H.W The weight of 11 mothers in kg are recorded as follows

47, 44, 42, 41, 58, 52, 55, 39, 40, 43, 61

Find median.

ascending, descending

Add another value 60 with the above data set. Then find median again.

Median for grouped data:-

A survey was conducted among 100 families to know their family size. The data is as follows:

Family size	No. of families
1	2
2	6
3	12
4	18
5	19
6	15
7	11
8	11
9	6

Find median of family size.

Sol^{n} :-

Table 1 :-

Family Size	No. of families	CF → cummulative freqwence
1	2	2
2	6	8
3	12	20
4	18	38
5	19	57
6	15	72
7	11	83
8	11	94
9	6	100

Here $n = 100$ which is divisible by 2. Thus median lies in the midway between 50th and 51st values. In order to find the 50th and 51st vale we have to calculate the cummulative freqwencies. From the cummulative freqwency column we find the 50th vale is 5 and 51st vale is also 5.

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

$$= \frac{\frac{100}{2}\text{th value} + \left(\frac{100}{2}+1\right)\text{th value}}{2}$$

$$= \frac{50\text{th value} + 51\text{st value}}{2}$$

$$= \frac{5+5}{2} = 5.$$

$\therefore$ Median family size $= 5$.

Now let the last entry of the 'no. of families' column is 7 in the place of 6.

Family size	No. of families	CF
1	2	2
2	6	8
3	12	20
4	18	38
5	19	57
6	15	72
7	11	83
8	11	94
9	7	101

Now, $n = 101$ which is not divisible by 2.
So median is $\left(\frac{n+1}{2}\right)$th $= \left(\frac{101+1}{2}\right)$th value
$= \left(\frac{102}{2}\right)$th value $=$ 51st value.
From the table we find 51st value is 5.
So, Median $= 5$.

#. Let us have the grouped data as follows :-

class limit	Frequency f_i	CF
24.5 – 29.5	3	3
29.5 – 34.5	9	12
34.5 – 39.5	15	27
39.5 – 44.5	12	39
44.5 – 49.5	7	46
49.5 – 54.5	4	50

CF কাকে বলে?
CF বের করার কোন কোন নিয়ম আছে

Here, $n = 50$ which is divisible by 2. So median will be found in the midway between $\frac{50}{2}$ th value and $(\frac{50}{2}+1)$ th value. Both 25th value and 26th value is in the class 34.5 – 39.5

$$\text{Median} = l_m + \frac{h}{f_m}\left(\frac{n}{2} - F_{m-1}\right)$$

where, l_m = lower limit of the median class = 34.5

h = class width = 5

f_m = frequency of the median class = 15

n = Sample size = 50

$F_{(m-1)}$ = Cummulative frequency of the pre-median class = 12

So, Median

$$= l_m + \frac{h}{f_m}\left(\frac{n}{2} - f_{(m-1)}\right)$$

$$= 34.5 + \frac{5}{15}\left(\frac{50}{2} - 12\right)$$

$$= 38.83$$

Ans