Mode

Mode: The data entry that occurs with the greatest frequency. A data set may have one mode, more than one mode, or no mode. If no entry is repeated the data set has no mode.

For ungrouped data

The most frequent score

Example: Find the mode for: 2, 6, 3, 9, 5, 6, 2, 6

It can be seen that the most frequently occurring value is 6

For grouped data Lastly, for frequency distribution, the method for mode calculation is somewhat different. Here we have to find a modal class. The modal class is the one with the highest frequency value. The following formula is applied for calculation of mode:

$$\textbf{Mode} = \textbf{L} + \left(\frac{f1-f0}{(f1-f0)+(f1-f2)}\right) . h$$

l = lower limit of the modal class,

h = size of the class interval (assuming all class sizes to be equal),

f_1 = frequency of the modal class,

f_0 = frequency of the class preceding the modal class,

f_2 = frequency of the class succeeding the modal class.

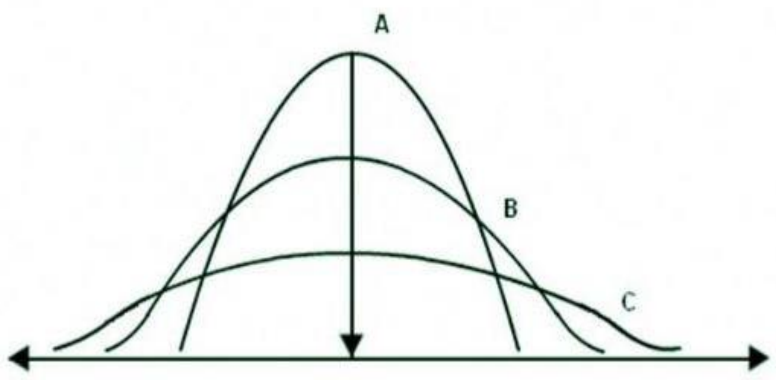
Example:

Class Limit	Frequency
1-	1
2-	4
3-	8
4-	7
5-	20
6-	3
6-7	2

Sol: $\textbf{Mode} = \textbf{L} + \left(\frac{f1-f0}{(f1-f0)+(f1-f2)}\right) . h$

Mode =5+(13/30)x1
=5.43

Measures of Dispersion Dispersion is the state of getting dispersed or spread. Statistical dispersion means the extent to which a numerical data is likely to vary about an average value. In other words, dispersion helps to understand the distribution of the data.



In statistics, the measures of dispersion help to interpret the variability of data i.e. to know how much homogenous or heterogeneous the data is. In simple terms, it shows how squeezed or scattered the variable is.

Types of Measures of Dispersion There are two main types of dispersion methods in statistics which are:

- Absolute Measure of Dispersion
- Relative Measure of Dispersion

Absolute Measure of Dispersion An absolute measure of dispersion contains the same unit as the original data set. Absolute dispersion method expresses the variations in terms of the average of deviations of observations. The types of absolute measures of dispersion are: **Range, Variance , Standard Deviation, Quartiles and Quartile Deviation, Mean Deviation.**

Relative Measure of Dispersion: The relative measures of depression are used to compare the distribution of two or more data sets. This measure compares values without units. Common relative dispersion methods include:

1. Coefficient of Variation
2. Coefficient of Standard Deviation
3. Coefficient of Mean Deviation

Range

The simplest measure of variability for a set of data is the range and is defined as the difference between the largest and smallest values in the set.

Range = Largest value-Smallest value

Example:

Find the range for the sample observations: 13, 23, 11, 17, 25, 18, 14, 24

Solution:

We see that the largest observation is 25 and the smallest observation is 11. The range is 25-11=14.

Example: Calculate range from following date

Class Limits	1-10	11-20	21-30	31-40	41-50
frequency	7	9	12	8	5

L= Upper boundary of the highest class = 75

S = Lower boundary of the lowest class = 60

Range = L – S = 75 – 60 = 15

Mean Deviation

The mean absolute deviation is defined exactly as the words indicate. The word “deviation” refers to the deviation of each member from the mean of the population. The term “absolute deviation” means the numerical (i.e. positive) value of the deviation, and the “mean absolute deviation” is simple.

Mean Value (M.D) = $\frac{\sum_{i=1}^{n}|xi-x'|}{n}$

To calculate mean absolute deviation it is necessary to take following steps:

1. Find x'

2. Find and record the signed differences

3. Find and record the absolute differences

4. Find $\sum_{i=1}^{n}|xi-x'|$

5. Find the mean absolute deviation.

Example 1: Suppose that sample consists of the observations **(**21, 17, 13, 25, 9, 19, 6, and 10) Find the mean deviation.

Solution: Perhaps the best manner to display the computations in steps **1**, **2**, **3**, and **4** is to make use of a table composed of three columns :

xi	$xi - x'$	$\|xi - x'\|$
21	21-15 = 6	6
17	17-15 = 2	2
13	13-15 = -2	2
25	25-15 = 10	10
9	9-15 = -6	6
19	19-15 = 4	4
6	6-15 = -9	9
10	10-15 = -5	5

$x' = \frac{120}{8} = 15$ $\sum 44$

Mean Value (M.D) = $\frac{\sum_{i=1}^{n}|xi-x'|}{n}$

$= \frac{44}{8} = 5.5$

Example 2: Suppose that sample consists of the observations 4, 6, 2, 0, 3, 5 and 8 Find the mean absolute deviation.

xi	$xi - x'$	$\|xi - x'\|$
4	4-4 = 0	0
6	6-4 = 2	2
2	2-4 = -2	2
0	0-4 = -4	4
3	3-4 = -1	1
5	5-4 = 1	1
8	8-4 = 4	4

$x' = \frac{28}{7} = 4$ $\sum 14$

Mean Value (M.D) = $\frac{\sum_{i=1}^{n}|xi-x'|}{n}$

$= \frac{14}{7} = 2$