

# VAR Function

Computes the variance among all values in a column. Input column can be of Integer or Decimal. If no numeric values are detected in the input column, the function returns 0.

The **variance** of a set of values attempts to measure the spread in values around the mean. A variance of zero means that all values are the same, and a small variance means that the values are closely bunched together. A high value for variance indicates that the numbers are spread out widely. Variance is always a positive value.

$$\text{Var}(X) = [\text{Sum} ((X - \text{mean}(X))^2)] / \text{Count}(X)$$

If a row contains a missing or null value, it is not factored into the calculation.

## Relevant terms:

Term	Description
Population	Population statistical functions are computed from all possible values. See <a href="https://en.wikipedia.org/wiki/Statistical_population">https://en.wikipedia.org/wiki/Statistical_population</a> .
Sample	Sample-based statistical functions are computed from a subset or sample of all values. See <a href="https://en.wikipedia.org/wiki/Sampling_(statistics)">https://en.wikipedia.org/wiki/Sampling_(statistics)</a> .  These function names include SAMP in their name.

**NOTE:** Statistical sampling has no relationship to the samples taken within the product. When statistical functions are computed during job execution, they are applied across the entire dataset. Sample method calculations are computed at that time.

The square root of variance is standard deviation, which is used to measure variance under the assumption of a bell curve distribution. See *STDEV Function*.

For a version of this function computed over a rolling window of rows, see *ROLLINGVAR Function*.

## Basic Usage

```
var(myRating)
```

**Output:** Returns the variance of the group of values from the `myRating` column.

## Syntax and Arguments

```
var(function_col_ref) [group:group_col_ref] [limit:limit_count]
```

Argument	Required?	Data Type	Description
function_col_ref	Y	string	Name of column to which to apply the function

For more information on the `group` and `limit` parameters, see *Pivot Transform*.

For more information on syntax standards, see *Language Documentation Syntax Notes*.

## function\_col\_ref

Name of the column the values of which you want to calculate the variance. Column must contain Integer or Decimal values.

- Literal values are not supported as inputs.
- Multiple columns and wildcards are not supported.

### Usage Notes:

Required?	Data Type	Example Value
Yes	String (column reference)	myValues

## Examples

**Tip:** For additional examples, see *Common Tasks*.

This example illustrates how you can apply statistical functions to your dataset. Calculations include average (mean), max, min, standard deviation, and variance.

### Source:

Students took a test and recorded the following scores. You want to perform some statistical analysis on them:

Student	Score
Anna	84
Ben	71
Caleb	76
Danielle	87
Evan	85
Faith	92
Gabe	85
Hannah	99
Ian	73
Jane	68

### Transformation:

You can use the following transformations to calculate the average (mean), minimum, and maximum scores:

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	AVERAGE(Score)

<b>Parameter: New column name</b>	'avgScore'
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<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	MIN(Score)
<b>Parameter: New column name</b>	'minScore'

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	MAX(Score)
<b>Parameter: New column name</b>	'maxScore'

To apply statistical functions to your data, you can use the VAR and STDEV functions, which can be used as the basis for other statistical calculations.

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	VAR(Score)
<b>Parameter: New column name</b>	var_Score

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	STDEV(Score)
<b>Parameter: New column name</b>	stdev_Score

For each score, you can now calculate the variation of each one from the average, using the following:

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	$((\text{Score} - \text{avg\_Score}) / \text{stdev\_Score})$
<b>Parameter: New column name</b>	'stDevs'

Now, you want to apply grades based on a formula:

Grade	standard deviations from avg (stDevs)
A	stDevs > 1
B	stDevs > 0.5

C	-1 <= stDevs <= 0.5
D	stDevs < -1
F	stDevs < -2

You can build the following transformation using the `IF` function to calculate grades.

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	<code>IF((stDevs &gt; 1), 'A', IF((stDevs &lt; -2), 'F', IF((stDevs &lt; -1), 'D', IF((stDevs &gt; 0.5), 'B', 'C'))))</code>

For more information, see *IF Function*.

To clean up the content, you might want to apply some formatting to the score columns. The following reformats the `stdev_Score` and `stDevs` columns to display two decimal places:

<b>Transformation Name</b>	Edit column with formula
<b>Parameter: Columns</b>	<code>stdev_Score</code>
<b>Parameter: Formula</b>	<code>NUMFORMAT(stdev_Score, '##.00')</code>

<b>Transformation Name</b>	Edit column with formula
<b>Parameter: Columns</b>	<code>stDevs</code>
<b>Parameter: Formula</b>	<code>NUMFORMAT(stDevs, '##.00')</code>

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	<code>MODE(Score)</code>
<b>Parameter: New column name</b>	'modeScore'

## Results:

Student	Score	modeScore	avgScore	minScore	maxScore	var_Score	stdev_Score	stDevs	Grade
Anna	84	85	82	68	99	87.00000000000001	9.33	0.21	C
Ben	71	85	82	68	99	87.00000000000001	9.33	-1.18	D
Caleb	76	85	82	68	99	87.00000000000001	9.33	-0.64	C
Danielle	87	85	82	68	99	87.00000000000001	9.33	0.54	B
Evan	85	85	82	68	99	87.00000000000001	9.33	0.32	C
Faith	92	85	82	68	99	87.00000000000001	9.33	1.07	A

Gabe	85	85	82	68	99	87.000000000 00001	9.33	0.32	C
Hannah	99	85	82	68	99	87.000000000 00001	9.33	1.82	A
Ian	73	85	82	68	99	87.000000000 00001	9.33	-0.96	C
Jane	68	85	82	68	99	87.000000000 00001	9.33	-1.50	D