Class-Mark (or mid-point): The central point of a class interval is called its mid-value or mid-point. It can be found out by adding the upper and lower limits of a class and dividing the sum by 2

$$\text{mid point} = \frac{\text{Upper limit of the class} + \text{lower limit}}{2}$$

Midpoint of the class interval

$$80-100 = \frac{80+100}{2} = 90$$

Example: The following table present the length of 80 plants sized in cm

80	87	98	81	74	48	79	80
78	82	93	91	70	90	80	84
73	74	81	56	65	92	70	71
86	83	93	65	51	85	68	72
68	86	43	74	73	83	90	35
75	67	72	90	71	76	92	93
81	88	91	97	72	61	80	91
77	71	59	80	95	99	70	74
63	89	67	60	82	83	63	60
75	79	88	66	70	88	76	63

① Creat a Table
② Find mean, Harmonic mean, Geometric mean, Quadratic mean, Variance

Solution: ①

Range = Upper value − Lower Value
$= 99 - 35$
$= 64$

② Number of classes

$C = 1 + 3.333 \log n$
or
$C = 2.5 \sqrt[4]{n}$

$C = 1 + 3.333 \log(80)$
$= 7.343$
$\cong 7$

Length of the class $= \dfrac{\text{Range}}{C} = \dfrac{64}{7} \cong 10$

Classes	Frequency	Mid point	$x_i f_i$	f_i/x_i
30 − 40	1	35	35	1/35 = 0.0285
40 − 50	2	45	90	0.044
50 − 60	5	55	275	0.091
60 − 70	15	65	975	0.231
70 − 80	25	75	1875	0.333
80 − 90	20	85	1700	0.235
90 − 100	12	95	1140	0.126
	$\Sigma f_i = 80$		$\Sigma x_i f_i = 6090$	1.0885

x_i	Frequency	x_i^2	$x_i^2 f_i$	$\log x_i$	$\log x_i f_i$
35	1	1225	1225	1.544	1.544
45	2	2025	4050	1.653	3.306
55	5	3025	15125	1.740	8.702
65	15	4225	63375	1.813	27.194
75	25	5625	140625	1.875	46.876
85	20	7225	144500	1.929	38.588
95	12	9025	108300	1.978	23.733
	80	32375	477200		149.943

$$\overline{X} = \frac{\sum x_i f_i}{\sum f_i} = \frac{6090}{80} = 76.125\,\text{cm}$$

$$\overline{HM} = \frac{\sum f_i}{\sum \frac{f_i}{x_i}} = \frac{80}{1.0885} = 73.496\,\text{cm}$$

$$Q = \sqrt{\frac{\sum x_i^2 f_i}{\sum f_i}} = \sqrt{\frac{477200}{80}} = 77.223\,\text{cm}$$

$$\log \overline{G} = \frac{\sum \log x_i f_i}{\sum f_i} = \frac{149.943}{80} = 1.8742$$

$$G = \text{invlog}(1.8742)$$

$= 74.866$

$$Var = \frac{\sum f_i x_i^2 - \frac{(\sum x_i f_i)^2}{\sum f_i}}{\sum f_i - 1}$$

$$= \frac{477200 - \frac{(6090)^2}{80}}{80 - 1}$$

$$= \frac{13598.75}{79}$$

$= 172.136$

or

$$V = \frac{13598.75}{80}$$

$= 169.98$

$S.D = \sqrt{169.98}$
$= \mp 13.037$

$$CV = \frac{SD}{X} \times 100\%$$

$$= \frac{13.037}{76.125} \times 100 = 17.1266$$

2- The opened table For the first category minimum (That is, there is no lower limit for the first category)

Less than 10
- 20
- 30
40 - 50

3- A table opend by the upper limit of th[e] last category (Ther is no Upper limit fo[r] the last category).

10 -
20 -
30
40 - and more.

Proportional Frequency Distribution

The relative frequency distribution is a normal frequency distribution in which frequencies are expressed in percentage that can be obtained by dividing the frequency of each category by the total number of frequencies

Assume that we have relative frequency number of its classes are m and the corresponding frequencies are $(f_1, f_2, \ldots f_m)$ then