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math

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

Constants

MoonBit math library provides the mathematical constant ?:

```
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
8     inspect(@math ceil(3.2), content="4")
9     inspect(@math ceil(-3.2), content="-3")
10
11
12    inspect(@math floor(3.7), content="3")
13    inspect(@math floor(-3.7), content="-4")
14
15
16    inspect(@math trunc(3.7), content="3")
17    inspect(@math trunc(-3.7), content="-3")
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:

```

  test "special functions" {

    inspect(@math atan2(1.0, 1.0), content="0.7853981633974483")


    inspect(@math hypot(3.0, 4.0), content="5")


    inspect(@math cbrt(8.0), content="2")
  }
```