Statistics

Mean of Grouped Data

Mean is that value of central tendency which is the average of the observations.

There are three methods to find mean for a frequency distribution.

(i)   Direct method

$$M = \frac{\sum fx}{\sum f}$$

where x is the mid-interval

f is the frequency

M is the mean

(ii)   (ii) Assumed Mean method

$$M = A + \frac{\sum fd}{\sum f}$$

where A = assumed mean

$d = x - A$

(iii)   (iii) Step-deviation method

$$M = A + i\frac{\sum ft}{\sum t}$$

where i = class size

$$t = \frac{d}{i}$$

Mode of Grouped Data

Mode is that value among the observations which has the maximum frequency.

In a grouped frequency distribution, we locate the modal class and find the mode using the following 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

h - size of the class interval

f_1 - frequency of the modal class

f_0 - frequency of the class preceding the modal class

f_2 - frequency of the class succeeding the modal class

Median of Grouped Data

Median is a measure of central tendency which gives the value of the middle-most observation in the data.

In a grouped frequency distribution, we locate the median class and find the median using the following formula.

$$\text{Median} = l + \left(\frac{\frac{N}{2} - c}{f}\right) \times h$$

l - Lower limit of the median class
c - Cumulative frequency preceding the median class frequency
h - Width of the class interval
N = Sum of the frequencies

Working rule
Step 1: Prepare the table containing less than the cumulative frequency with the help of the given frequencies.

Step 2: Find out the cumulative frequency to which $\frac{N}{2}$ belongs. Class interval of this cumulative frequency is the median class interval.

Step 3: Find out the frequency f and lower limit l of this median class.
Step 4: Find the width 'h' of the median class interval.
Step 5: Find the cumulative frequency c of the class preceding the median class.
Step 6: Apply the formula

$$\text{Median} = l + \left(\frac{\frac{N}{2} - c}{f}\right) \times h,\ \text{to find the median.}$$

Graphs in Statistics
Graphical Representation of Cumulative Frequency Distribution
Cumulative frequency is obtained by adding the frequency of a class interval and the frequencies of the preceding intervals up to that class interval.

Ogive (Cumulative Frequency Curve)
There are two ways of constructing an Ogive or cumulative frequency curve. (Ogive is pronounced as O-jive). The curve is usually of 'S' shape.

To Plot an Ogive:
(i)   We plot the points with coordinates having abscissae as actual limits and ordinates as the cumulative frequencies
(ii)   Join the plotted points by a smooth curve.
(iii)   An Ogive is connected to a point on the X-axis representing the actual lower limit of the first class.