

Statistics

CBSE Class 11 Maths · Knowledge organiser

KEY DEFINITIONS

Range

Maximum minus minimum: the simplest measure of spread.

Mean deviation

The average distance of the values from the mean or median.

Standard deviation

The square root of the variance; a larger value means the data are more spread out.

YOU SHOULD BE ABLE TO...

- Find the range, a simple mean deviation and a simple variance, and know how SD responds to scaling.
- Find mean deviations and variances from frequency tables, including about the median.
- Compare the spread of two data sets and interpret the result.
- Work backwards from a mean and variance to missing or corrected values.

COMMON MISTAKES

- ✗ Dropping the modulus in the mean deviation (the deviations then add to 0).
- ✗ Using the class limits instead of the class marks for grouped data.
- ✗ Dividing by n (number of classes) instead of $N = \sum f_i$.
- ✗ Forgetting to take the square root for the standard deviation, or subtracting $\bar{x}$ instead of $\bar{x}^2$ in the short formula.

KEY FORMULAS

Mean deviation about a $\frac{\sum f_i |x_i - a|}{\sum f_i}$

Variance; SD $\sigma^2 = \frac{\sum f_i (x_i - \bar{x})^2}{N} = \frac{\sum f_i x_i^2}{N} - \bar{x}^2$, $\sigma = \sqrt{\sigma^2}$

Adding k leaves σ unchanged; multiplying by k multiplies σ by $|k|$

WORKED EXAMPLE

Find the mean deviation about the mean of 3, 5, 9, 11.

$$\bar{x} = 7; |x - 7| = 4, 2, 2, 4: \text{MD} = \frac{12}{4} = 3.$$