NOTATION · CHEAT SHEET

Vector Notation at a Glance

The marks from the notation cards across the vector pages: how each is read and what it means. Every group links to the full card on its page.

VECTORS

$\mathbf{v},\ \vec{v}$

VECTOR V
Bold in print, an arrow by hand: either marks a vector, not a number.

$\overrightarrow{AB}$

VECTOR A B
The vector from point A to point B.

$\mathbf{i}, \mathbf{j}, \mathbf{k}$

THE STANDARD BASIS
Unit vectors along the axes; also $\mathbf{e}_1, \ldots, \mathbf{e}_n$.

BASIC OPERATIONS

$(v_1, \ldots, v_n)$

V WITH COMPONENTS V ONE TO V N
The subscript names a slot: v_2 is the second component, a number.

$\mathbb{R}^n$

R N, REAL N-SPACE
All vectors with n real components.

MAGNITUDE

$\|\mathbf{v}\|$

THE NORM OF V
Length; two bars for a vector, one for a number.

$\|\mathbf{v}\|_1,\ \|\mathbf{v}\|_\infty$

ONE-NORM, INFINITY-NORM
The subscript picks the norm; $\|\mathbf{v}\|_2$ is the usual length.

$\hat{\mathbf{u}}$

U HAT
A unit vector: $\|\hat{\mathbf{u}}\| = 1$.

DOT PRODUCT

$\mathbf{a} \cdot \mathbf{b}$

A DOT B
A number from two vectors; $\mathbf{ab}$ with no dot means nothing.

$\mathbf{a}^T\mathbf{b}$

A TRANSPOSE B
The same number in matrix form: row times column.

CROSS PRODUCT

$\mathbf{a} \times \mathbf{b}$

A CROSS B
A vector from two vectors, in $\mathbb{R}^3$ only.

$\mathbf{a} \cdot (\mathbf{b} \times \mathbf{c})$

A DOT, B CROSS C
The scalar triple product: a signed volume.

VECTOR PROPERTIES

$\mathbf{a} \parallel \mathbf{b}$

A IS PARALLEL TO B
One is a scalar multiple of the other: $\mathbf{a} = c\mathbf{b}$.

$\mathbf{a} \perp \mathbf{b}$

A IS ORTHOGONAL TO B
Their dot product is 0.

$\mathbf{0}$

THE ZERO VECTOR
Parallel and orthogonal to every vector.

SAME MARKS, DIFFERENT JOB

$\lvert x\rvert$ vs $\|\mathbf{v}\|$	One pair of bars for a number, two for the length of a vector.
$\cdot$ and $\times$	Between numbers, plain multiplication; between vectors, the dot and cross products.
v_2 vs $\mathbf{v}_2$	Plain: the second component of $\mathbf{v}$; bold: the second vector in a list.