

Median - (4)

(3) Frequency Distribution Series and the Median.

Calculation of median in a continuous series involves the following steps:

- (i) The data are arranged in ascending or descending orders of their class interval.
- (ii) The frequencies are then converted into cumulative frequencies.
- (iii) Median class of the series is identified. It corresponds to the cumulative frequency which includes the $(\frac{N}{2})^{\text{th}}$ item.
- (iv) The following formula is applied to determine the the actual median value.

Formula,

$$M = l_1 + \frac{\frac{N}{2} - C.F.}{f} \times h$$

Here l_1 = lower limit of Median class
 $C.f$ or C = Cumulative frequency
 of the ~~more~~ median class.
 f = frequency of the median class
 i = Class interval of the median class.

Illustration.

Find out median value of the following distribution:

Wage Rate.	0-10	10-20	20-30	30-40	40-50
No. of workers	22	38	46	35	20

Soln.

C. g.	frequency	C. f
0-10	22	22
10-20	38	60
20-30	46	106
30-40	35	141
40-50	20	161

$$\Sigma f = N = 161$$

$M =$ Size of $\frac{N}{2}$ th items.

$$= \frac{161}{2} = 80.5 \text{th item.}$$

80.5 is just come from 106 C.f.

So median class 20-30.

Here formulae,

$$M = l_1 + \frac{\frac{N}{2} - C}{f} \times i$$

Here l_1 = lower limit of the median class
= 20

N = Total No of frequency
= 161

C = Cf of pre median class.
= 60

i = class interval of the median class
= 10.

f = frequency of the median class.
= 46.

$M =$

$$M = 20 + \frac{\frac{161}{2} - 60}{46} \times 10$$

$$= 20 + \frac{80.5 - 60}{46} \times 10$$

$$= 20 + \frac{20.5}{46} \times 10$$

$$20 + 4.46 = 24.46$$

$$\text{Median} = 24.46$$