Greek alphabet

Σ	Sigma	Set of alphabet symbols
Γ	Gamma	Set of stack/tape symbols
α	alpha	
β	beta	
γ	gamma	
δ	delta	Transition function
ε	epsilon	Empty string
σ	sigma	

Strings

w	String made of symbols from Σ
w^R	String obtained by writing w in the reverse order
$\|w\|$	Length of the string x
xy	String made by concatenating x and y
w^n	String made by concatenating n copies of w: $\underbrace{ww\ldots w}_{n \text{ copies}}$
	In particular: $w^0 = \varepsilon$, $w^1 = w$ and $w^2 = ww$
$\{0,1\}^n$	Binary strings of length exactly n symbols
$\{0,1\}^*$	Binary strings of any length: $\{\varepsilon, 0, 1, 00, 01, 10, 11, 000, \ldots\}$

Regular exressions

$\square + \square$	Union ("or")	
$\square\square$	Concatenation ("glueing" two strings)	(juxtaposition/no symbol)
$\square^*$	Star (zero or more copies)	e.g. $1^* = \{\varepsilon, 1, 11, 111, 1111, \ldots\}$
$\square^+$	One or more copies – shorthand for $\square\square^*$	e.g. $1^+ = \{1, 11, 111, 1111, \ldots\}$
Σ^*	Any string of finite length over the given alphabet, including ε	(zero length)
Σ^+	Any string of finite non-zero length over the given alphabet	(not ε)
$()$	Grouping, to override usual precedence rule: *star, concatenation, union*	
ε	Empty string	
$\emptyset$	No strings at all	

Set and logic notation

$\{x_1, \ldots, x_n\}$	Finite set consisting of the elements x_1 until x_n
$\{pattern \mid condition\}$	Set of items matching $pattern$ and satisfying $condition$. The $\mid$ symbol is read "such that"
$\emptyset$	Empty set, i.e. $\{\}$
$\in$	"in", member of a set
$\notin$	"not in", not a member of a set
$\cup$	Union of two sets
$\cap$	Intersection of two sets
$-$	Difference of two sets
$\times$	Cartesian product of two sets
$\subset$	Subset of ...
$\lvert A\rvert$ or $\#A$	Cardinality of the set A, i.e. count of its elements
2^A	Power set of A, i.e. set of all subsets of A
$\wedge$	Logical "and"
$\vee$	Logical "or"
$\neg$ or $\bar{}$	Logical "no"
$\oplus$	Logical "xor" – "exclusive or"
$\mathbb{N}$	Natural numbers: $\{1, 2, 3, \ldots\}$
$\mathbb{Z}$	Integers: $\{0, 1, -1, 2, -2, 3, -3, \ldots\}$
$\mathbb{Z}_{\geq 0}$	Non-negative integers: $\{0, 1, 2, 3, \ldots\}$
S'	A set called "S prime" (a way of making new names)
S'' or S'''	A set called "S double prime" / "S triple prime"

Numeric

$=$	equals
$\neq$	not equal
$<$	less than
$\leq$	less than or equal
$>$	greater than
$\geq$	greater than or equal
$n!$	Factorial of n: $n \times (n-1) \times (n-2) \times \cdots \times 2 \times 1$