

# Mathematics in LaTeX

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## 1 Basic Math

### 1.1 Inline Math

The Pythagorean theorem:  $a^2 + b^2 = c^2$ .

### 1.2 Display Math

The quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

## 2 Mathematical Environments

### 2.1 Equation Environment

$$\lim_{x \rightarrow \infty} \frac{1}{x} = 0 \tag{1}$$

### 2.2 Aligned Equations

$$f(x) = x^2 \tag{2}$$

$$g(x) = \sin(x) \tag{3}$$

### 2.3 Cases Environment

$$f(x) = \begin{cases} 1 & \text{if } x \geq 0 \\ 0 & \text{if } x < 0 \end{cases}$$

## 3 Mathematical Symbols

### 3.1 Greek Letters

$$\alpha, \beta, \gamma, \Delta, \epsilon, \theta, \pi, \Sigma, \omega$$

### 3.2 Mathematical Operators

$$\sin(x), \cos(x), \lim_{n \rightarrow \infty}, \sum_{i=1}^n, \bigcup_{i=1}^n$$

### 3.3 Brackets and Delimiters

$$(a+b) \times (c-d) = ac - ad + bc - bd$$
$$\left(\frac{1}{2}\right)$$

## 4 Theorem Environments

**Theorem 1** (Pythagorean Theorem). *For a right triangle, the square of the length of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the lengths of the other two sides.*

$$a^2 + b^2 = c^2$$

*Proof.* This follows directly from the definition of a right triangle. □

## 5 Conclusion

This document has demonstrated various mathematical expressions, environments, symbols, and theorem environments available in L<sup>A</sup>T<sub>E</sub>X.