Appendix C

List of Symbols

$\mathbf{N}$	natural numbers, 6, 69
$\mathbf{Z}$	integers, 6, 69
$\mathbf{Q}$	rational numbers, 6, 69
$\emptyset$	empty set, 6
$\mathbf{Q}^+$	positive rationals, 6
$a \in A$	a is in A, 6
$a \notin A$	a is not in A, 6
$A \subset B$	subset, 7
$\subset$	subset, 7
$A = B$	set equality, 7
$a \neq b$	a is not equal to b., 9
$P \implies Q$	P implies Q, 9
$P \implies Q \implies R \implies S$	11
$P \iff Q$	11
$x = y$	12
$a = b = c = d$	13
$P(x)$, proposition form	14
$\{x \in A : P(x)\}$	the set of all x in A such that $P(x)$ is true, 14
$R \cap T$	intersection of sets, 15
$R \cup T$	union of sets, 15
$R \setminus T$	set difference, 15

(a, b)	ordered pair, 15
(a, b, c)	ordered triple, 15
$A \times B$	Cartesian product, 16
$f : A \to B$	function with domain A, codomain B, 16
Δ	symmetric difference, 21
x^{-1}	inverse for x, 22
C, $\widetilde{C}$	calculator numbers, 26
$\oplus$	calculator addition, 26
$\ominus$	calculator subtraction, 26
$\odot$	calculator multiplication, 26
$\oslash$	calculator division, 26
$\mathbf{Z}_n$	$\{x \in \mathbf{N} : x < n\}$, 27
$\oplus_n$	addition in $\mathbf{Z}_n$, 27
$\odot_n$	multiplication in $\mathbf{Z}_n$, 27
$+$	addition in a field, 29
$\cdot$	multiplication in a field, 29
$-x$	additive inverse in a field, 30
x^{-1}	multiplicative inverse in field, 30
$\mathbf{Z}_n$	a finite field, 33
$\mathbf{D}_F$	set of digits in F, 37
x^2	$x \cdot x$, 38
$a - b$	$a + (-b)$, 39
a/b	$a \cdot b^{-1}$, 39
$\frac{a}{b}$	$a \cdot b^{-1}$, 39
F^+	positive elements in ordered field, 43
F^-	negative elements in an ordered field, 44
$<, \leq, >, \geq$	order relations in an ordered field, 45
$\lvert x \rvert$	absolute value, 48
$\lvert x - y \rvert$	distance from x to y, 51
$\mathbf{N}_F$	natural numbers in F, 56
$\mathbf{Z}_F$	integers in F, 64
$\mathbf{Q}_F$	rational numbers in F, 65
$n!$	factorial function, 71
a^n	power function, 72, 74
$\mathbf{Z}_{\geq k}$	$\{n \in \mathbf{Z} : n \geq k\}$, 75, 93

$S(p) = \sum_{j=k}^{p} f(j)$	summation notation, 76
$\cdots$	hidden induction, 77
$\max(p, q)$	maximum of p and q, 80
$\max_{j \le n \le l} f(n)$	maximum, 81
$\mathbf{Z}_{j \le n \le l}$	$\{n \in \mathbf{Z}\colon j \le n \le l\}$, 81
C_F	complexification of F, 83
$\oplus, \odot$	operations on C_F, 84
i	square root of -1, 87
$\tilde{a}$, $(a, 0)$	element of $\mathbf{C}_F$, 87
z^*	complex conjugate of z, 89
$\{f(n)\}$	sequence, 92
$\{f(0), f(1), f(2), \cdots\}$	sequence, 92
$\{[a_n, b_n]\} \to x$	convergence of search sequence, 94
$\mathbf{R}$	real field, 97
$a^{\frac{1}{p}}$	pth root of a, 104
$\sqrt{a}$	square root of a, 104
a^r	fractional power, 104
$\mathbf{C}$	complex numbers, 106
$\lvert z \rvert$	absolute value, 106
$\mathrm{Re}(z)$	real part of z, 107
$\mathrm{Im}(z)$	imaginary part of z, 107
$C(\alpha, r)$	circle in $\mathbf{C}$, 110
$D(\alpha, r)$	open disc, 110
$\bar{D}(\alpha, r)$	closed disc, 111
$n \mapsto 2^n$	maps to, 125
$\tilde{\alpha}$	constant sequence, 127
$f \to L$	f converges to L, 127
N_f	precision function for f, 130
$\mathrm{Re}f$, $\mathrm{Im}f$, f^*, $\lvert f \rvert$	sequences, 134
$\lim f$, $\lim\{f(n)\}$	limit of a sequence, 138
$.a_1 a_2 \cdots a_n$	decimal notation, 146
$g \circ a$	composition, 159