MODE

The term mode has come from French in which means to be fashion. As a statistical language mode is the value that occurs most frequently in a statistical distribution. The mode is the most representative average and is a position of greatest concentration of values. It has great value conceptually, it is what the doctor means when he describes that a desease of cold & fever usually take a week to get cured. Similarly, average size of shirt/shoes sold, average income e.t.c also cannot be most or frequently occuring value.

Merits of Mode:

1) Easy to understand
2) Simple to calculated & Locale
3) Quantative data in ranking is possible, mode is very usefull.
4) It is the actual value that is in the series.
5) Mode remains unaffacted by dispersion of Series.
6) Not affected by extreme items,
7) Can be calculated even values are not known.

Demerits :-

1) mode cannot be subject to further mathematical treatment, because is not obtained from any algebric calculations.
2) It is quite likely, that there is no mode for a series.
3) Cannot be used if relative importance of the items have to be considered.
4) choice of grouping has a considerable influence On the value of the mode.

Mode is calculated by two methods:-

(I) Inspection Method

(II) Grouping Method

(I) Inspection Method :-

Example :- Find the mode from the following data

Marks of 20 students. 20, 40, 50, 50, 65, 68, 68, 72, 72, 40, 40, 72, 68, 72, 50, 72, 20, 72, 40, 22

Marks :	20	40	50	65	68	72	22
freq	2	4	3	1	3	6	1

The most frequently occuring number of marks is 72 therefore mode = 72

Location of Mode in Continious series :-

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

where,

L_1 = lower limit of modal class

f_0 = Frequency of the group preceding the modal class

f_1 = Frequency of the modal class

f_2 = Frequency of the group succeding of modal class

i = Magnitude/range of modal class

Example :- Calculate Mode from the following data :-

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	4	10	25	15	10	6

Sol^n

Marks	No. of students
0-10	4
10-20	10 f_0
20-30	25 f_1
30-40	15 f_2
40-50	10
50-60	6

Using inspection method 20-30 is modal class

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

$$= 20 + \frac{25 - 10}{2 \times 25 - 10 - 15} \times 10$$

$$= 20 + \frac{15}{50 - 25} \times 10$$

$$= 20 + \frac{150^{6}}{25}$$

$$= 20 + 6 = 26$$

$\therefore$ Mode(Z) = 26 Ans.

Example:- Find mode from the following data.

Marks obtained	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8
No. of students	4	10	25	15	23	22	12	3

Soln By Grouping method:-

		I+2	II+3	I+2+3	II+3+4	III+4+5
Marks	f	I	II	IV	V	VI
0-1	4	4+10 =14		4+10+25 =39		
1-2	10		10+25 35		10+25+15 =50	25+15+23 =(63)
2-3	(25)	25+15 =40		15+23+22 =(60)		
3-4	15		15+23 =(38)		23+22+12 =(57)	22+12+3 =37
4-5	23	23+22 =(45)				
5-6	22		22+12 =34			
6-7	12	12+3 =15				
7-8	3					

Analysis

Column	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8
I			✓					
II				✓	✓			
III				✓	✓			
IV				✓	✓	✓		
V					✓	✓	✓	
VI			✓	✓	✓			
	–	–	2	4	(5)	3	1	–

Modal class is 4-5

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

$$= 4 + \frac{23 - 15}{2 \times 23 - 15 - 22} \times 1$$

$$= 4 + \frac{8}{46 - 37} \times 1$$

$$= 4 + \frac{8}{9}$$

$$= 4 + .89 = 4.89$$

$\therefore$ Mode = 4.89 Ans

Relation between Mean, Median and Mode.

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

Example :- Find out mode of the following data :-

5, 10, 15, 20, 25, 30, 35

$$\text{Mean}(\bar{x}) = \frac{\Sigma x}{N} = \frac{140}{7} = 20$$

$$\text{Median}(M) = \left\{\frac{N+1}{2}\right\} = \left\{\frac{7+1}{2}\right\} = \left\{\frac{8}{2}\right\} = 4\text{th item.}$$

4th item lies = 20

$\therefore$ Mode = 3 Median − 2 Mean

= 3 × 20 − 2 × 20

= 60 − 40

Mode = 20 Ans.