Appendix D

List of Symbols

Symbol	Meaning	Page
$\rightarrow$	conditional statement	5, 33
$\mathbb{R}$	set of real numbers	10
$\mathbb{Q}$	set of rational numbers	10
$\mathbb{Z}$	set of integers	10
$\mathbb{N}$	set of natural numbers	54
$y \in A$	y is an element of A	55
$z \notin A$	z is not an element of A	55
$\{ \quad \mid \quad \}$	set builder notation	58
$\forall$	universal quantifier	63
$\exists$	existential quanitifer	63
$\emptyset$	the empty set	60
$\wedge$	conjunction	33
$\vee$	disjunction	33
$\neg$	negation	33
$\leftrightarrow$	biconditional statement	39
$\equiv$	logically equivalent	43
$m \mid n$	m divides n	82
$a \equiv b \pmod{n}$	a is congruent to b modulo n	92
$\lvert x \rvert$	absolute value of x	135
$A = B$	A equals B (set equality)	55
$A \subseteq B$	A is a subset of B	55
$A \not\subseteq B$	A is not a subset of B	219
$A \subset B$	A is a proper subset of B	218

Symbol	Meaning	Page
$\mathcal{P}(A)$	power set of A	222
$\|A\|$	cardinality of a finite set A	223
$A \cap B$	intersection of A and B	216
$A \cup B$	union of A and B	216
A^c	complement of A	216
$A - B$	set difference of A and B	216
$A \times B$	Cartesian product of A and B	256
(a, b)	ordered pair	256
$\mathbb{R} \times \mathbb{R}$	Cartesian plane	258
$\mathbb{R}^2$	Cartesian plane	258
$\bigcup_{X \in \mathcal{C}} X$	union of a family of sets	265
$\bigcap_{X \in \mathcal{C}} X$	intersection of a family of sets	265
$\bigcup_{j=1}^{n} A_j$	union of a finite family of sets	266
$\bigcap_{j=1}^{n} A_j$	intersection of a finite family of sets	267
$\bigcup_{j=1}^{\infty} B_j$	union of an infinite family of sets	267
$\bigcap_{j=1}^{\infty} B_j$	intersection of an infinite family of sets	267
$\{A_\alpha \mid \alpha \in \Lambda\}$	indexed family of sets	268
$\bigcup_{\alpha \in \Lambda} A_\alpha$	union of an indexed family of sets	268
$\bigcap_{\alpha \in \Lambda} A_\alpha$	intersection of an indexed family of sets	268
$n!$	n factorial	188
$f_1, f_2, f_3, \ldots$	Fibonacci numbers	202
$s(n)$	sum of the divisors of n	284
$f : A \to B$	function from A to B	285
$\text{dom}(f)$	domain of the function f	285
$\text{codom}(f)$	codmain of the function f	285
$f(x)$	image of x under f	285
$\text{range}(f)$	range of the function f	287
$d(n)$	number of divisors of n	292
I_A	identity function on the set A	298

Symbol	Meaning	Page
p_1, p_2	projection functions	304
$\det(A)$	determinant of A	305
A^T	transpose of A	305
R_n	$R_n = \{0, 1, 2, \ldots, n-1\}$	296
$\det : M_{2,2} \to \mathbb{R}$	determinant function	323
$g \circ f : A \to C$	composition of functions f and g	325
f^{-1}	the inverse of the function f	338
Sin	the restricted sine function	349
Sin^{-1}	the inverse sine function	349
$\text{dom}(R)$	domain of the relation R	364
$\text{range}(R)$	range of the relation R	364
$x \, R \, y$	x is related to y	366
$x \not R \, y$	x is not related to y	366
$x \sim y$	x is related to y	366
$x \nsim y$	x is not related to y	366
R^{-1}	the inverse of the relation R	373
$[a]$	equivalence class of a	391
$[a]$	congruence class of a	392
$\mathbb{Z}_n$	the integers modulo n	402
$[a] \oplus [c]$	addition in $\mathbb{Z}_n$	404
$[a] \odot [c]$	multiplication in $\mathbb{Z}_n$	404
$\gcd(a, b)$	greatest common divisor of a and b	414
$f(A)$	image of A under the function f	351
$f^{-1}(C)$	pre-image of C under the function f	351
$A \approx B$	A is equivalent to B A and B have the same cardinality	452
$\mathbb{N}_k$	$\mathbb{N}_k = \{1, 2, \ldots, k\}$	455
$\text{card}(A) = k$	cardinality of A is k	455
$\aleph_0$	cardinality of $\mathbb{N}$	465
$\boldsymbol{c}$	cardinal number of the continuum	482