

Sets

Symbol	LaTeX	Meaning
\in	<code>\in</code>	Element of
\subseteq	<code>\subseteq</code>	Subset or equal sets
\subset	<code>\subset</code>	Strict subset
\cup	<code>\cup</code>	Set Union
\cap	<code>\cap</code>	Set Intersection
\emptyset	<code>\emptyset</code>	Empty Set
$A - B$	<code>A-B</code>	Difference of Sets
\bar{A}	<code>\overline{A}</code>	Set Complement
$A \times B$	<code>A \times B</code>	Cartesian Product of Sets
\supseteq	<code>\supseteq</code>	Superset or equal Sets
\supset	<code>\supset</code>	Strict Superset

Integers

Symbol	LaTeX	Meaning
\mathbf{N}	<code>\mathbf{N}</code>	The Natural Numbers (includes zero)
\mathbf{Z}	<code>\mathbf{Z}</code>	The Integers
$a\mathbf{Z}$	<code>a\mathbf{Z}</code>	All Multiples of $a \in \mathbf{Z}$
\mathbf{Z}_n	<code>\mathbf{Z}_n</code>	The Integers Modulo n , $n \in \mathbf{Z}^+$
\mathbf{Z}_n^\times	<code>\mathbf{Z}^{\times}_n</code>	The Units Modulo n , $n \in \mathbf{Z}^+$
$b a$	<code>b a</code>	b is a divisor of a where $a, b \in \mathbf{Z}$
$b \nmid a$	<code>b \cancel{a}</code>	b isn't a divisor of a where $a, b \in \mathbf{Z}$
$\gcd(a, b)$ or (a, b)	<code>\gcd(a,b)</code> or <code>(a,b)</code>	Greatest Common Divisor of $a, b \in \mathbf{Z}$
$\text{lcm}[a, b]$ or $[a, b]$	<code>\text{lcm}(a,b)</code> or <code>[a,b]</code>	Least Common Multiple of $a, b \in \mathbf{Z}$
$\varphi(n)$	<code>\varphi(n)</code>	Euler's Function for $n \in \mathbf{Z}^+$
$a \equiv b \pmod{n}$	<code>a \equiv b \pmod{n}</code>	Congruence Modulo $n \in \mathbf{Z}^+$
$[a]_n$	<code>[a]_n</code>	The Congruence Class of a modulo n where $a \in \mathbf{Z}$ and $n \in \mathbf{Z}^+$

Fields

Symbol	LaTeX	Meaning
\mathbf{Q}	\mathbf{Q}	The Rationals
\mathbf{Q}^+	\mathbf{Q}^+	The Positive Rationals
\mathbf{Q}^\times	\mathbf{Q}^\times	Group of Nonzero Rationals under multiplication
\mathbf{R}	\mathbf{R}	The Reals
\mathbf{R}^+	\mathbf{R}^+	The Positive Reals
\mathbf{R}^\times	\mathbf{R}^\times	Group of Nonzero Reals under multiplication
\mathbf{C}	\mathbf{C}	The Complex Numbers
\mathbf{C}^\times	\mathbf{C}^\times	Group of Nonzero Reals under multiplication

Operations

Symbol	LaTeX	Meaning
$\frac{a+1}{b-1}$	$\frac{a+1}{b-1}$	Rational expression
$\sum_{n=0}^{100} a_n$	$\sum_{n=0}^{100} a_n$	Sumation of a sequence
$\prod_{n=0}^{100} a_n$	$\prod_{n=0}^{100} a_n$	Product of a sequence
$\int_{t=1}^{t=\infty} \frac{1}{t^2} dt = 1$	$\int_{t=1}^{t=\infty} \frac{1}{t^2} dt = 1$	Integral of $1/t^2$ from 1 to ∞
$\frac{d}{dx}(f(x))$	$\frac{d}{dx}(f(x))$	The derivative with respect to x of $f(x)$
$\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1} = 2$	$\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1} = 2$	Limit of a rational function as $x \rightarrow 1$
$\{a_n\}_{n=0}^{10} = a_1, a_2, \dots, a_{10}$	$\{a_n\}_{n=0}^{10} = a_1, a_2, \dots, a_{10}$	Ten terms of a sequence
$e^{a+bi} = e^{\sqrt{a^2+b^2}}(\cos \theta + i \sin \theta)$, $\theta = \arctan(b/a), a > 0$	$e^{a+bi} = e^{\sqrt{a^2+b^2}}(\cos \theta + i \sin \theta)$, $\theta = \arctan(b/a), a > 0$	The polar form of the exponential of a complex number in the first or fourth quadrant.

Functions

Symbol	LaTeX	Meaning
$f(A)$	<code>f(A)</code>	Image of the set A under the function f
$f^{-1}(B)$	<code>f^{-1}(B)</code>	Inverse image the set B under the function f
$g \circ f$	<code>g \circ f</code>	Composition of functions f and g
1_S	<code>1_S</code>	The Identity function of the set S
$[a]$	<code>[a]</code>	The Equivalence class of a
S / \sim	<code>S \big{/} \sim</code>	The Factor set of S
\sim_f	<code>\sim_f</code>	The Equivalence Relation defined by the function f
S/f	<code>S \big{/} f</code>	The factor set of S defined by the function f

Polynomials

Symbol	LaTeX	Meaning
$F[x]$	<code>F[x]</code>	The polynomials in x over the field F
$\deg(f(x))$	<code>\times{deg}(f)</code>	The degree of the polynomial $f(x) \in F[x]$
$g(x) \mid f(x)$	<code>g(x) \big f(x)</code>	$g(x)$ is a divisor of $f(x)$ where $f(x), g(x) \in F[x]$
$\langle g(x) \rangle$	<code>\big<g(x)\big></code>	The set of polynomials divisible by $g(x) \in F[x]$
$\gcd(f(x), g(x))$	<code>\text{gcd}(f(x),g(x))</code>	Greatest Common Divisor of polynomials
$\mathbf{Q}[\sqrt{a}]$	<code>\mathbf{Q} \big[\sqrt{a} \big]</code>	The field $\{q_1 + q_2\sqrt{a} \mid q_1, q_2 \in \mathbf{Q}\}$ for some $a \in \mathbf{Q}$ such that $\sqrt{a} \notin \mathbf{Q}$

Groups

Symbol	LaTeX	Meaning
$\text{Sym}(S)$	<code>\text{Sym}(S)</code>	Set of permutations of S
S_n	<code>\text{S}_n</code>	The set of permutations of the set of n elements
(a_1, \dots, a_k)	<code>(a_1, \dots, a_k)</code>	Cycle of length k
$a^{-1}; a^n$	<code>a^{-1}; a^n</code>	inverse of a ; n th power of a
$\langle a \rangle$	<code>\big<a\big></code>	The cyclic group generated by a
$o(a)$	<code>o(a)</code>	The order of the element a in a group

$ G $	$ G $	The order of the group G
$G_1 \times G_2$	$G_1 \times G_2$	The direct product of the groups G_1 and G_2
aH	aH	A left coset of H determined by a where $H \subseteq G$ are groups and $a \in G$
$GL_n(F)$	$GL_n(F)$	The general linear group of $n \times n$ matrices with nonzero determinant over the field F under multiplication
$SL_n(F)$	$SL_n(F)$	The special linear group of $n \times n$ matrices with determinant 1 over the field F under multiplication
D_n	D_n	The dihedral group of order $2n$
A_n	A_n	The alternating group on n elements.

Miscellaneous

Symbol	LaTeX	Meaning
$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$	<code>\bigg[\begin{matrix} 0 & -1 \\ 1 & 0 \end{matrix}\bigg]</code>	A 2 by 2 matrix
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	<code>x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}</code>	Quadratic formula for $ax^2 + bx + c = 0$, $a \neq 0$
$e^{i\theta} = \cos \theta + i \sin \theta$	<code>e^{i\theta}=\cos\theta+i\sin\theta</code>	The Euler Polar Formula

Symbol	$x = \sqrt[3]{\frac{q}{2} + \sqrt{\frac{p^3}{27} + \frac{q^2}{4}}} - \sqrt[3]{-\frac{q}{2} + \sqrt{\frac{p^3}{27} + \frac{q^2}{4}}}$
LaTeX	<code>x=\sqrt[3]{\frac{q}{2}+\sqrt{\frac{p^3}{27}+\frac{q^2}{4}}} - \sqrt[3]{-\frac{q}{2}+\sqrt{\frac{p^3}{27}+\frac{q^2}{4}}}</code>
Meaning	Cubic formula for a root of $x^3 + px = q$