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 $= \overline{X} = \dfrac{\overline{fixi}}{\sum fi}$

  (ii) The assumed mean method $\overline{X} = a + \dfrac{\overline{fidi}}{\sum fi}$, Where $d_i = x_i - a.$

  (iii) The step deviation method: $X = a + \dfrac{\sum fiui}{\sum fi} \times h$, where $U_1 = \dfrac{X_i - a}{h}$

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

$$mode = 1 + \left[\dfrac{f_1 - f_0}{2f_1 - f_0 - f_2} \right] \times h$$

  l = lower limit of the modal class.

  f_1 = frequency of the modal class.

  f_o = 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:

$$median = 1 + \left[\dfrac{n/2 - Cf}{f} \right] \times h$$

  l = lower limit of the median class.

  n = number of observations.

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

f = frequency of median class.

h = class size.

- Empirical Formula: Mode = 3 median - 2 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.