

Table of Contents

- 1 math
 - 1.1 Constants
 - 1.2 Basic Arithmetic Functions
 - 1.2.1 Rounding Functions
 - 1.2.2 Exponential and Logarithmic Functions
 - 1.3 Trigonometric Functions
 - 1.3.1 Basic Trigonometric Functions
 - 1.3.2 Hyperbolic Functions
 - 1.4 Special Functions
 - 1.4.1 Two-argument Functions

math

This library provides common mathematical functions for floating-point arithmetic, trigonometry, and general numeric comparisons.

Constants

MoonBit math library provides the mathematical constant π

```
1
2  test "mathematical constants" {
3      inspect(@math PI, content="3.141592653589793")
4  }
```

Basic Arithmetic Functions

Rounding Functions

Several functions are available for rounding numbers in different ways:

```
1
2  test "rounding functions" {
3
4      inspect(@math round(3.7), content="4")
5      inspect(@math round(-3.7), content="-4")
6
7      inspect(@math ceil(3.2), content="4")
8      inspect(@math ceil(-3.2), content="-3")
9
10
11     inspect(@math floor(3.7), content="3")
12     inspect(@math floor(-3.7), content="-4")
13
14
15     inspect(@math trunc(3.7), content="3")
16     inspect(@math trunc(-3.7), content="-3")
17 }
18 }
```

Exponential and Logarithmic Functions

The library provides standard exponential and logarithmic operations:

```

1
2  test "exponential and logarithmic" {
3
4      inspect(@math exp(1.0), content="2.718281828459045")
5      inspect(@math expm1(1.0), content="1.718281828459045")
6
7
8      inspect(@math ln(2.718281828459045), content="1")
9      inspect(@math ln_1p(1.718281828459045), content="1")
10
11
12     inspect(@math log2(8.0), content="3")
13     inspect(@math log10(100.0), content="2")
14 }

```

Trigonometric Functions

Basic Trigonometric Functions

Standard trigonometric functions operating in radians:

```

1
2  test "basic trigonometry" {
3
4      inspect(@math sin(@math PI / 2.0), content="1")
5      inspect(@math cos(0.0), content="1")
6      inspect(@math tan(@math PI / 4.0), content="0.9999999999999999")
7
8
9      inspect(@math asin(1.0), content="1.5707963267948966")
10     inspect(@math acos(1.0), content="0")
11     inspect(@math atan(1.0), content="0.7853981633974483")
12 }

```

Hyperbolic Functions

The library also includes hyperbolic functions and their inverses:

```

1
2  test "hyperbolic functions" {
3
4      inspect(@math sinh(1.0), content="1.1752011936438014")
5      inspect(@math cosh(1.0), content="1.5430806348152437")
6      inspect(@math tanh(1.0), content="0.7615941559557649")
7
8
9      inspect(@math asinh(1.0), content="0.881373587019543")
10     inspect(@math acosh(2.0), content="1.3169578969248166")
11     inspect(@math atanh(0.5), content="0.5493061443340548")
12 }

```

Special Functions

Two-argument Functions

Some special mathematical functions taking two arguments:

```
1
2  test "special functions" {
3
4      inspect(@math atan2(1.0, 1.0), content="0.7853981633974483")
5
6
7      inspect(@math hypot(3.0, 4.0), content="5")
8
9
10     inspect(@math cbrt(8.0), content="2")
11 }
```