

Computing the Variance

We can employ vector operations to compute the variance of an array of numbers. Consider data on a variable X to be expressed as a vector \underline{x}' (hypothetical scores on the first quiz)

$$\underline{x}' = (15, 11, 9, 14, 13, 12, 6, 13, 8, 10)$$

variance is the sum of squared deviations divided by the number of observations:

$$S^2 = \frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N}, \text{ where } \bar{X} = \frac{\sum_{i=1}^N X_i}{N}$$

Use vector notation and operations at each step along the way to compute the variance of this data set.

1. Do this by hand showing ALL steps, employing matrix notation and computation.
2. Also, complete these steps using the Matrix command language in SPSS.