② Down clustered frequency distribution:
It is the distribution that shows the decreasing frequencies starting with the last category of it.

The distribution table of the collected frequencies is calculated on the basis of the minimum limits of the categories

Example: The frequency table represents the distribution of 60 peasant families according to their ownership of the number of orange trees.

Requires the configuration of the descending relative clustered frequency distribution Fi' (Downward Repetition)

classes	Minimum Limits	fi	Fi'	Fi*	PFi*
60-74	greaterthan or equal 60	4	60	60/60	$\frac{60}{60} \times 100 = 100$
75-89	greaterthan or equal 75	5	60-4 =15	15/60	$\frac{15}{60} \times 100 = 25$
90-104	90	10	60-9 51	51/60	85
105-119	105	12	60-19 41	41/60	68.333
120-134	120	16	60-31 29	29/60	48.333
135-149	135	7	60-47 13	13/60	21.66
150-164	150	6	60-54 6	6/60	10
		60			

If the random variable is of a continuous variable, it is as in the following example:

The following is a frequency distribution of the weights of a sample of students from a college the size of which is 100 students. what is required is to creat a frequency distvibution table for the ascending clustered and the relative ascending clustered frequency distribution table.

classes	Upper limit	fi	Fi	Fi*	
46-	Less than 53	7	7	7/100	$(\frac{7}{100}) \times 100 = 7$
53-	Less than 60	15	22	22/100	22
60-	Less than 67	27	49	49/100	49
67-	less than 74	21	70	70/100	70
74-	Less than 81	14	84	84/100	84
81-	Less than 88	8	92	92/100	92
88-	Less than 95	5	97	97/100	97
95-102	Less than 102	3	100	100/100	100
		100			

Mode For Grouped Data

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

where f_1 is the frequency of the modal class

f_0 is the frequency of the class preceding the modal class

f_2 is the frequency of the class succeeding the modal class

h is the size of the class intervals

L is the lower limit of the modal class

Ex: Find the mode of the following table:-

classes	f_i
1 - 3	7
3 - 5	8
5 - 7	2
7 - 9	2
9 - 11	1

Solution:-

x_i	w_i	$x_i w_i$
75	3	225
87	2	174
63	3	189
94	3	282
61	4	244
	15	1114

$$\bar{X}_w = \frac{\Sigma x_i w_i}{\Sigma w_i}$$

$$= \frac{1114}{15}$$

$$= 72.26$$

2- $\sum (x_i - \bar{X})^2$ = As little as possible

The sum of the squares of the deviations of X values from their arithmetic mean is the least possible, that it, less than the sum of the squares of any other value.

Ex: $x_i = 9, 8, 6, 5, 7$

$\bar{X} = 7$

$$\sum_{i=1}^{5} (x_i - \bar{X})^2 = (9-7)^2 + (8-7)^2 + (6-7)^2 + (5-7)^2 + (7-7)^2$$

$$= 10$$

If we subtract from these values any number other than the arithmetic mean, let it $A = 10$

$$\sum_{i=1}^{5} (x_i - \bar{X})^2 = (9-10)^2 + (8-10)^2 + (6-10)^2 + (5-10)^2 + (7-10)^2$$

$$= 55$$

That is mean $55 > 10$

$\therefore \sum (x_i - \bar{X})^2$ = As little as possible.

3- When we add any constant number (k) to all values of obsevation then the arithmetic mean for the new values $= \bar{X} + k$

Ex: Let $x_i = 8, 3, 2, 12, 10$

$\bar{X} = \frac{35}{5} = 7$

if we add the constant value (4) then the