Handwritten Notes

On

Statistics

Statistics

1. Central tendency
2. Dispersion

Central tendency

AM   GM   HM   median   mode

Ex:
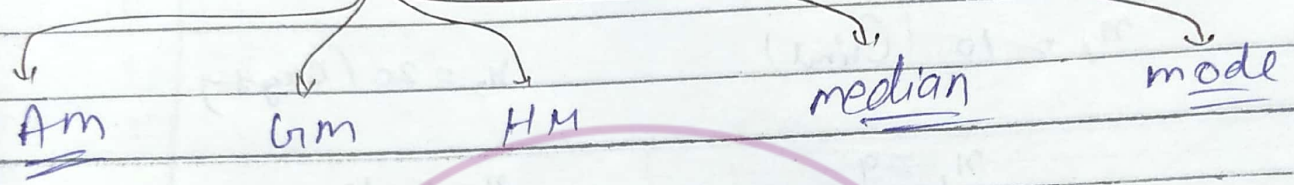
	Mno (x_i)
1	10
2	12
3	18
4	10
5	10
6	12
7	9
8	18
9	12
10	9

$$\bar{x} = \frac{10 + 12 + 18 + 10 + 5 + 12 + 9 + 18 + 12 + 9}{10}$$

$$= 12$$

formula

1 mean $$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

② mean =

x^0	f_i
9	2
10	3
12	3
18	2

$$\bar{x} = \frac{9 \times 2 + 10 \cdot 3 + 12 \cdot 3 + 18 \cdots}{2 + 3 + 3 + 2}$$

$$= \frac{\sum x_i f_i}{\sum f_i}$$

③ weighted mean

$$\bar{x} = \frac{x_1 w_1 + x_2 w_2 + \cdots + x_n w_n}{w_1 + w_2 + \cdots w_n}$$

④ Combined Average :

$$x_1 = 10 \ (\text{Girl}) \qquad\qquad x_2 = 20 \ (\text{Buys})$$

$$n_1 = 9 \qquad\qquad n_2 = 12$$

$$\text{Combined mean} = \frac{n_1 x_1 + n_2 x_2}{n_1 + n_2} = \frac{10 \cdot 9 + 20 \cdot 12}{10 + 2}$$

प्र	उ
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
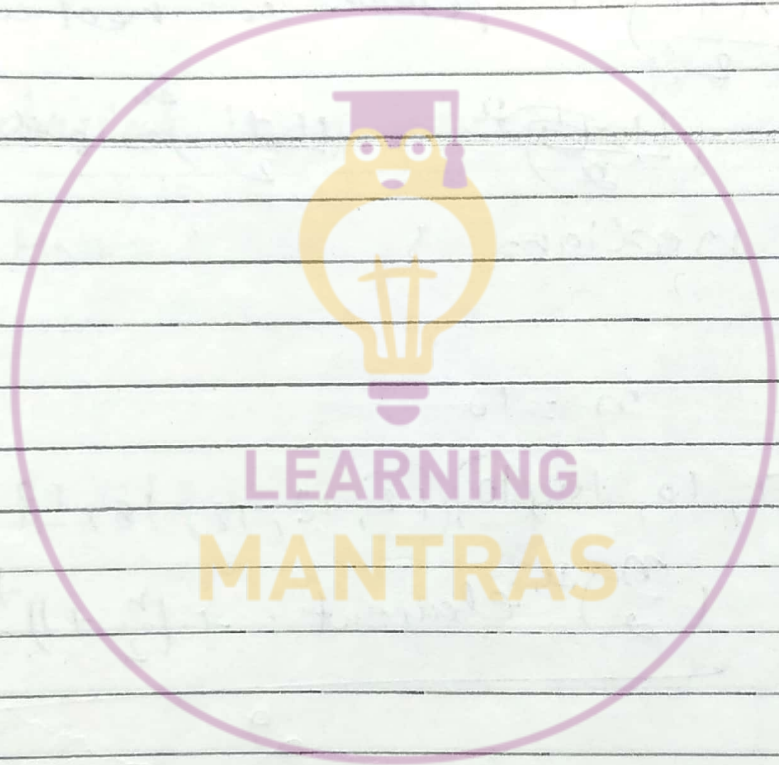
median : 9, 3 2 3 4 9 1 5 3 2 1

find median

1, 1, 2, 2, 3, 3, 3, 4, 5, 9, 9

$n = 1$

$\left(\dfrac{n+1}{2}\right)^{th}$ position or median

$\left(\dfrac{11+1}{2}\right)^{th}$ $\left(\dfrac{11+1}{2}\right)^{th} = 6^{th}$

median = 3

②

$n = 10$

9, 9, 10, 10 ⑩ ⑫ 12, 12, 18, 18

$$\dfrac{\left(\dfrac{n}{2}\right)^{th} element + \left(\dfrac{n}{2}+1\right)^{th} element}{2}$$

5th and 6th = $$\dfrac{\left(\dfrac{10}{2}\right)^{th} element + \left(\dfrac{10}{2}+1\right)^{th} element}{2}$$

= $\dfrac{10+12}{2} = 11$

Range

$$1, 3, 3, 7, 5, 3, 1, 4, 9, 3$$

$$\text{Range} = L - S$$
$$= 9 - 1 = 8$$

$$\text{Coff of Range} = \frac{L-S}{L+S} = \frac{9-1}{9+1} = \frac{8}{10} = \frac{4}{5}$$

$\times$ Mean deviation =

x_i	f_i
9	2
10	3
12	3
18	2

$$M.D = |9-12|2 + |10-12|3$$

$$M.D = \frac{|9-12|2 + |10-12|3 + |12-13|3 + |18-12|}{2+5+3+2}$$

$$S.D = \frac{\sum |x_i - \bar{x}|^2}{M}$$

Ex. $\quad n_1 = 10 \qquad\qquad n_2 = 20$

$\bar{x}_1 = 9 \qquad\qquad \bar{x}_2 = 12$

$\sigma_1^2 \qquad\qquad\qquad \sigma_2^2$

Combined mean $\bar{x} = \dfrac{n_1 \bar{x}_1 + n_2 \bar{x}_2}{n_1 + n_2}$

Combined Variance $\sigma^2 = \dfrac{n_1(\sigma_1^2 + d_1^2) + n_2(\sigma_2^2 + d_2^2)}{n_1 + n_2}$

$d_1 = \bar{x} - \bar{x}_1$
$d_2 = \bar{x} - \bar{x}_2$