Central Tendency

Median

Median

- **MEDIAN:** The midpoint of the values after they have been ordered from the smallest to the largest, or the largest to the smallest.
- It is partition value which divides the series into two equal parts in such a way that half of the values are smaller than the median value and half of the values are more than the value.
- It is positional value in the sense that it lies in the middle of the series.

Median

❖ PROPERTIES OF THE MEDIAN

1. There is a unique median for each data set.
2. It is not affected by extremely large or small values and is therefore a valuable measure of central tendency when such values occur.
3. It can be computed for ratio-level, interval-level, and ordinal-level data.
4. It can be computed for an open-ended frequency distribution if the median does not lie in an open-ended class.

Median

❖ Steps to Calculate Median:

1. **In the case of individual series, arrange the data in ascending or descending order, preferably in ascending order.**
2. **Calculate Median = (N+1)/2**
3. **Find Median value as (N+1)/2th item of the series**

❖ MEDIAN – Examples

Q. The ages for a sample of five college students are:

21, 18, 19, 20, 22

Arranging the data in ascending order gives:

18, 19, 20, 21, 22. Here, N = 5

Median = **(N+1)/2th item = 6/2th item = 3rd item**

Thus the median is **20**.

Median

❖Steps to Calculate Median in Discrete Series:

1. In the case of discrete series, arrange the data in ascending or descending order, preferably in ascending order.
2. Prepare a column of cumulative frequency.
3. Calculate Median = (N+1)/2
4. Find Median value as (N+1)/2th item of the series

Median

Q. The heights of fifteen basketball players, in inches, are:

Height (inches)	No. of Players	Cumulative Frequency (c.f)
73	3	3
75	4	7
76	2	9
80	3	12
81	3	15
	15	

Median = (N+1)/2

Median = (15+1)/2

= 8th item

Median = 16 Ans

Median

❖ Steps to Calculate Median:

1. In the case of continuous series, arrange the data in ascending or descending order, preferably in ascending order.
2. Prepare a column of mid values of each classes.
3. Prepare a column of cumulative frequency.
4. Calculate Median = N/2th item.
5. Find Median class as (N+1)/2th item of the series.

Median

6. **From median class find median value by using following formula:**

$$Median = L + \frac{\frac{N}{2} - c.f}{f} \times i$$

where,

- N is number of observations.
- L is lower limit of median class.
- c.f is cumulative frequency of the class preceding median class.
- f is frequency of the class preceding median class.
- i is class interval of the class median class.

Median

❖ MEDIAN – Examples

Income (000 Rs) (Class Limits)	No. of Persons (f)	Mid Value (m)	c.f.
10-20	5	15	5
20-30	7	25	12
30-40	6	35	18
40-50	5	45	23
50-60	3	55	26
	N = 26		

Median

❖ **Solution**

Median = N/2th item

= 26/2th item = 13th item

Median class = 30 - 40

$$Median = L + \frac{\frac{N}{2} - c.f}{f} \times i$$

$$Median = 30 + \frac{13 - 12}{6} \times 10$$

$Median = 30 + 1.67 = 31.67$ Ans