What is the average of several standard deviations?

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The average of several standard deviations is a statistical measure that calculates the overall variability of a set of data points. It is determined by adding up all the standard deviations of the data points and dividing the sum by the number of data points. This value represents the average amount of deviation from the mean for the entire dataset. It is commonly used to gauge the level of variability within a set of data and can provide valuable insights for further analysis.

Find the Average of Several Standard Deviations

Occasionally you may be interested in finding the average of two or more standard deviations.

You can use one of two formulas to do so, depending on your data:

Method 1: Equal Sample Sizes

If you want to find the average standard deviation among *k* groups and each group has the same sample size, you can use the following formula:

Average S.D. = √ (s12 + s22 + ... + sk2) / k

where:

sk: Standard deviation for kth groupk: Total number of groups

Method 2: Unequal Sample Sizes

If you want to find the average standard deviation among *k* groups and each group does not have the same sample size, you can use the following formula:

Average S.D. = √ ((n1-1)s12 + (n2-1)s22 + ... + (nk-1)sk2) / (n1+n2 + ... + nk - k)

where:

nk: Sample size for kth groupsk: Standard deviation for kth groupk: Total number of groups

The following examples show how to use each formula in practice.

Method 1: Averaging Standard Deviations for Equal Sample Sizes

Suppose we'd like to calculate the average standard deviation of sales during the following six sales periods:

Sales Period	Mean Sales	Std. Deviation of Sales
1	46	12
2	44	11
3	49	8
4	58	8
5	60	6
6	49	14

Let's assume that we made the same number of sales transactions in each sales period. We can use the following formula to calculate the average standard deviation of sales per period:

Average standard deviation = √ (s12 + s22 + ... + sk2) / kAverage standard deviation = √ (122 + 112 + 82 + 82 + 62 + 142) / 6Average standard deviation = 10.21

The average standard deviation of sales per period is 10.21.

Method 2: Averaging Standard Deviations for Unequal Sample Sizes

Suppose we'd like to calculate the average standard deviation of sales during the following six sales periods:

Sales Period	Total Transactions	Mean Sales	Std. Deviation of Sales
1	22	46	12
2	17	44	11
3	15	49	8
4	19	58	8
5	20	60	6
6	19	49	14

Since the sample size (the total transactions) is not equal in each sales period, we'll use the following formula to calculate the average standard deviation of sales per period:

Average S.D. = √ ((n1-1)s12 + (n2-1)s22 + ... + (nk-1)sk2) / (n1+n2 + ... + nk - k)Average S.D. = √ ((21)122 + (16)112 + (14)82 + (18)82 + (19)62 + (18)142) / 106Average S.D. = 10.29

The average standard deviation of sales per period is 10.29.

Notice that the average standard deviation in both examples were quite similar. This is because the sample sizes (total transactions) in the second example were all fairly close together.

The two methods for calculating the average standard deviation will only differ greatly when the sample sizes differ greatly between the groups.