# EXAMPLE - Trigonometry Hyperbolic Arc Functions

This example illustrates how to apply inverse (arc) hyperbolic functions to your transformations.

- **Hyperbolic arcsine.** See *ASINH Function*.
- **Hyperbolic arccosine.** See *ACOSH Function*.
- **Hyperbolic arctangent.** See *ATANH Function*.

**Source:**

In the following sample, input values are in radians. In this example, all values are rounded to two decimals for clarity.

| Y |
|---|
| -4.00 |
| -3.00 |
| -2.00 |
| -1.00 |
| -0.75 |
| -0.50 |
| 0.00 |
| 0.50 |
| 0.75 |
| 1.00 |
| 2.00 |
| 3.00 |
| 4.00 |

**Transformation:**

The following transformations include checks for the valid ranges for input values.

Hyperbolic arcsine:

| | |
|---|---|
| **Transformation Name** | `New formula` |
| **Parameter: Formula type** | `Single row formula` |
| **Parameter: Formula** | `round(degrees(asinh(Y)), 2)` |
| **Parameter: New column name** | `'asinhY'` |

Hyperbolic arccosine:

Valid over the range (y > 1)

| | |
|---|---|
| **Transformation Name** | `New formula` |

| | |
|---|---|
| **Parameter: Formula type** | `Single row formula` |
| **Parameter: Formula** | `if(Y>1,round(degrees(acosh(Y)), 2),null())` |
| **Parameter: New column name** | `'acoshY'` |

Hyperbolic arctangent:

Valid over the range (-1 < y < 1)

| | |
|---|---|
| **Transformation Name** | `New formula` |
| **Parameter: Formula type** | `Single row formula` |
| **Parameter: Formula** | `if(abs(y)<1,round(degrees(atanh(Y)), 2),null())` |
| **Parameter: New column name** | `'atanhY'` |

**Results:**

| Y | atanhY | acoshY | asinhY |
|---|---|---|---|
| -4 | *null* | *null* | -120.02 |
| -3 | *null* | *null* | -104.19 |
| -2 | *null* | *null* | -82.71 |
| -1.5 | *null* | *null* | -68.45 |
| -1 | *null* | *null* | -50.5 |
| -0.75 | -55.75 | *null* | -39.71 |
| -0.5 | -31.47 | *null* | -27.57 |
| 0 | 0 | *null* | 0 |
| 0.5 | 31.47 | *null* | 27.57 |
| 0.75 | 55.75 | *null* | 39.71 |
| 1 | *null* | *null* | 50.5 |
| 1.5 | *null* | 55.14 | 68.45 |
| 2 | *null* | 75.46 | 82.71 |
| 3 | *null* | 101 | 104.19 |
| 4 | *null* | 118.23 | 120.02 |