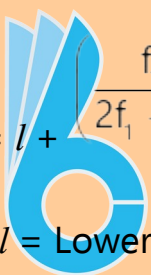


CHAPTER 14

Statistics

Mode of grouped data:

In case of grouped data, it is not possible to determine the mode by looking at the class with the maximum frequency. This case, first locate the class with the maximum frequency. This class is known as the modal class. The mode lies in this class.


$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

Where, l = Lower limit of the modal class

f_1 = Frequency of the modal class

f_0 = Preceding frequency of the modal class

f_2 = Succeeding frequency of the modal class

h = Size of the modal class

Note:

- If the given data is in discontinuous form, then convert it into continuous form for calculating the mode.

- Mode can be less than, more than or equal to the mean of the data.

Example:

If mode of the following series is 54, then find the value of 'f'.

Class – Interval	0 – 15	15 – 30	30 – 45	45 – 60	60 – 75	75 – 90
Frequency	3	5	f	16	12	7

Procedure:

Step – I:

If the given distribution is continuous, it is fine. If discontinuous (Inclusive) then we must make it continuous by subtracting 0.5 from lower limit of each class interval and adding 0.5 to upper limit of each class – interval.

Step – II:

Mark the maximum frequency out of the given frequencies and name it as f_1 . The student may think that there may be two equal maxima; it can be so but beyond the scope of our learning stage.

Step – III:

Now, mark the corresponding class – interval (Modal class) corresponding to the maximum frequency ' f_1 '.

Step – IV:

Now, find the following values from the given frequency distribution.

i.e. l , f_1 , f_0 , f_2 , and h .

Step – V:

Substitute the 5 values obtained in Step – IV in the following formula.

$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

Sol.

Here, given mode is 54, which lies in the interval 45 – 60.

Therefore, the modal class is 45 – 60.

$$\therefore l = 45, f_1 = 16, f_0 = f, f_2 = 12 \text{ and } h = 15$$

Class – Interval	Frequency
0 – 15	3
15 – 30	5
30 – 45	$f - f_0$
45 – 60	16 – f_1
60 – 75	$12 - f_2$
75 – 90	7

$$\therefore \text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

$$54 = 45 + \left(\frac{16 - f}{2 \times 16 - f - 12} \right) \times 15$$

$$\Rightarrow 9(20 - f) = 15(16 - f)$$

$$\Rightarrow 180 - 9f = 15(16 - f)$$

$$\Rightarrow -9f + 15f = 240 - 180$$

$$\Rightarrow 6f = 60$$

$$\Rightarrow f = \frac{60}{6}$$

$$\Rightarrow f = 10$$

Hence, required value of 'f' is 10.

