

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
$\{ \mid \}$	set builder notation	58
\forall	universal quantifier	63
\exists	existential quantifier	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
$ x $	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	267
$\bigcap_{j=1}^n A_j$	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	269
$\bigcap_{\alpha \in \Lambda} A_\alpha$	intersection of an indexed family of sets	269
$n!$	n factorial	188
f_1, f_2, f_3, \dots	Fibonacci numbers	202
$s(n)$	sum of the divisors of n	283
$f : A \rightarrow B$	function from A to B	285
$\text{dom}(f)$	domain of the function f	285
$\text{codom}(f)$	codomain 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
p_1, p_2	projection functions	304
$\det(A)$	determinant of A	305
A^T	transpose of A	305
$\det : M_{2,2} \rightarrow \mathbb{R}$	determinant function	323



Symbol	Meaning	Page
$g \circ f : A \rightarrow C$	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	367
$x \not\sim y$	x is not related to y	367
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
$\text{gcd}(a, b)$	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	452
	A and B have the same cardinality	
\mathbb{N}_k	$\mathbb{N}_k = \{1, 2, \dots, k\}$	455
$\text{card}(A) = k$	cardinality of A is k	455
\aleph_0	cardinality of \mathbb{N}	465
c	cardinal number of the continuum	482