**Interpretation (for QD): Comparing the results obtained from the two sets of values, we can say that the values in set B are less dispersed around the median as compared to the values in set A.**

### 3. The Mean Deviation or the Average Deviation

$$MD = \frac{\Sigma|X - \bar{X}|}{n}$$ **Formula 15**

where: MD = mean deviation
X = individual value
$\bar{X}$ = mean of data
n = total number of items or observations
$|X - \bar{X}|$ = deviations from the mean regardless of algebraic signs

Example: Mean Deviation for Ungrouped Data

Determine the mean deviation of the two sets of data and follow the steps below.

Sets of observation: A: 10, 8, 6, 5, 12, 11, 13, 7
B: 9, 4, 8, 6, 16, 9, 10, 17

Preview from Notesale.co.uk
Page 7 of 17

Step 1. Arrange the values in ascending or descending order.

Step 2. Find the sum of the values.

Step 3. Compute the value of the mean.

Step 4. Find the value of the deviation of each score from the mean.

Step 5. Find the **absolute value** of each deviation obtained in Step 4.

Step 6. Find the sum of the absolute values in Step 5.

Step 7. Substitute the values in the formula and solve.

| X (Step 1) | $X - \bar{X}$ (Step 4) | $\lvert X - \bar{X} \rvert$ (Step 5) |
|---|---|---|
| 5 | 5 - 9 = -4 | 4 |
| 6 | 6 - 9 = -3 | 3 |
| 7 | 7 - 9 = -2 | 2 |
| 8 | 8 - 9 = -1 | 1 |
| 10 | 10 - 9 = 1 | 1 |
| 11 | 11 - 9 = 2 | 2 |
| 12 | 12 - 9 = 3 | 3 |
| 13 | 13 - 9 = 4 | 4 |
| $\Sigma X$ = 72 (Step 2) | | $\Sigma\lvert X - \bar{X} \rvert = 20$ (Step 6) |

(Step 3) $\bar{X} = \frac{\Sigma X}{n} \frac{10+8+6+5+12+11+13+7}{8} = \frac{72}{8} = 9$

(Step 7) $MD = \frac{\Sigma\lvert X-\bar{X}\rvert}{n} = \frac{20}{8} = 2.5$

**Interpretation: This means that on the average, the scores of the students in set A deviated from the mean by 2.5.**

**Note: The lower the mean deviation, the closer the values are around the mean.**

**Try this! Solve set B as an exercise.**

Preview from Notesale.co.uk
Page 8 of 17

**4. The Variance**

**By Deviation Method (Long Method):**

For Variance of a Sample Data:

$s^2 = \frac{\Sigma(X-\bar{X})^2}{n-1}$ **Formula 16a**

where:
$s^2$= variance
x = individual value
$\bar{X}$ = mean
n = total number of items or observations

**By Raw Score Method (Short Method):**

For Variance of a Sample Data:

$s^2 = \frac{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}{n-1}$ **Formula 16b**

where:
$s^2$ = variance
x = individual value
$x^2$ = squared of individual value
n = total number of items or observations