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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_lpm(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 }
```