NOTATION · CHEAT SHEET

Function Notation at a Glance

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

BASICS

$f(x)$	**F OF X** f names the rule, $f(x)$ its output; never f times x.
$g(t),\ P(n)$	**G OF T; P OF N** Any letter can name a function; t hints at time, n at counting.
$f(x+1)$	**F OF X PLUS ONE** Whatever is in the brackets replaces x everywhere.

DOMAIN

$[2,5)$	**TWO INCLUDED, FIVE EXCLUDED** Square bracket in, round bracket out.
$\{x \mid x \geq 0\}$	**ALL X SUCH THAT** Set-builder: the variable, then the test it must pass.
$(a,b) \cup (c,d)$	**A UNION OF INTERVALS** For domains in separate pieces, as $(-\infty,-1) \cup (1,\infty)$.

RANGE

$\{y \mid y \geq 0\}$	**ALL Y SUCH THAT** The same grammar on the output side.
$f : \mathbb{R} \to \mathbb{R}$	**F FROM R TO R** Domain, then codomain; the range may be smaller.
$\{2,5,7\}$	**EXACTLY THESE OUTPUTS** A finite range listed in braces.

FUNCTION ARITHMETIC

$(f+g)(x)$	**F PLUS G, OF X** Equals $f(x)+g(x)$; the same for $f-g$.
$(fg)(x)$	**F TIMES G, OF X** Equals $f(x)\,g(x)$.
$\left(\frac{f}{g}\right)(x)$	**F OVER G, OF X** Equals $\frac{f(x)}{g(x)}$, only where $g(x) \neq 0$.

COMPOSITION

$f \circ g$	**F AFTER G** Feed the output of g into f; read right to left.
$f(g(x))$	**F OF G OF X** The same thing, evaluated inside out.
$fg(x)$	**AMBIGUOUS** Could mean a product; avoid it for composition.

INVERSE FUNCTIONS

$f^{-1}(x)$	**F INVERSE OF X** The function that undoes f: $f^{-1}(f(x)) = x$.
$\frac{1}{f(x)},\ (f(x))^{-1}$	**ONE OVER F OF X** The reciprocal: a different thing.
$\mathrm{Dom}(f),\ \mathrm{Ran}(f)$	**DOMAIN AND RANGE OF F** They swap: $\mathrm{Dom}(f^{-1}) = \mathrm{Ran}(f)$.

PIECEWISE FUNCTIONS

$\begin{cases} 2x & x < 0 \\ 5 & x \geq 0 \end{cases}$	**DEFINED BY CASES** Use the row whose condition holds.
$x < 1,\ x \geq 1$	**SPLIT AT THE BOUNDARY** Each cut point belongs to exactly one row.
$\bullet,\ \circ$	**SOLID DOT, OPEN DOT** On a graph: endpoint included, endpoint excluded.

TRANSFORMATIONS

$af(b(x-h))+k$	**THE FOUR-KNOB FORM** Outside letters move it vertically, inside letters horizontally.
$f(x-h)$	**F OF X MINUS H** Shifts right by h: the sign goes the opposite way.
$-f(x)$ vs $f(-x)$	**TWO MIRRORS** Flip across the x-axis against flip across the y-axis.

SAME MARKS, DIFFERENT JOB

f^{-1} vs $\frac{1}{f}$	The inverse function against the reciprocal.
$f(x)$	The brackets apply f; they never mean multiplication.
$(2,5)$	An open interval in a domain; a point in the plane on a graph.
the bar $\mid$	Such that, inside set braces; given, inside $P(\cdot)$; divides, between integers.