

1 Inline and display math

Inline math: α or $\sum_i n_i$ or just x .

Unnumbered display math:

$$x = \sum_{i=0}^{\infty} y_i$$

Below an example of numbered display math which can be referred to by page number 1 or equation number 1:

$$x = \sum_{i=0}^{\infty} y_i \tag{1}$$

2 Math notation

We already saw greek letters. Here are some more: ϵ , ξ , Ξ , ε .

Mathematicians like to decorate their symbols: x' , \hat{a} , \acute{e} , \bar{i} , \vec{o} , \dot{u} , \ddot{v} , even putting two accents on top of each other: $\vec{\ddot{y}}$.

Various operators: $\alpha = \Omega$, $x < y$, $\gamma \leq \xi$

Subscripts and superscripts:

$$x_i, x_{i+1}, a^2, b^{x+y}$$

Fractions

$$x/y \text{ and } \frac{\alpha}{\beta + \gamma}$$

Roots

$$\sqrt{x+y}, \sqrt[3]{2}$$

Sums, products and integrals

$$\sum_i x_i = \prod_{i=2}^7 i + 1 = \int_{z=0}^{\infty} z^2$$

3 Arrays and matrices

Native \LaTeX matrix with each column differently aligned

$$\begin{array}{rcl} 0.15 & 3a & 0 \\ 0.0003 & 5b & 10 \\ 0.011 & ab & 1 \end{array}$$

Matrices, amsmath-style

$$\begin{matrix} x & y & z \\ .0 & .01 & .001 \end{matrix}$$

Variations:

$$\begin{pmatrix} x & y & z \\ .0 & .01 & .001 \end{pmatrix} \begin{bmatrix} x & y & z \\ .0 & .01 & .001 \end{bmatrix}$$

Matrices with ellipses

$$\begin{bmatrix} a_{11} & \cdots & a_{1m} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nm} \end{bmatrix} \begin{bmatrix} a_{11} & \cdots & a_{1m} \\ \cdots & \cdots & \cdots \\ a_{n1} & \cdots & a_{nm} \end{bmatrix}$$

4 Large delimiters

$$\begin{pmatrix} 10 & 100 \\ a & b \end{pmatrix}$$

Single large delimiter

$$\begin{cases} a \\ b \end{cases}$$

5 Other multiline constructs

Amsmath numbered multiline equation with one unnumbered row

$$\begin{aligned} f(x) &= (a + b)^2 \\ &= a^2 + 2ab + b^2 \end{aligned} \tag{2}$$

$$\neq (a + b)(a - b) \tag{3}$$

See equations 2 and 3.

Unnumbered:

$$\begin{aligned} f(x) &= (a + b)^2 \\ &= a^2 + 2ab + b^2 \end{aligned}$$

6 Fonts in math

Italic, Roman, Bold: *E*, E, *p*, p, *M*, **M**, *v*, **v**

Bold Greek: $\boldsymbol{\psi}$, $\boldsymbol{\psi}$, $\boldsymbol{\infty}$, $\boldsymbol{\infty}$ (may require `\usepackage{bm}`)

Fancy fonts: \mathbb{B} \mathcal{A} \mathfrak{A}