**Variance and Standard deviation**

**Variance: mean of the squared deviations of the values from their mean**

For Grouped data

**Indirect Method**

For Grouped data

**Standard deviation: positive square root of the mean of the squared deviations of the values from their mean**

For Grouped data

**Indirect Method**

For Grouped data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Class limits** | **Mid Points (X)** | **frequency** |  |  |  |
| 45-49 | 47 | 1 | 20.83 | 433.89 | 433.89 |
| 50-54 | 52 | 4 | -15.83 | 250.589 | 1002.36 |
| 55-59 | 57 | 17 | -10.83 | 117.289 | 1993.92 |
| 60-64 | 62 | 28 | -5.83 | 33.989 |  |
| 65-69 | 67 | 25 | -0.83 | 0.689 |  |
| 70-74 | 72 | 18 | 4.17 | 17.389 |  |
| 75-79 | 77 | 13 | 9.17 | 84.089 |  |
| 80-84 | 82 | 6 | 14.17 |  |  |
| 85-89 | 87 | 5 | 19.17 |  |  |
| 90-94 | 92 | 2 | 24.17 |  |  |
| 95-99 | 97 | 1 | 29.17 |  |  |
| **Sum** |  | **120** |  |  | **10866.668** |

**Absolute and Relative Dispersion**

Measure of absolute dispersion cannot be used to compare the variation of two or more series. For example the standard deviation of heights of students cannot be compared with the S.D of weights. A measure of absolute dispersion does not, in itself, tell whether the variation is large or small. To compare the variation of two or more series, we need a measure called the relative dispersion defined by

**Types**

1. Coefficient of Range
2. Coefficient of Quartile deviation/ Semi-interquartile range
3. Coefficient of Mean Deviation
4. Coefficient of Variance
5. Coefficient of Standard deviation

**Coefficient of Range=**

**Coefficient of quartile deviation:**

**Coefficient of mean deviation:**

**Coefficient of Variance:**

The most commonly used measure of relative dispersion is the *coefficient of variation* which was introduced by karl Pearson. It is frequently used in comparing dispersion of two or more series. It is also used as a criterion of *consistence performance*; the smaller the coefficient of variation, the more consistence is the performance.

Example: Mean grade 78, Standard deviation: 8

Mean grade 73, standard deviation: 7.6

C.V for statistics=

**Standardized variable**

**Mean= 0, Variance = 1**