
Total Σ =				50	

02

7855

Median:

Even number so

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

$$L = 2.5, h = 2, b = 25, cb = 13$$

$$= 1 + \frac{h}{b} (n/2 - c \cdot b)$$

$$= 1 + \frac{2}{25} (25 - 13)$$

$$\text{Median} = 1.96$$

Mode:

$$M = L + \frac{b_m - b_1}{(b_m - b_1) + (b_m - b_2)}$$

$$L = 2.5, b_m = 25, b_1 = 13, b_2 = 10, h = 2$$

$$= 2.5 + \frac{25 - 13}{(25 - 13) + (25 - 10)} \times 2$$

$$M = 3.38$$

03

7855

Un-Grouped

Distribution

Number	Frequency	cumulative Frequency	Tally
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	
Σ	50		

In ungrouped data the highest frequency is 14 thus the number of children corresponding is 3

Thus Mode = 3

Median: Since the data is even

$$\text{thus } \frac{n}{2} = \frac{50}{2}$$

Median = 25

Question # 02

Calculate Quartiles and deciles

(Given) Class	x	(Given) b	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

05 7855

As we know that

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

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

So, the considered class is (6-8)

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

As we know

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

Putting values

$$Q_1 = 6 + \frac{2}{13} \left[\frac{50}{4} - 3 \right]$$

$$Q_1 = 12.33$$

Now $[Q_2]$

$$Q_2 = 2 \left[\frac{n}{4} \right]^{\text{th}}$$

$$Q_2 = 2 \left[\frac{50}{4} \right]^{\text{th}} = 25$$

Qb

7855

putting values in equation:

$$Q_2 = 14 + \frac{2}{10} \left[\frac{2(50)}{4} - 22 \right]$$

$$Q_2 = 14.6$$

now $[Q_3]$

$$Q_3 = 3 \left[\frac{n}{4} \right]^{\text{th}}$$

$$Q_3 = 3 \left[\frac{50}{4} \right]^{\text{th}}$$

$$Q_3 = 37.5$$

now boy decides $[D_1]$

As we know

$$D_1 = \left[\frac{n}{10} \right] \quad \therefore n = 50$$

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

putting values in equation

$$D_1 = 6 + \frac{2}{13} \left[\frac{50}{10} - 3 \right]$$

$$D_1 = 6.30$$

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$[D_2]:$

$$D_2 = 2 \left[\frac{n}{10} \right]$$

$$D_2 = 2 \left[\frac{50}{10} \right]$$

$$D_2 = 10$$

Now putting values

$$D_2 = b + \frac{2}{13} \left[\frac{2(50)}{10} - 3 \right]$$

$$D_2 = 7.07$$

$[D_3]:$

$$D_3 = 3 \left[\frac{n}{10} \right]^{\text{th}}$$

$$D_3 = 3 \left[\frac{50}{10} \right] = 15$$

putting values in equation

$$D_3 = b + \frac{2}{13} \left[\frac{3(50)}{10} - 3 \right]$$

$$D_3 = 7.84$$

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[Du]:

$$D_u = 4 \left[\frac{n}{10} \right]^{\text{th}}$$

$$D_u = 4 \left[\frac{50}{10} \right] = 20$$

put in equation

$$D_u = 10 + \frac{2}{b} \left[\frac{u(50)}{10} - 16 \right]$$

$$D_u = 11.33$$

[Ds]:

$$D_s = 5 \left[\frac{50}{10} \right] = 25$$

Putting values

$$D_s = 14 + \frac{2}{10} \left[\frac{5(50)}{10} - 22 \right]$$

$$D_s = 14.6$$

[Db]:

$$D_b = 6 \left[\frac{n}{10} \right]^{\text{th}} = 6 \left[\frac{50}{10} \right]$$

$$D_b = 30$$

09

7855

Putting values

$$D_6 = 14 + \frac{2}{10} \left[\frac{6(50)}{10} - 22 \right]$$

$$D_6 = 15.6$$

[D7]:

$$D_7 = 7 \left[\frac{n}{10} \right] = 7 \left[\frac{50}{10} \right]$$

$$D_7 = 35$$

Putting values

$$D_7 = 18 + \frac{2}{5} \left[\frac{7(50)}{10} - 32 \right]$$

$$D_7 = 19.2$$

[D8]:

$$D_8 = 8 \left[\frac{n}{10} \right] = 8 \left[\frac{50}{10} \right]$$

$$D_8 = 40$$

Putting values

$$D_8 = 22 + \frac{2}{3} \left[\frac{8(50)}{10} - 37 \right]$$

$$D_8 = 24$$

10 7855

[Da]:

$$Da = 9 \left[\frac{n}{10} \right] = 9 \left[\frac{50}{10} \right] = 45$$

putting values

$$Da = 26 + \frac{2}{5} \left[\frac{9(50)}{10} - 40 \right]$$

$$\boxed{Da = 28}$$

Question # 03

Define the following.

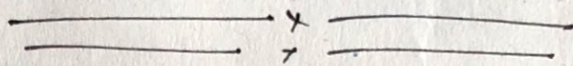
(a) Random Statistics:

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

Randomness is most often used in statistics to signify well defined statistical properties.

(b) Inferential Statistics:

Inferential statistics is a branch of statistics through which we collect the data, analyze the data, summarize the data, interpret the data and tabulate the data to get precise results in non-numerical form.



(c) Descriptive Statistics:

Descriptive statistics can be defined as:

The collection of data, analysis of data, summarization of data, interpretation of data, tabulation of data at least we get a precise result in numerical form is called descriptive statistics.

(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 ~~to~~ 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.

The End