

MODE

Definition — "The value of the variable which occurs most frequently in a distribution is called the mode"

— Kenny

"The mode may be regarded as the most typical value of a series."

— Croxtan and Cowden

MERITS

(a) Simple and popular — It is very simple measure of central tendency and because of this, it is very popular measure of central tendency.

(b) Less effect of Marginal values — Compared to mean, mode is less affected by marginal values in the series. Mode is determined only by the value with the highest frequencies.

(c) Graphic Determination — Mode can be located graphically, with the help of histogram.

(d) No need of knowing all the items or frequencies — The calculation of mode needs only the item with highest frequency in the distribution. It does not require knowledge of the all items and freq. in the distribution.

DEMIRITS

(i) Uncertain and Vague

(ii) Difficult — When frequencies of all items are identical, it is difficult to identify

modal value.

(iii) Ignores extreme marginal frequencies — It ignores extreme marginal frequencies. So, modal value is not a representative of all the items in a series.

Calculation of Mode in Discrete Series —

In case of discrete series, two methods are used to find out the value of Mode.

(i) Inspection Method — If the distribution is regular and only one maximum frequency is there, then the mode value can be obtained by mere inspection.

Example —

Find the mode of the following series —

Wt. of grasshoppers (in gram)	21	22	23	24	25	26	27
Frequency	4	2	6	9	7	5	1

By inspection we can find that 24 has maximum frequency i.e., 9. Therefore, 24 is the mode of the series.

(ii) Grouping Method — When the discrete series is bimodal or multimodal, then grouping of frequencies

If series is ~~done~~ done to ascertain mode.

Example -

Find the mode of the following series -

Wt. of grasshoppers : (in gram)	21	22	23	24	25	26	27
Frequency	4	2	6	9	9	7	5

Here, 24 and 25 both have maximum and same frequency i.e., 9. To find out actual value of mode, grouping method will be used.

Grouping Table:

Wt. of grasshopper	Frequency					
	f	In groups of two		In groups of three		
Variable	I	II	III	IV	V	VI
21	4	6	8	12	17	24
22	2					
23	6	15				
24	9	18	25			
25	9	16				
26	7	12	21			
27	5					

II column is showing sum of 1st+2nd, 2nd+3rd, 3rd+4th, 4th+5th, 5th+6th, 6th+7th
 III n n n n n

IV column is showing the sum of 1st+2nd+3rd, 4th+5th+6th

V n n n n n n 2nd+3rd+4th, 5th+6th+7th

VI n n n n n n 3rd+4th+5th

[II, IV & VI column - no further pairing of freq. is possible]

Analysis Table

Columns	Items having max. freq.					
	22	23	24	25	26	27
I				✓	✓	
II					✓	✓
III				✓	✓	
IV				✓	✓	✓
V					✓	✓
VI			✓	✓	✓	
Total		1	4	6	3	1

From above table it appears that 25 is repeated max. number of times i.e., 6 times and hence Mode = 25.

Computation of Mode in Continuous Series

CLASS-INTERVAL	FREQUENCY
10 - 19	10
20 - 29	15
30 - 39	16
40 - 49	17
50 - 59	12

FORMULA

$$\text{Mode} = L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times i$$

OR

$$L_1 + \frac{\Delta_1}{\Delta_1 + \Delta_2} \times i$$

Where L_1 = lower limit of modal class

f_0 = frequency of the preceding class

f_1 = frequency of modal class

f_2 = frequency of the succeeding modal class

$$\Delta_1 = f_1 - f_0$$

$$\Delta_2 = f_1 - f_2$$

i = Width of the class interval

In the given question, 40-49 is the modal class because it has got the maximum frequency.

$$L_1 = 40, f_0 = 16, f_1 = 17, f_2 = 12, i = 10$$

$$\text{Mode} = L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times i$$

$$= 40 + \frac{17 - 16}{34 - 16 - 12} \times 10$$

$$= 40 + \left[\frac{1}{6} \right] \times 10$$

$$= 40 + \frac{10}{6}$$

$$= 40 + 1.66$$

$$= 41.66 \text{ Ans.}$$

Empirical formula for mode -

$$\text{Mode} = 3 \text{ Median} - 2 \text{ Mean.}$$