STATISTICS

CONCEPT OF MEDIAN

MEDIAN :

Median is the value of middle item of a series arranged in ascending or descending order of magnitudes.

Median for ungrouped data :

(a) If n is odd the median = $\left(\frac{n+1}{2}\right)^{th}$ term

(b) If n is even, there are two middle terms.

i.e. $\left(\frac{n}{2}\right)^{th}$ term & $\left(\frac{n}{2}+1\right)^{th}$ term

$$\text{median} = \frac{\left(\frac{n}{2}\right)^{th} term + \left(\frac{n}{2}+1\right)^{th} term}{2}$$

Median for Grouped Data :

In a grouped data, we may not be able to find the middle observation by looking at the cumulative frequencies as the middle observation will be some value in a class interval. It is, therefore, necessary to find the value inside a class that divides the whole distribution into two halves.

To find this class, we find the cumulative frequencies of all the classes and $\frac{n}{2}$. We now locate the class whose cumulative frequency is greater than (and nearest to) $\frac{n}{2}$. This is

called the median class.

After finding the median class, we use the following formula for calculating the median.

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

where, l = lower limit of median class,

n = number of observations,

cf = cumulative frequency of class preceding the median class,

f = frequency of median class,

h = class size (assuming class size to be equal).

In a continuous frequency distribution the value of the median would be in class-interval

$$\text{Median} = l + \frac{\frac{n}{2} - C.f}{f} \times h$$

l = lower limit of median class

n = no. of observations

c.f = cumulative frequency of class preceding the median class.

h = class size (assuming class size to be equal)

Median for Grouped data

Method for finding the median for grouped data

Step–1: For the given frequency distribution, prepare the cumulative frequency table and obtain $N = Sf_i$

Step–2: Find (n/2)

Step–3: Look at the cumulative frequency just greater than (n/2) and find the corresponding class, known as median class.

Step–4: Use the formula

Median, (Me) = $l + \left\{\frac{(n/2 - C.f.)}{f}\right\} \times h$

l = Lower limit of median class

h= Width of median class

f = Frequency of median class

C.f. = Cumulative frequency of the class procceding the median class

n = f_i