

Exercise VSAQs

Page No: 24.21

Question 1: If the ratio of mean and median of a certain data is 2:3, then find the ratio of its mode and mean.

Solution:

Empirical formula: Mode = 3 median - 2 mean

Since, ratio of mean and median of a certain data is 2:3, then mean = 2x and median = 3x

$$\begin{aligned}\text{Mode} &= 3(3x) - 2(2x) \\ &= 9x - 4x \\ &= 5x\end{aligned}$$

Therefore,

$$\text{Mode: Mean} = 5x:2x \text{ or } 5:2$$

Question 2: If the ratio of mode and median of a certain data is 6 : 5, then find the ratio of its mean and median.

Solution: We know, Empirical formula: Mode = 3 Median - 2 Mean

Since, ratio of mode and median of a certain data is 6:5.

$$\Rightarrow \text{Mode}/\text{Median} = 6/5$$

$$\text{or Mode} = (6 \text{ Median})/5$$

Now,

$$(6 \text{ Median})/5 = 3 \text{ Median} - 2 \text{ Mean}$$

$$(6 \text{ Median})/5 - 3 \text{ Median} = - 2 \text{ Mean}$$

$$\text{or } 9/10 (\text{Median}) = \text{Mean}$$

$$\text{or Mean/ Median} = 9/10 \text{ or } 9:10.$$

Question 3: If the mean of $x+2$, $2x+3$, $3x+4$, $4x+5$ is $x+2$, find x .

Solution:

Given: Mean of $x+2$, $2x+3$, $3x+4$, $4x+5$ is $x+2$

We know, Mean = (Sum of all the observations) / (Total number of observations)

Sum of all the observations = $x+2 + 2x+3 + 3x+4 + 4x+5 = 10x + 14$

Total number of observations = 4

\Rightarrow Mean = $(10x + 14)/4$

or $(x + 2) = (10x + 14)/4$ (using given)

$4x + 8 = 10x + 14$

$x = -1$

Question 4: The arithmetic mean and mode of a data are 24 and 12 respectively, then find the median of the data.

Solution:

Given: The arithmetic mean and mode of a data are 24 and 12 respectively

We know, Empirical formula: Mode = 3 Median - 2 Mean

or 3 Median = Mode + 2 Mean

Using given values, we get

3 Median = $12 + 2(24) = 60$

or Median = 20

Question 5: If the difference of mode and median of a data is 24, then find the difference of median and mean.

Solution:

Given: difference of mode and median of a data is 24.

That is, Mode - Median = 24

or Mode = 24 + Median ... (1)

We know, Empirical formula: Mode = 3 Median - 2 Mean

24 + Median = 3 Median - 2 Mean
(Using (1))

24 = 2 Median - 2 Mean

or 12 = Median - Mean

Therefore, the difference of median and mean is 12.