

# Simple example

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## 1 Hello

This is a simple example using the  $\text{\LaTeX}$  library and some math stuff.

### 1.1 Arithmetics with infix operators

$$4^{(2^3)^2} - 10000 \cdot 10000 \cdot (10000 \cdot 10000) \cdot (10000 \cdot 10000 \cdot 10000)$$

is  $3.402 \cdot 10^{38}$ . For  $x = 19$  and  $\tau = 2 \cdot \pi$ ,

$$2 + 7 \cdot (6 - \tau) - e^{5 - \sqrt{x^2 + \frac{4}{\pi}}} \approx 1.77 \cdot 10^{-2}.$$

### 1.2 Simple finite sums / products

$$\sum_{n \in \{0,1,4,5\}} \frac{5}{2} - n = 0$$

$$\sum_{n=1}^4 \frac{5}{2} - n = 0$$

$$\sum_{j=1}^{40} \cos\left(\frac{2 \cdot \pi}{40} \cdot j\right) \approx -2.33 \cdot 10^{-15}$$

$$2 \cdot \sum_{i=1}^6 i^2 + i = 224$$

$$\left(\sum_{i=1}^6 i^2 + i\right) \cdot 2 = 224$$

$$\left(\sum_{i=1}^6 i^2 + i\right) + 2 = 114$$

$$\sum_{i=1}^6 \sum_{j=1}^6 i \cdot j = 441$$

$$\sum_{i=1}^6 i \cdot \sum_{j=1}^6 j = 441$$

$$\sum_{i=1}^6 \sum_{j=1}^i i \cdot j = 266$$

$$\sum_{i=1}^6 \prod_{j=1}^i i \cdot j \approx 3.397 \cdot 10^7$$

### 1.3 Checking some simple identities

$$\arcsin(\sin(\arccos(\cos(\arctan(\tanh 0)))))$$

is 0,

$$\operatorname{arcsinh}\left(\sinh\left(\operatorname{arccosh}\left(\frac{\cosh(\operatorname{arctanh}(\tanh 0))}{2}\right)\right)\right)$$

**is not.** (Test passed.)

A simple equations chain:

$$\begin{aligned} 10^{18} &= 10^9 \cdot 10^9 \\ &= 10^{3^2} \cdot 10^5 \cdot 10^4 \\ &= 1000000000000000000. \end{aligned}$$

(Test passed.)

Another equations chain, this time using floats:

$$\begin{aligned} 10^{-18} &= 10^{-9} \cdot 10^{-9} \\ &= 10^{-(3^2)} \cdot 10^{-5} \cdot 10^{-4} \\ &= \frac{1}{1000000000000000000}. \end{aligned}$$

**Test failed.** Even true mathematical identities may not show to hold when using floating-point arithmetics.

Equation-chains can also be approximate (“rough”):

$$\begin{aligned}10^{-18} &\approx 10^{-9} \cdot 10^{-9} \\&\approx 10^{-(3^2)} \cdot 10^{-5} \cdot 10^{-4} \\&\approx \frac{1}{999998765432100000}.\end{aligned}$$

(Test passed.)