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FACULTY OF ENGINEERING & TECHNOLOGY

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LECTURE- 12

BSc (AG)
2nd Year , IIIrd Sem.
Statistical Methods
AES-213

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Outline of lecture

- Measure of Central Tendency
- Numerical Problems on mean, median & mode
- Type II & Type III
- Suggested Readings & References

Numerical problems based on Mean, Median & Mode

There are three types of numerical problems in mean, median and mode according to the given observations.

- Type I
- Type II
- Type III

We discuss one by one both types.

Numerical problems Type II & Type III

Here, $N/2 = 13.5$.
Number 13.5 in cumulative frequency is 18.
So median = 4

(c) Mode
Here, number 5 has maximum frequency hence,
mode = 5.

Type – III.

Question: Find the mean, Median, Mode of the following data.

Class interval	0 – 10	10-20	20-30	30-40
frequency	2	5	7	10

Answer.

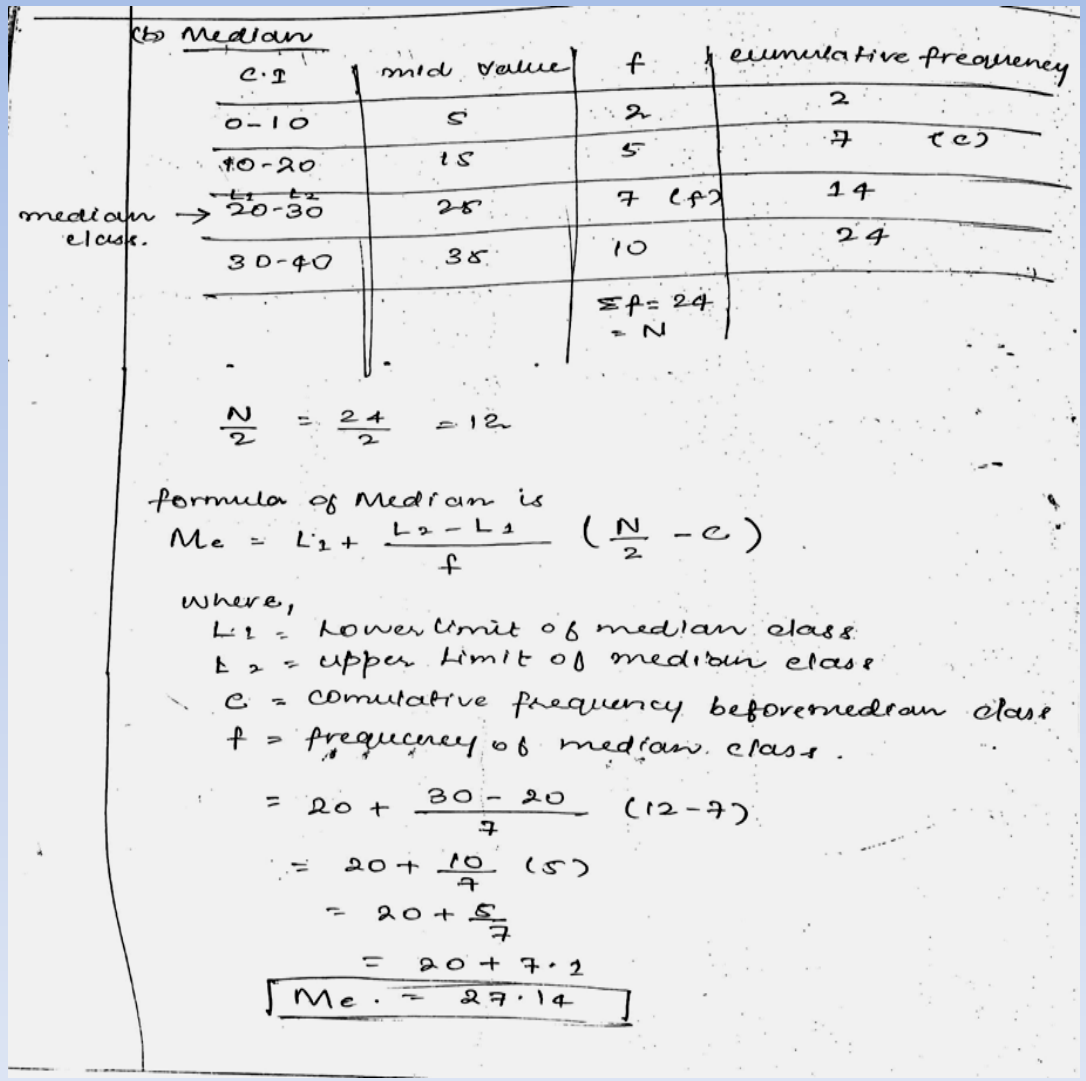
(a) Mean

C.I	Mid values(x)	f	fx
0-10	$\frac{0+10}{2} = 5$	2	10
10-20	$\frac{10+20}{2} = 15$	5	75
20-30	$\frac{20+30}{2} = 25$	7	175
30-40	$\frac{30+40}{2} = 35$	10	350
		24	610

$$\bar{x} = \frac{\Sigma fx}{N} = \frac{610}{24}$$

$$= 25.41$$

Numerical problems Type III



(b) Median

C.I	mid value	f	cumulative frequency
0-10	5	2	2
10-20	15	5	7 (c)
L_1 L_2 20-30 ← median class.	25	7 (f)	14
30-40	35	10	24
		$\Sigma f = 24 = N$	

$\frac{N}{2} = \frac{24}{2} = 12$

formula of Median is

$$Me = L_1 + \frac{L_2 - L_1}{f}\left(\frac{N}{2} - c\right)$$

where,

L_1 = Lower limit of median class

L_2 = upper limit of median class

c = comulative frequency beforemedian class

f = frequency of median class.

$$= 20 + \frac{30 - 20}{7}(12 - 7)$$

$$= 20 + \frac{10}{7}(5)$$

$$= 20 + \frac{5}{7}$$

$$= 20 + 7.1$$

$$\boxed{Me. = 27.14}$$

Numerical problems Type III

(e) Mode

Class interval	5-10	10-20	20-30	30-40
frequency	2	(f_1) 5	(f) 10	(f_2) 7

Here, maximum frequency is 10 so our mode class is 20-30

Mode formula is,

$$= L_1 + \frac{L_2 - L_1}{2f - f_1 - f_2}(f - f_1)$$

where,

f_1 = frequency before mode class

f_2 = frequency after mode class

$$= 20 + \frac{30 - 20}{2 \times 10 - 5 - 7}(10 - 5)$$

$$= 20 + \frac{10}{20 - 5 - 7}(5)$$

$$= 20 + \frac{10}{8}(5)$$

$$= 20 + \frac{50}{8}$$

$$\boxed{M_o = 26.25}$$

Suggested Readings & References

1) Statistical Methods: P.N. Arora, Sumeet Arora & S. Arora; S. Chand & Company Ltd.

2) Fundamental of Mathematical Statistics: S.C. Gupta & V. Kapoor; Sultan Chand & Sons.

3) Statistics: M.R. Spiegel; Schaum's Outline Series, Mc-Graw Hill Publication.

4) Advanced Engineering Mathematics: Erwin Kreyszig; John Wiley & Sons Inc.

5) Elements of Statistics: J.P. Chauhan & S. Kumar; Krishna Publication.

* THANK YOU *