

Mathematical Notation

Numbers

Notation	Meaning	Example
\mathbb{N}	Natural numbers	1, 2, 3, ... (some people include 0)
\mathbb{Z}	Integers	..., -2, -1, 0, 1, 2, ...
\mathbb{R}	Real numbers	$\frac{1}{2}, \sqrt{2}, \pi, \dots$
$ x $	modulus	$ 2 = 2, -3 = 3$
a/b or $\frac{a}{b}$	a over b	$12/3 = 4, 2/4 = 0.5$
$a \mid b$	a divides b	$4 \mid 12$
${}^m C_n$ or $\binom{m}{n}$	m choose n	${}^5 C_2 = 10$
$n!$	n factorial	$5! = 120$
$\sum_{i=a}^b x_i$	$x_a + x_{a+1} + \dots + x_b$	$\sum_{i=1}^3 i^2 = 1^2 + 2^2 + 3^2 = 14$

Sets

Notation	Meaning	Example
$\{\dots\}$	a set	$\{1, 2, 3\}$
$x \in A$	x is an element of the set A	NOTE: $\{1, 2\} = \{2, 1\}$ $2 \in \{1, 2, 3\}$
$\{x : \dots\}$ or $\{x \mid \dots\}$	the set of all x such that ...	$\{x : x^2 = 4\} = \{-2, 2\}$
$ A $	cardinality of A (number of elements in A)	$ \{1, 2, 3\} = 3$
$A \cup B$	A union B (set of elements in either A or B)	$\{1, 2, 3\} \cup \{2, 4\} = \{1, 2, 3, 4\}$
$A \cap B$	A intersection B (set of elements in both A and B)	$\{1, 2, 3\} \cap \{2, 4\} = \{2\}$
$A \setminus B$	set difference (set of elements in A but not B)	$\{1, 2, 3\} \setminus \{2, 4\} = \{1, 3\}$
$A \subseteq B$	A is a subset of B (or equal)	$\{1, 3\} \subseteq \{1, 2, 3\}$
A'	complement of A	everything not in A
\emptyset	empty set (no elements)	$\{1, 2\} \cap \{3, 4\} = \emptyset$
(x, y)	ordered pair	NOTE: $(1, 2) \neq (2, 1)$
$A \times B$	Cartesian product (set of all ordered pairs)	$\{1, 2\} \times \{1, 3\} =$ $\{(1, 1), (2, 1), (1, 3), (2, 3)\}$

The Greek alphabet

You don't need to learn this; keep it for reference. Apologies to Greek students: you may not recognise this, but it is the Greek alphabet that mathematicians use!

Name	Capital	Lowercase
alpha	A	α
beta	B	β
gamma	Γ	γ
delta	Δ	δ
epsilon	E	ϵ
zeta	Z	ζ
eta	H	η
theta	Θ	θ
iota	I	ι
kappa	K	κ
lambda	Λ	λ
mu	M	μ
nu	N	ν
xi	Ξ	ξ
omicron	O	\omicron
pi	Π	π
rho	P	ρ
sigma	Σ	σ
tau	T	τ
upsilon	Υ	υ
phi	Φ	ϕ
chi	X	χ
psi	Ψ	ψ
omega	Ω	ω