Math Notation Cheat Sheet

Operations & grouping

Multiplication	$4 \times 3 = 4 \cdot 3 = 12$
Division and remainder	$19 \div 4 = 4$ remainder 3
Group before operating	$3(2 + 4) = 18$
Root and power	$\sqrt{(49)} = 7;\ 7^2 = 49$

A fraction bar groups all of its numerator and denominator.

Equality & comparisons

Equal; not equal	$8 = 5 + 3;\ 8 \neq 9$
Inclusive comparisons	$0 \leq x;\ x \geq 0$
Identity for all x	$(x + 1)^2 \equiv x^2 + 2x + 1$
Approximately equal	$\pi \approx 3.14$
Proportional to	$C \propto r$ when $C = 2\pi r$

The open end of < or > faces the greater value.

Functions, change & indexes

Evaluate a function	$f(x) = x^2;\ f(4) = 16$
Change from first to second	$\Delta x = x_2 - x_1$
Magnitude and factorial	$\lvert -6 \rvert = 6;\ 4! = 24$
Summation	$\sum_{k=1}^{3} k^2 = 14$
Product	$\prod_{k=1}^{3} k = 1 \times 2 \times 3 = 6$

Subscripts can identify an input, a position or a starting index.

Greek letters you will meet

Alpha, beta, gamma, delta	A α · B β · Γ γ · Δ δ
Epsilon, zeta, eta, theta	E ε · Z ζ · H η · Θ θ
Iota, kappa, lambda, mu	I ι · K κ · Λ λ · M μ
Nu, xi, omicron, pi	N ν · Ξ ξ · O ο · Π π
Rho, sigma, tau, upsilon	P ρ · Σ σ · T τ · Υ υ
Phi, chi, psi, omega	Φ φ · X χ · Ψ ψ · Ω ω

Use the letter's meaning in its problem.

Sets, chance & data

In the set	$2 \in \{1, 2, 3\};\ 4 \notin \{1, 2, 3\}$
Both events; either event	$A \cap B;\ A \cup B$
Probability given B	$P(A \mid B) = P(A \cap B)/P(B)$
Population variance	σ^2

Conditional probability requires P(B) > 0. An inclusive "or" includes outcomes in both events.

Vectors, matrices & complex

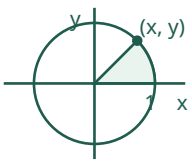
Vector and length	$\mathbf{v} = (3, 4);\ \lVert \mathbf{v} \rVert = 5$
Transpose and inverse	$A^T;\ A^{-1}$
Determinant	$\det(A)$
Complex number	$z = 2 - 3i;\ i^2 = -1$

A transpose swaps rows and columns. A matrix inverse exists only for a nonsingular square matrix.

Angles in degrees & radians

Full turn	$360° = 2\pi$ radians
Right angle	$90° = \pi/2$ radians
Reference angle	$30° = \pi/6$ radians

Radians measure arc length per radius. The unit circle has radius 1.



Derivatives & accumulation

First and second derivative	$f'(x);\ f''(x)$
Hold other variables fixed	$\partial f/\partial x$
Derivative of x^2	$d(x^2)/dx = 2x$
Signed accumulation	$\int_0^2 x\,dx = 2$

The limits of a definite integral show the interval. The dx names the integration variable.

