List of Mathematical Symbols

Sl.no.	Symbols	Name	Explanation
1	$=$	is equal to; equals	$x = y$ means x and y do represent the same thing or value.
2	$\neq$	is not equal to; does not equal	$x \neq y$ means that x and y do not represent the same thing or value.
3	$< \\ >$	is less than, is greater than	$x < y$ means x is less than y. x > y means x is greater than y.
4	$\ll \\ \gg$	is much less than, is much greater than	$x \ll y$ means x is much less than y. x ≫ y means x is much greater than y.
5	$\leq \\ \geq$	is less than or equal to, is greater than or equal to	$x \leq y$ means x is less than or equal to y. x ≥ y means x is greater than or equal to y.
6	$\prec$	is Karp reducible to; is polynomial-time many-one reducible to	$L_1 \prec L_2$ means that the problem L_1 is Karp reducible to L_2.
7	$\propto$	is proportional to; varies as	$y \propto x$ means that $y = kx$ for some constant k.
8	$+$	plus; add	4 + 6 means the sum of 4 and 6.
9	$-$	negative; minus; the opposite of	9 − 4 means the subtraction of 4 from 9.
10	$\times$	times; multiplied by	3 × 4 means the multiplication of 3 by 4.
11	$\cdot$	times; multiplied by	3 · 4 means the multiplication of 3 by 4.
12	$\div \\ /$	divided by; over	6 ÷ 3 or 6⁄3 means the division of 6 by 3.
13	$\pm$	plus or minus	6 ± 3 means both 6 + 3 and 6 − 3.

14	$\mp$	minus or plus	6 ± (3 ∓ 5) means both 6 + (3 − 5) and 6 − (3 + 5).
15	$\sqrt{\ }$ $\sqrt{\ }$	the (principal) square root of	$\sqrt{x}$ means the positive number whose square is *x*.
16	$\lvert \ldots \rvert$	absolute value of; modulus of	|**x** – **y**| means the Euclidean distance between **x** and **y**.
17	$\lVert \ldots \rVert$	norm of; length of	|| *x* || means the norm of the element *x* of a normed vector space.
18	$\mid$ $\nmid$	divides	*a*|*b* means *a* divides *b*. a∤b means a does not divide b.
19	$\parallel$	is parallel to	*x* || *y* means *x* is parallel to *y*.
20	$\#$	cardinality of; size of; order of	*A*#*B* is the connected sum of the manifolds *A* and *B*. If *A* and *B* are knots, then this denotes the knot sum, which has a slightly stronger condition.
21	$\aleph$	aleph	$\aleph_\alpha$ represents an infinite cardinality (specifically, the *α*-th one, where *α* is an ordinal).
22	$\beth$	beth	$\beth_\alpha$ represents an infinite cardinality (similar to א, but ב does not necessarily index all of the numbers indexed by א.).

23	$\mathfrak{c}$	cardinality of the continuum; cardinality of the real numbers; c;	$\mathbb{R}\|\mathbb{R}\|\mathfrak{c}$ The cardinality of is denoted by or by the symbol (a lowercase Fraktur letter C).
24	:	such that; so that	: means “such that”, and is used in proofs and the set-builder notation (described below).
25	!	factorial	$n!$ means the product $1 \times 2 \times ... \times n$.
26	$\sim$	has distribution	X ~ D, means the random variable X has the probability distribution D.
27	$\approx$	is approximately equal to	$x \approx y$ means x is approximately equal to y.
28	$\wr$	wreath product of … by …	$A \wr H$ means the wreath product of the group A by the group H.
29	$\triangleleft$ $\triangleright$	is a normal subgroup of	$N \triangleleft G$ means that N is a normal subgroup of group G.
30	$\ltimes$ $\rtimes$	the semidirect product of	$N \rtimes_\varphi H$ is the semidirect product of N (a normal subgroup) and H (a subgroup), with respect to φ. Also, if $G = N \rtimes_\varphi H$, then G is said to split over N.
31	$\bowtie$	the natural join of	$R \bowtie S$ is the natural join of the relations R and S, the set of all combinations of tuples in R and S that are equal on their common attribute names.
32	$\therefore$	therefore; so; hence	Sometimes used in proofs before logical consequences.
33	$\because$	because; since	Sometimes used in proofs before reasoning.

34	■ ▶ □	QED; tombstone; Halmos symbol	Used to mark the end of a proof.
35	⇒ → ⊃	implies; if … then	$A \Rightarrow B$ means if A is true then B is also true; if A is false then nothing is said about B.
36	⇔ ↔	if and only if; iff	$A \Leftrightarrow B$ means A is true if B is true and A is false if B is false.
37	¬ ~	not	The statement $\neg A$ is true if and only if A is false.
38	∧	and; min; meet	The statement $A \wedge B$ is true if A and B are both true; else it is false.
39	∨	or; max; join	The statement $A \vee B$ is true if A or B (or both) are true; if both are false, the statement is false.
40	⊕ ⩒	x or	The statement $A \oplus B$ is true when either A or B, but not both, are true. $A \veebar B$ means the same.
41	∀	for all; for any; for each	$\forall x$: $P(x)$ means $P(x)$ is true for all x.
42	∃	there exists; there is; there are	$\exists x$: $P(x)$ means there is at least one x such that $P(x)$ is true.

43	$\exists!$	there exists exactly one	$\exists!\ x$: $P(x)$ means there is exactly one x such that $P(x)$ is true.
44	$:=$ $\mathrel{:=}$ $\equiv$ $:\Leftrightarrow$ $\triangleq$ $\stackrel{\text{def}}{=}$ $\doteq$	is defined as; equal by definition	$x := y$, $x =: y$ or $x \equiv y$ means x is defined to be another name for y, under certain assumptions taken in context.
45	$\cong$	is congruent to	$G \cong H$ means that group G is isomorphic (structurally identical) to group H.
46	$\equiv$	... is congruent to ... modulo ...	$a \equiv b \pmod{n}$ means $a - b$ is divisible by n
47	$\{\ ,\ \}$	the set of …	$\{a,b,c\}$ means the set consisting of a, b, and c.
48	$\{\ :\ \}$ $\{\ \mid\ \}$	the set of … such that	$\{x : P(x)\}$ means the set of all x for which P(x) is true. $\{x \mid P(x)\}$ is the same as $\{x : P(x)\}$.
49	$\emptyset$ $\varnothing$ $\{\}$	the empty set	$\emptyset$ means the set with no elements.{ } means the same.
50	$\in$ $\notin$	is an element of; is not an element of	$a \in S$ means a is an element of the set S; $a \notin S$ means a is not an element of S.