Exercise: Math mode

1) Inline math

Inline formula: $y = mx + c$. Another example: $5^2 = 3^2 + 4^{1000}$. Superscripts and subscripts: a^b or a_b and x_n^{1000}.

Spaces does not register in this mode. For manual spacing use , , .

2) Display math

The same formula can be showcased in the middle of the page on its own line:

$$y = kx + c$$

Text will go on after this notation as normal.

3) Greek letters

For example: $\alpha, \beta, \gamma, \theta, \lambda, \pi, \omega$ and $\Gamma, \Delta, \Theta, \Lambda, \Pi, \Omega$.

4) Integral + neatly typeset `dx`

$$\int_{-\infty}^{+\infty} e^{-x^2} \, dx$$

5) Numbered equations

$$(x + y)(x - y) = x^2 - y^2 \tag{1}$$

6) amsmath: alignment and text inside math

$$Q_{n,0} = 1, \quad Q_{0,k} = [k = 0]; \tag{2}$$

$$Q_{n,k} = Q_{n-1,k} + Q_{n-1,k-1} + \binom{n}{k}, \quad \text{for } n, k > 0. \tag{3}$$

7) Matrices

$$\begin{pmatrix} a & b & c \\ d & e & f \end{pmatrix} \quad \begin{bmatrix} 1 & 2 \\ -5 & -6 \end{bmatrix}$$

8) Fonts in math mode + nesting

Compare:
$$\text{``size''} \neq size \neq \text{size} \neq \textbf{size}$$

Individual styles:

$$\text{ABC} \quad ABC \quad \textbf{ABC} \quad \mathsf{ABC} \quad \mathtt{ABC} \quad \mathbb{R} \; \mathbb{N} \; \mathbb{Z}$$

Now nesting will be present after the compilation is complete.

$$\mathsf{A} \quad \textbf{A} \quad \boldsymbol{\alpha} \quad \alpha$$

9) Two more environments: gather and multline

$$P(x) = ax^5 + bx^4 + cx^3 + dx^2 + ex + f \tag{4}$$
$$x^2 + x = 10 \tag{5}$$

$$(a + b + c + d)x^5 + (b + c + d + e)x^4$$
$$+ (c + d + e + f)x^3 + (d + e + f + a)x^2 + (e + f + a + b)x$$
$$+ (f + a + b + c)$$