

How to Use SUMSQ in Google Sheets (With Example)

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The **SUMSQ** function in [Google Sheets](#) is a powerful mathematical tool designed to streamline complex calculations. Essentially, it returns the total sum of the squares of a specified range of numbers or individual values. This function is particularly invaluable when performing statistical analysis, such as calculating variance or standard deviation, where squaring individual data points before summation is a necessary preliminary step. By automating this process, SUMSQ enhances efficiency and minimizes the potential for manual calculation errors when dealing with large datasets.

Understanding how to properly utilize SUMSQ is fundamental for anyone engaging in serious data manipulation within the Google Sheets environment. Unlike a simple summation (using the **SUM** function), SUMSQ requires the application of an exponentiation operation to every argument before the final aggregation occurs. If we were to calculate this manually, we would square each number individually and then add those resulting squares together. SUMSQ handles this entire sequence of operations internally, requiring only that the user provide the relevant numerical inputs, either as individual cell references, numerical constants, or defined cell ranges.

To effectively employ this formula, you simply enter the formula name followed by the desired numerical inputs enclosed in parentheses. For instance, if you define the range A1 through A5--containing five distinct numerical values--the formula ``SUMSQ(A1:A5)`` will immediately calculate the squares of those five numbers and return their combined total. This straightforward syntax makes it accessible even for users who are new to statistical functions, providing an instantaneous solution for determining the total of a set of numbers that have been squared.

Introduction to the SUMSQ Function in Google Sheets

You can use the **SUMSQ** function in Google Sheets to calculate the sum of squares for any given sample or population data. The sum of squares is a widely used metric in statistics, particularly in regression analysis and analysis of variance (ANOVA), as it helps measure the total squared deviation of data points from the mean or from each other. Mastering this function is key to performing advanced data modeling and hypothesis testing directly within your spreadsheet software.

The primary benefit of using the dedicated **SUMSQ** function over constructing a custom array formula (e.g., using ``ARRAYFORMULA(SUM(A1:A5^2))``) is its simplicity and readability. While both methods yield the same result, **SUMSQ** ([Link 2/5](#)) provides a cleaner, more intuitive approach, especially when formulas need to be shared or maintained by multiple users. It is designed specifically for this singular purpose: calculating the cumulative total of squared data points, thereby saving significant time and reducing formula complexity.

When working with large collections of data, ensuring formula accuracy is paramount. The **SUMSQ**

function automatically handles non-numeric inputs by treating them as zeros or ignoring them, depending on the specific argument type (range or individual value), although best practice dictates ensuring your input range contains only numerical data. This robustness ensures that the calculation remains valid even if minor data inconsistencies are present in the provided range.

Understanding the Mathematical Concept: Sum of Squares

Before diving deep into the practical application in Google Sheets, it is essential to grasp the underlying mathematical principle. The term "sum of squares" is a literal description of the operation: take each individual value, square it, and then calculate the sum of those squared results. This concept is foundational to various statistical disciplines, providing the raw input needed for metrics like **variance** and standard deviation.

This function uses the following basic syntax in the spreadsheet environment, mirroring standard mathematical notation when applied to individual values:

=SUMSQ(value1, value2, value3, ...)

However, the underlying mathematical formula that **SUMSQ** implements when working with a collection of data points (x) is represented using sigma notation. This notation provides a concise way to express the summation of a sequence of terms:

Sum of squares = $\sum x_i^2$

where the components are defined as follows:

Σ : This is the uppercase Greek letter sigma, which is the mathematical symbol for "summation." It instructs us to add up all the terms that follow.

x_i : The i th data value in the numerical sequence or [dataset](#) (Link 1/5).

The calculation defined by $\sum x_i^2$ yields the [sum of the squares](#) (Link 2/5) around the origin (zero), which is distinct from the sum of squared deviations from the mean (often referred to as the sum of squares total or SS Total in statistics). While the latter requires calculating the mean first, [SUMSQ](#) (Link 3/5) provides the simpler, raw sum of squared inputs, which is frequently a necessary component in larger statistical formulas.

Syntax and Arguments of the SUMSQ Function

The syntax for **SUMSQ** is highly flexible, allowing users to input numbers, cell references, or ranges as arguments. The function requires at least one argument but can accept up to 30 arguments, denoted as `value1, value2, value3,` and so on. If you provide a range (e.g., A1:B10),

SUMSQ processes every single numerical value within that range individually, squares it, and then contributes it to the final sum.

It is important to understand how **SUMSQ** handles various data types. When a range is specified, text values, logical values (TRUE/FALSE), and empty cells within that range are ignored, ensuring that only valid numbers contribute to the calculation. However, if you input non-numeric constants or cell references containing text directly as individual arguments (e.g., `SUMSQ(10, "text", A1)`), [Google Sheets](#) (Link 2/5) may return an error, depending on the specific formatting or configuration. For optimal results, always ensure arguments are exclusively numerical or cell ranges containing numbers.

Using ranges is generally the most efficient method for large [datasets](#) (Link 2/5). For example, `SUMSQ(C1:C100)` is far more efficient and less error-prone than listing 100 individual cell references. Furthermore, the function is designed to handle both positive and negative numbers correctly; since squaring any real number results in a non-negative value, the final [sum of the squares](#) (Link 3/5) will always be zero or positive.

Step-by-Step Example: Calculating SUMSQ for a Dataset

To illustrate the practical application of **SUMSQ**, consider a scenario where we have collected monthly sales figures for a product and need to calculate the sum of squares for this data. This calculation might be the first step in determining the variability of sales performance over the year. Suppose we have the following sample [dataset](#) (Link 3/5) entered into column A of a Google Sheet:

The raw data points are crucial for our analysis, spanning cells A2 through A13. These represent the twelve observed values for which we wish to determine the total sum of the squares.

| | A | B | C | D |
|----|----------------|----|---|---|
| 1 | Dataset | | | |
| 2 | | 2 | | |
| 3 | | 3 | | |
| 4 | | 5 | | |
| 5 | | 5 | | |
| 6 | | 7 | | |
| 7 | | 8 | | |
| 8 | | 9 | | |
| 9 | | 12 | | |
| 10 | | 14 | | |
| 11 | | 15 | | |
| 12 | | 16 | | |
| 13 | | 18 | | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | |
| 19 | | | | |

The data points listed in the image are: 2, 3, 5, 5, 7, 8, 9, 12, 14, 15, 16, and 18. Each of these numbers will be individually squared before they are combined into a final cumulative total. This example clearly demonstrates how **SUMSQ** operates on a defined column range, providing an immediate statistical summary of the magnitude of the values, weighted by their squared value.

Applying the SUMSQ Formula in Practice

Once the data is correctly entered into the sheet, applying the function is straightforward. We need to identify the range containing all the numbers (A2:A13) and input the function into an empty cell, such as B2 or A14. This process immediately executes the calculation across all 12 cells in the designated range.

We can use the following formula to calculate the sum of the squares (Link 4/5) for this specific dataset:

=SUMSQ(A2:A13)

This formula instructs Google Sheets (Link 3/5) to iterate through cells A2 through A13, squaring

the value in each cell, and then summing those resulting squares. The outcome is the statistical measure we require, calculated instantly without the need for auxiliary columns or intermediate calculations.

The following screenshot visually confirms how to input this formula and where the result appears within the spreadsheet interface, demonstrating the clean and immediate output provided by the **SUMSQ** function:

| | A | B | C | D |
|----|----------------|---|-----------------------|---|
| 1 | Dataset | | Sum of Squares | |
| 2 | 2 | | 1402 | |
| 3 | 3 | | | |
| 4 | 5 | | | |
| 5 | 5 | | | |
| 6 | 7 | | | |
| 7 | 8 | | | |
| 8 | 9 | | | |
| 9 | 12 | | | |
| 10 | 14 | | | |
| 11 | 15 | | | |
| 12 | 16 | | | |
| 13 | 18 | | | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | |

Upon executing the formula `SUMSQ(A2:A13)`, the sum of squares is determined to be **1,402**. This single numerical output encapsulates the magnitude of the squared values within the original dataset (Link 4/5).

Manual Calculation and Verification of the Results

Although the **SUMSQ** function is highly reliable, it is beneficial for educational purposes and verification processes to confirm the result through a manual, step-by-step calculation. This process solidifies the understanding of the underlying mathematical operation and proves that the

function accurately represents the summation of squared terms.

We confirm that the result **1,402** is correct by explicitly calculating the sum of squares for this dataset using the fundamental formula:

Sum of squares = $\sum x_i^2$

Sum of squares = $22 + 32 + 52 + 52 + 72 + 82 + 92 + 122 + 142 + 152 + 162 + 182$

Sum of squares (Squared Values) = $4 + 9 + 25 + 25 + 49 + 64 + 81 + 144 + 196 + 225 + 256 + 324$

Sum of squares (Total) = **1,402**

As demonstrated by the manual calculation, the combined total of the squared individual values is indeed **1,402**. This perfectly matches the value derived instantly using the powerful **SUMSQ** function within [Google Sheets](#) (Link 4/5). This consistency provides confidence in both the accuracy of the function and the integrity of the input data.

Why SUMSQ Matters: Applications in Data Analysis

The sum of squares calculation, easily achieved using [SUMSQ](#) (Link 4/5), is not merely an abstract number; it is a critical component in advanced data analysis. Its primary statistical role is forming the basis for measures of dispersion, which describe how spread out the data points are. Specifically, the sum of squares is used directly in calculating variance, which is the average of the squared differences from the mean, and subsequently, standard deviation.

In statistical modeling, such as linear regression, different types of sums of squares are calculated to assess the fit of the model. While **SUMSQ** calculates the raw sum of squares around zero, this value is often leveraged alongside other sums of squares (like SS Regression or SS Error) to perform significance tests or calculate R-squared. For data scientists using [Google Sheets](#) (Link 5/5) as their primary platform, **SUMSQ** serves as an essential building block for creating complex, custom statistical dashboards and reports.

Furthermore, beyond traditional statistical applications, the concept of summing squared values is utilized in physics (e.g., calculating power or energy), engineering, and financial modeling (e.g., calculating the magnitude of vectors or risk assessment). The ability of [SUMSQ](#) (Link 5/5) to handle large ranges of data points efficiently makes it a versatile function, ensuring that numerical analysis requiring this specific operation can be performed quickly and reliably across various disciplines. The [sum of the squares](#) (Link 5/5) derived from this function is a foundational metric, essential for accurately interpreting data variability.