

# POW Function

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Computes the value of the first argument raised to the value of the second argument. Each argument can be a Decimal or Integer literal or a reference to a column containing numeric values.

## Basic Usage

### Numeric literal example:

```
derive type:single value: POW(10,3)
```

**Output:** Generates a column containing the value of  $10^3$ , which is 1000.

### Column reference example:

```
derive type:single value: POW(MyValue,2) as: 'sqred_MyValue'
```

**Output:** Generates the new `sqred_myValue` column containing the value of the `MyValue` column raised to the power of 2 (squared).

## Syntax and Arguments

```
derive type:single value: POW(base_numeric_value, exp_numeric_value)
```

Argument	Required?	Data Type	Description
base_numeric_value	Y	string, decimal, or integer	Name of column or Decimal or Integer literal that is the base value to be raised to the power of the second argument
exp_numeric_value	Y	string, decimal, or integer	Name of column or Decimal or Integer literal that is the power to which to raise the base value

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

### base\_numeric\_value

Name of the column or numeric literal whose values are used as the bases for the exponential computation.

- Missing input values generate missing results.
- Literal numeric values should not be quoted.
- Multiple columns and wildcards are not supported.

### Usage Notes:

Required?	Data Type	Example Value
Yes	String (column reference) or Integer or Decimal literal	2 . 3

### exp\_numeric\_value

Name of the column or numeric literal whose values are used as the power to which the base-numeric value is raised.

- Missing input values generate missing results.
- Literal numeric values should not be quoted.
- Multiple columns and wildcards are not supported.

#### Usage Notes:

Required?	Data Type	Example Value
Yes	String (column reference) or Integer or Decimal literal	5

### Examples

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

### Example - Exponential functions

The following example demonstrates how the exponential functions work together. These functions include the following:

- EXP -  $e^X$ . See *EXP Function*.
- LN - natural logarithm of the above. See *LN Function*.
- LOG -  $10^X$ . See *LOG Function*.
- POW -  $X^Y$ . The value X raised to the power Y. See *POW Function*.

#### Source:

rowNum	X
1	-2
2	1
3	0
4	1
5	2
6	3
7	4
8	5

#### Transform:

```
derive type:single value: EXP (X) as: 'expX'
```

```
derive type:single value: LN (expX) as: 'ln_expX'
```

```
derive type:single value: LOG (X) as: 'logX'
```

```
derive type:single value: POW (10,logX) as: 'pow_logX'
```

## Results:

In the following, (null value) indicates that a null value is generated for the computation.

rowNum	X	expX	ln_expX	logX	pow_logX
1	-2	0.1353352832366127	-2	(null value)	(null value)
2	-1	0.1353352832366127	-0.9999999999999998	(null value)	(null value)
3	0	1	0	(null value)	0
4	1	2.718281828459045	1	0	1
5	2	7.3890560989306495	2	0.30102999566398114	1.9999999999999998
6	3	20.085536923187668	3	0.47712125471966244	3
7	4	54.59815003314423	4	0.6020599913279623	3.999999999999999
8	5	148.41315910257657	5	0.6989700043360187	4.999999999999999

## Example - Pythagorean Theorem

The following example demonstrates how the POW and SQRT functions work together to compute the hypotenuse of a right triangle using the Pythagorean theorem.

- POW -  $X^Y$ . In this case, 10 to the power of the previous one. See *POW Function*.
- SQRT - computes the square root of the input value. See *SQRT Function*.

The Pythagorean theorem states that in a right triangle the length of each side (x,y) and of the hypotenuse (z) can be represented as the following:

$$z^2 = x^2 + y^2$$

Therefore, the length of z can be expressed as the following:

$$z = \text{sqrt}(x^2 + y^2)$$

For more information on the Pythagorean theorem, see [https://en.wikipedia.org/wiki/Pythagorean\\_theorem](https://en.wikipedia.org/wiki/Pythagorean_theorem). **Source:**

The dataset below contains values for x and y:

X	Y
3	4

4	9
8	10
30	40

**Transform:**

You can use the following transform to generate values for  $z^2$ .

**NOTE:** Do not add this step to your recipe right now.

```
derive type:single value:(POW(x,2) + POW(y,2)) as:'Z'
```

You can see how column Z is generated as the sum of squares of the other two columns. Now, wrap the value computation in a SQRT function:

```
derive type:single value:SQRT((POW(x,2) + POW(y,2))) as: 'Z'
```

**Results:**

X	Y	Z
3	4	5
4	9	9.848857801796104
8	10	12.806248474865697
30	40	50