NOTATION · CHEAT SHEET

Arithmetic Notation at a Glance

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

FRACTIONS

$\frac{a}{b}$	**A OVER B** The vinculum: numerator over denominator, a division held in place.
a/b	**A SLASH B; A OVER B** The inline spelling for running text and code; same value, no grouping power.
$a \div b$	**A DIVIDED BY B** The obelus, the schoolroom division sign: $a \div b = \frac{a}{b}$.

MIXED NUMBERS

$2\frac{3}{4}$	**TWO AND THREE QUARTERS** Adjacency means addition here, and only here: $2 + \frac{3}{4}$.
$3\frac{5}{4}$ vs $4\frac{1}{4}$	**NON-STANDARD FORM, AND ITS CORRECTION** The fractional part must be proper; carry the extra whole.
$-2\frac{3}{4}$	**NEGATIVE TWO AND THREE QUARTERS** The minus grips the whole package: $-(2 + \frac{3}{4})$.

DIVISIBILITY

$a \mid b$	**A DIVIDES B** A statement, true or false: $b = a \cdot k$ for some integer k.
$5 \nmid 12$	**FIVE DOES NOT DIVIDE TWELVE** The slashed bar denies: no integer k gives $12 = 5k$.
$b \bmod a = 0$	**B MOD A EQUALS ZERO** The same fact as a computation: the remainder vanishes.

FACTORS

$n = p_1^{a_1} \cdots p_k^{a_k}$	**N AS A PRODUCT OF PRIME POWERS** Canonical factorisation: p for primes, exponents count repeats.
$d(n) \cdot \tau(n)$	**D OF N; TAU OF N** The number of positive divisors of n.
$\sigma(n)$	**SIGMA OF N** The sum of the positive divisors: $\sigma(12) = 28$.

GCD

$\gcd(a, b)$	**THE G-C-D OF A AND B** Greatest common divisor, in function spelling.
HCF, GCF	**HIGHEST, OR GREATEST, COMMON FACTOR** Other names for the gcd: HCF in British and Indian schools, GCF in American schools.
$\gcd(a, b) = 1$	**A AND B ARE COPRIME** The equation is the notation; coprimality has no mark of its own.

LCM

$\operatorname{lcm}(a, b)$	**THE L-C-M OF A AND B** Least common multiple, the mirror twin of $\gcd$.
$[a, b]$	**BRACKET A, B** Number theory's shorthand for the lcm; (a, b) is the gcd.
LCM vs LCD	**LEAST COMMON MULTIPLE; LEAST COMMON DENOMINATOR** The LCD of fractions is the LCM of their denominators.

MODULO

$a \bmod n$	**A MOD N** The operator that computes a remainder: $17 \bmod 5 = 2$.
$a \,\%\, n$	**A PERCENT N** The remainder operator in code: C, Java, Python, JavaScript.
$a \equiv b \pmod n$	**A IS CONGRUENT TO B MODULO N** A statement: a and b leave the same remainder.

INTEGER PART

$\lfloor x \rfloor$	**FLOOR OF X** The greatest integer at most x: the integer part.
$\lceil x \rceil$	**CEILING OF X** The least integer at least x.
$\{x\}$	**FRACTIONAL PART OF X** What the floor leaves: $x - \lfloor x \rfloor$, in $[0, 1)$.
$\lfloor x + \frac{1}{2} \rfloor$	**X ROUNDED TO THE NEAREST INTEGER** Rounding built from the floor; ties go up: $2.5 \to 3$.

SAME MARKS, DIFFERENT JOB

$a \mid b$	Divides, between integers; such that, inside set braces; absolute value when doubled.
(a, b) vs $[a, b]$	The gcd and the lcm in number-theory shorthand; a point or an interval elsewhere.
$\{x\}$	The fractional part here; a one-element set in set theory.
$\bmod$ vs $\pmod n$	An operator that returns a number; a label on a congruence statement.
$\sigma(n)$	The divisor sum here; a standard deviation in statistics.