

# Standard Deviation

## Standard Deviation

The Standard Deviation is a measure of how spread out numbers are.

Its symbol is  $\sigma$  (the greek letter sigma)

The formulawise: it is the square root of the variance. variance is the average of the squared differences from the Mean.

To calculate the variance, follow these steps:

- Find out the Mean of the sample
- Then for each number: subtract the Mean from the X
- Square the result (the squared difference)

For non-grouped data

Non-grouped data is just a list of values. The standard deviation is given by the formula:

$$\sigma = \sqrt{\sum[X - \bar{X}]^2 / n - 1}$$

$\sigma$  = standard deviation

$\sum$  = summation of

$\bar{X}$  = X bar = mean

$n$  = number of observation

### Example

Find the standard deviation of 4, 6, 11, 12, 15, 18, 8, 12, 14

X	$X - \bar{X}$	$(X - \bar{X})^2$
4	$4 - 10 = -6$	36
6	$6 - 10 = -4$	16
11	$11 - 10 = 1$	1
12	$12 - 10 = 2$	4
15	$15 - 10 = 5$	25
18	$18 - 10 = 8$	64
8	$8 - 10 = -2$	4
12	$12 - 10 = 2$	4
14	$14 - 10 = 4$	16
$N = 10$		$\Sigma = 170$
$\bar{X} = 100/10 = 10$		

$$\sigma = \sqrt{\frac{170}{9}} = \sqrt{18.88}$$

$$= 4.34 \approx 4$$