

# COVAR Function

Computes the covariance between two columns using the population method. Source values can be of Integer or Decimal type.

**Covariance** measures the joint variation between two sets of values. The sign of the covariance tends to show the linear relationship between the two datasets; positive covariance indicates that the numbers tend to increase with each other.

- The magnitude of the covariance is difficult to interpret, as it varies with the size of the source values.
- The normalized version of covariance is the correlation coefficient, in which covariance is normalized between -1 and 1. For more information, see *CORREL Function*.

## 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.  <b>NOTE:</b> 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.

**Wrangle vs. SQL:** This function is part of Wrangle, a proprietary data transformation language. Wrangle is not SQL. For more information, see *Wrangle Language*.

## Basic Usage

```
covar(squareFootage,purchasePrice)
```

**Output:** Returns the covariance between the values in the `squareFootage` column and the `purchasePrice` column.

## Syntax and Arguments

```
covar(function_col_ref1,function_col_ref2) [group:group_col_ref] [limit:limit_count]
```

Argument	Required?	Data Type	Description
function_col_ref1	Y	string	Name of column that is the first input to the function
function_col_ref2	Y	string	Name of column that is the second input to 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\_ref1, function\_col\_ref2

Name of the column the values of which you want to calculate the covariance. 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)	myInputs

### Examples

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

This example illustrates the following two-column statistical functions:

- CORREL - Correlation co-efficient between two columns. See *CORREL Function*.
- COVAR - Calculates the covariance between two columns. See *COVAR Function*.
- COVARSAAMP - Calculates the covariance between two columns using the sample population method. See *COVARSAAMP Function*.

### Source:

The following table contains height in inches and weight in pounds for a set of students.

Student	heightIn	weightLbs
1	70	134
2	67	135
3	67	147
4	67	160
5	72	136
6	73	146
7	71	135
8	63	145
9	67	138
10	66	138
11	71	161
12	70	131
13	74	131
14	67	157
15	73	161

16	70	133
17	63	132
18	64	153
19	64	156
20	72	154

**Transformation:**

You can use the following transformations to calculate the correlation co-efficient, the covariance, and the sampling method covariance between the two data columns:

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	round(correl(heightIn, weightLbs), 3)
<b>Parameter: New column name</b>	'corrHeightAndWeight'

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	round(covar(heightIn, weightLbs), 3)
<b>Parameter: New column name</b>	'covarHeightAndWeight'

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	round(covarsamp(heightIn, weightLbs), 3)
<b>Parameter: New column name</b>	'covarHeightAndWeight-Sample'

**Results:**

Student	heightIn	weightLbs	covarHeightAndWeight-Sample	covarHeightAndWeight	corrHeightAndWeight
1	70	134	-2.876	-2.732	-0.074
2	67	135	-2.876	-2.732	-0.074
3	67	147	-2.876	-2.732	-0.074
4	67	160	-2.876	-2.732	-0.074
5	72	136	-2.876	-2.732	-0.074
6	73	146	-2.876	-2.732	-0.074
7	71	135	-2.876	-2.732	-0.074
8	63	145	-2.876	-2.732	-0.074
9	67	138	-2.876	-2.732	-0.074

10	66	138	-2.876	-2.732	-0.074
11	71	161	-2.876	-2.732	-0.074
12	70	131	-2.876	-2.732	-0.074
13	74	131	-2.876	-2.732	-0.074
14	67	157	-2.876	-2.732	-0.074
15	73	161	-2.876	-2.732	-0.074
16	70	133	-2.876	-2.732	-0.074
17	63	132	-2.876	-2.732	-0.074
18	64	153	-2.876	-2.732	-0.074
19	64	156	-2.876	-2.732	-0.074
20	72	154	-2.876	-2.732	-0.074