General directions for students: whatever be the notes provided, everything must be copied in the Maths copy and then do the HOME WORK in the same copy.

Mean or Arithmetic Mean (Mean of ungroup data)

The mean of n observations is the sum of n variates $x_1, x_2, x_3, x_4, \ldots\ldots\ldots x_n$ is given by

$$\text{Mean } (\bar{x}) = A = \frac{x_1 + x_2 + x_3 + \ldots\ldots\ldots\ldots + x_n}{n}$$

$$\text{In symbol (arithmetic mean) } A = \frac{\sum x_i}{n}$$

$$\text{Or Mean} = \frac{\text{Sum of variates or observations}}{\text{Total no.of variates}}$$

Median of raw data : Arranging of raw data in increasing or decreasing order

If the number of variates (n) is odd, then median $= \left(\frac{n+1}{2}\right)^{th}$ observation

If the number of variates (n) is even, then median $= \frac{\left(\frac{n}{2}\right)^{th} \text{ variates} + \left(\frac{n}{2}+1\right)^{th} \text{ variates}}{2}$

EXERCISE – 20.1

1. Find the mean of 8, 6, 10, 12, 1, 3, 4, 4.

Solution : Mean $= \frac{8+6+10+12+1+3+4+4}{8} = \frac{48}{8} = 6$ **Ans.**

7. The mean of 5 numbers is 20. If one number is excluded, mean of the remaining number becomes 23. Find the excluded number.

Solution : Mean of 5 numbers $= 20$

Sum of 5 observations $= 5 \times 20 = 100$

Mean of 4 numbers $= 23$

Sum of 4 observations $= 4 \times 23 = 92$

Excluded number = Sum of 5 observations − Sum of 4 observations

$= 100 - 92 = 8$ **Ans.**

12. Mean of 9 observations was found to be 35. Later on, it was detected that an observation 81 was misread as 18. Find the correct mean of the observations.

Solution : $\text{Mean of 9 observations} = \frac{\text{Incorrect sum of 9 observations}}{9}$

$\therefore$ Incorrect sum of 9 observations $= 9 \times 35 = 315$

One observation was detected as 81 was misread as $18 = 315 - 18 + 81 = 378$

Mean of 9 observations $= \frac{378}{9} = 42$ **Ans.**

14. Calculate the mean and the median of the numbers : 2, 3, 4, 3, 0, 5, 1, 1, 3, 2

Solution : $\text{Mean} = \frac{2+3+4+3+0+5+1+1+3+2}{10} = \frac{24}{10} = 2.4$ **Ans**

Increasing order : 0, 1, 1, 2, 2, 3, 3, 3, 4, 5

Number of variates $(n) = 10$ (Even)

$\therefore \left(\frac{n}{2}\right)^{th}$ variates $= \left(\frac{10}{2}\right)^{th}$ variates $= 5^{th}$ Variates $= 2$

And $\left(\frac{n}{2}+1\right)^{th}$ variates $= (5+1)^{th}$ Variates $= 6^{th}$ Variates $= 3$

$\text{Median} = \frac{\left(\frac{n}{2}\right)^{th}\text{ variates} + \left(\frac{n}{2}+1\right)^{th}\text{ variates}}{2} = \frac{2+3}{2} = \frac{5}{2} = 2.5$ **Ans**

19. The following observations have been arranged in ascending order. If the median of the data is 13, find the value of x : 3, 6, 7, 10, x, x + 4, 19, 20, 25, 28

Solution : 3, 6, 7, 10, x, x + 4, 19, 20, 25, 28

Number of variates $(n) = 10$ (Even)

$\therefore \left(\frac{n}{2}\right)^{th}$ variates $= \left(\frac{10}{2}\right)^{th}$ variates $= 5^{th}$ Variates $= x$

And $\left(\frac{n}{2}+1\right)^{th}$ variates $= (5+1)^{th}$ Variates $= 6^{th}$ Variates $= x + 4$

$$\text{Median} = 13 \qquad \left[\text{Median} = \frac{\left(\frac{n}{2}\right)^{th} \text{ variates} + \left(\frac{n}{2}+1\right)^{th} \text{ variates}}{2}\right]$$

$$\Rightarrow \quad \frac{(5)^{th} \text{ variates} + (6)^{th} \text{ variates}}{2} = 13$$

$$\Rightarrow \quad \frac{x+x+4}{2} = 13 \quad \Rightarrow \quad 2x = 26 - 4 \Rightarrow 2x = 22 \Rightarrow x = 11 \quad \text{Ans.}$$

HOMEWORK

EXERCISE – 20.1

QUESTION NUMBERS : 3, 5(i), 6(ii), 10, 13 and 16

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