

Chapter-14

Statistics

- **Mean:** The arithmetic mean (or, simply mean) is the sum of the values of all the observations divided by the total number of observation.
- The mean for grouped data can be found by:

(i) The direct method $\bar{X} = \frac{\sum f_i x_i}{\sum f_i}$

(ii) The assumed mean method $\bar{X} = a + \frac{\sum f_i d_i}{\sum f_i}$, Where $d_i = x_i - a$.

(iii) The step deviation method: $\bar{X} = a + \frac{\sum f_i u_i}{\sum f_i} \times h$, where $u_i = \frac{x_i - a}{h}$

- The mode for the grouped data can be found by using the formula:

$$\text{mode} = l + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right] \times h$$

l = lower limit of the modal class.

f_1 = frequency of the modal class.

f_0 = frequency of the preceding class of the modal class.

f_2 = frequency of the succeeding class of the modal class.

h = size of the class interval.

Modal class - class interval with highest frequency.

- The median for the grouped data can be found by using the formula:

$$\text{median} = l + \left[\frac{n/2 - Cf}{f} \right] \times h$$

l = lower limit of the median class.

n = number of observations.

Key Notes

Cf = cumulative frequency of class interval preceding the median class.

f = frequency of median class.

h = class size.

- Empirical Formula: $\text{Mode} = 3 \text{ median} - 2 \text{ mean}$.
 - Cumulative frequency curve or an Ogive:
 - (i) Ogive is the graphical representation of the cumulative frequency distribution.
 - (ii) Less than type Ogive:
 - Construct a cumulative frequency table.
 - Mark the upper class limit on the x = axis.
 - (i) More than type Ogive:
 - (ii) Construct a frequency table.
 - (iii) Mark the lower class limit on the x-axis.
 - To obtain the median of frequency distribution from the graph:
 - (i) Locate point of intersection of less than type Ogive and more than type Ogive:
 - (ii) Draw a perpendicular from this point on x-axis.
 - (iii) The point at which it cuts the x-axis gives us the median.
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