NOTATION · CHEAT SHEET

Powers, Roots and Logarithms: Notation at a Glance

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

POWERS

-2^2

THE NEGATIVE OF TWO SQUARED
The power is taken first: $-2^2 = -4$.

$(-2)^2$

NEGATIVE TWO, SQUARED
Brackets put the sign under the power: $(-2)^2 = 4$.

a^{2^3}

A TO THE TWO CUBED
Stacked powers are read from the top down: a^8, not a^6.

NATURAL EXPONENTS

a^n

A TO THE N
n factors of a; read a squared, a cubed for $n = 2, 3$.

$-2^4 \neq (-2)^4$

MINUS TWO-TO-THE-FOURTH VS MINUS-TWO TO THE FOURTH
-16 against 16: the brackets decide what is raised.

NEGATIVE EXPONENTS

a^{-n}

A TO THE MINUS N
The reciprocal $\frac{1}{a^n}$; the minus never makes the value negative.

a^{-1}

A INVERSE
The reciprocal $\frac{1}{a}$.

$\mathrm{m\,s^{-2}}$

METRES PER SECOND SQUARED
In units, a negative power means per.

RATIONAL EXPONENTS

$a^{m/n}$

A TO THE M OVER N
The n-th root of a^m: denominator is the root, numerator the power.

$(-8)^{2/6}$

EXPONENT READ IN LOWEST TERMS
Reduce first: $(-8)^{1/3} = -2$.

`8^(1/3)`

EIGHT TO THE ONE-THIRD, IN CODE
Needs the brackets; `8^1/3` is $\frac{8}{3}$.

EXPONENTIAL FUNCTIONS

e

E, EULER'S NUMBER
The base $e \approx 2.71828$.

$\exp(x) = e^x$

EXP OF X
The same function, written so the exponent stays on the line.

$P(t) = P_0\, e^{kt}$

P OF T EQUALS P-NAUGHT E TO THE K T
P_0 is the start value, k the growth rate.

ROOTS

$a^{1/n}$

A TO THE ONE OVER N
The n-th root of a in exponent form.

$(\sqrt[n]{a})^m$

THE N-TH ROOT OF A, RAISED TO THE M
The same value as $a^{m/n}$, root taken first.

ROOT PROPERTIES

$\sqrt[n]{a}$

THE N-TH ROOT OF A
Index n in the crook; index 2 is left unwritten.

$\sqrt{9+16}$

THE ROOT OF THE WHOLE QUANTITY
The bar covers the sum: $\sqrt{25} = 5$, not $3 + 4$.

$\pm \cdot \mp$

PLUS OR MINUS; MINUS OR PLUS
Two values in one line; $\mp$ takes the opposite sign.

COMMON AND NATURAL LOGARITHMS

$\log_b x$

LOG BASE B OF X
The exponent b needs to reach x.

$\log x$

LOG OF X
Base 10 in school and on calculators; often base e in higher maths.

$\ln x$

NATURAL LOG OF X
Base e: $\ln x = \log_e x$.

SAME MARKS, DIFFERENT JOB

a^{-1}	For a number, the reciprocal; for a function, f^{-1} is the inverse function, not $\frac{1}{f}$.
$a^{1/n}$ vs $\sqrt[n]{a}$	One value, two spellings: the exponent form and the radical form.
$\log x$	Base 10 or base e depending on who is writing; $\ln$ is always base e.