# Median, Mode

# MEDIAN:

The median is the middle value of set of observations arranged in either ascending or descending order.

## Rules to find the Median of an ungrouped data

1. Arrange the given data in ascending or descending order of magnitude.

2. Determine the total number of observations, say, n.

3. If n is odd, then median =  $\left(\frac{n+1}{2}\right)^{\text{th}}$  observation

4. If n is even, then  $\frac{\left(\frac{n}{2}\right)^{th}observation + \left(\frac{n}{2}+1\right)^{th}observation}{2}$ 

Let us understand with some examples:

Example: A student obtained the following marks in fifteen class tests.

25,22,29,24,21,25,22,24,27,20,28,27,29,27

Find the median marks.

Solution: Arranging the marks in ascending order, we get

20,21,22,22,24,24,25,25,27,27,27,28,29,29,29

Here, the number of observations is n = 15, which is odd.

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

 $\Rightarrow Median (marks) = \left(\frac{15+1}{2}\right)^{th} term = 8^{th} term = 25$ Example: The following are the ages (in years) of 12 persons.

35, 36, 27, 32, 23, 39, 40, 55, 28, 32, 46, 45

#### Median, Mode

#### Find the median age of these persons.

**Solution:** Arranging the ages(in years) in ascending order, we get

23,27,28,32,32,35,36,39,40,45,46,55

Here, the number of observations in n = 12, which is even.

Hence,

Median age = 
$$\frac{\left(\frac{n}{2}\right)^{tn}observation + \left(\frac{n}{2}+1\right)^{tn}observation}{2}$$

Median age =  $\frac{6^{th}observation + 7^{th}observation}{2}$ =  $\frac{35+36}{2}$  years =  $\frac{71}{2}$  years = 35.5 years

### MODE:

The mode is the score (observation) that appears most often in a given set of observations. Hence, it is that value of the observation which occurs most frequently.

Let us understand with an Example:

Example: Find the mode for each of the following distributions:

26,41,8,30,26,20,26,24,13,17,24

Solution: Arranging the observations in ascending order, we have

8,13,17,20,24,26,26,26,30,41

Here 26 occurs most frequently, i.e., three times.

Hence, the mode is 26.