## Appendix D: List of Symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\to)</td>
<td>Conditional statement</td>
</tr>
<tr>
<td>(\mathbb{R})</td>
<td>set of real numbers</td>
</tr>
<tr>
<td>(\mathbb{Q})</td>
<td>set of rational numbers</td>
</tr>
<tr>
<td>(\mathbb{Z})</td>
<td>set of integers</td>
</tr>
<tr>
<td>(\mathbb{N})</td>
<td>set of natural numbers</td>
</tr>
<tr>
<td>(y \in A)</td>
<td>(y) is an element of (A)</td>
</tr>
<tr>
<td>(z \notin A)</td>
<td>(z) is not an element of (A)</td>
</tr>
<tr>
<td>{</td>
<td>}</td>
</tr>
<tr>
<td>(\forall)</td>
<td>universal quantifier</td>
</tr>
<tr>
<td>(\exists)</td>
<td>existential quantifier</td>
</tr>
<tr>
<td>(\emptyset)</td>
<td>the empty set</td>
</tr>
<tr>
<td>(\wedge)</td>
<td>conjunction</td>
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<tr>
<td>(\vee)</td>
<td>disjunction</td>
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</tbody>
</table>
\[ \neg \] negation
\[ \leftrightarrow \] biconditional statement
\[ \equiv \] logically equivalent
\[ m \mid n \] \( m \) divides \( n \)
\[ (a \equiv b) \pmod{n} \] \( a \) is congruent to \( b \) modulo \( n \)
\[ \lfloor x \rfloor \] \( m \) divides \( n \)
\[ A = B \] \( A \) equals \( B \) (set equality)
\[ A \subseteq B \] \( A \) is a subset of \( B \)
\[ A \not\subseteq B \] \( A \) is not a subset of \( B \)
\[ A \subset B \] \( A \) is a proper subset of \( B \)
\[ \mathcal{P}(A) \] power set of \( A \)
\[ |A| \] cardinality of a finite set \( A \)
\[ A \cap B \] intersection of \( A \) and \( B \)
\[ A^c \] complement of \( A \)
\[ A - B \] set difference of \( A \) and \( B \)
\[ A \times B \] Cartesian product of \( A \) and \( B \)
\[ (a, b) \] ordered pair
\[ \mathbb{R} \times \mathbb{R} \] Cartesian plane
\[ \mathbb{R}^2 \] Cartesian plane
\[ \bigcup_{X \in \mathcal{C}} X \] union of a family of sets
\[ \bigcap_{X \in \mathcal{C}} X \] intersection of a finite family of sets
\[ \bigcup_{j = 1}^{n} A_j \] union of a finite family of sets
\[ \bigcap_{j = 1}^{n} A_j \] intersection of a finite family of sets
\[ \bigcup_{j = 1}^{\infty} B_j \] union of an infinite family of sets
\[ \bigcap_{j = 1}^{\infty} B_j \] intersection of an infinite family of sets
\{ \alpha \in \Lambda \} \quad \text{indexed family of sets}

\bigcup_{\alpha \in \Lambda} A_\alpha \quad \text{union of an indexed family of sets}

\bigcap_{\alpha \in \Lambda} A_\alpha \quad \text{intersection of an indexed family of sets}

(n!)

(n) \quad \text{factorial}

(f_1, f_2, f_3, \ldots) \quad \text{Fibonacci numbers}

(s(n)) \quad \text{sum of the divisors of } (n)

(f: A \to B) \quad \text{function from } (A) \text{ to } (B)

dom((f)) \quad \text{domain of the function } (f)

codom((f)) \quad \text{codomain of the function } (f)

(f(x)) \quad \text{image of } (x) \text{ under } (f)

range((f)) \quad \text{range of the function } (f)

(d(n)) \quad \text{number of divisors of } (n)

(I_A) \quad \text{identity function on the set } (A)

(p_1, p_2) \quad \text{projection functions}

det((A)) \quad \text{determinant of } (A)

(A^T) \quad \text{transpose of } (A)

det: \mathbb{M}_{2, 2} \to \mathbb{R} \quad \text{determinant function}

(g \circ f: A \to C) \quad \text{composition of function } (f) \text{ and } (g)

(f^{-1}) \quad \text{the inverse of the function } (f)

\text{Sin} \quad \text{the restricted sine function}

\text{Sin}^{-1} \quad \text{the inverse sine function}

dom((R)) \quad \text{domain of the relation } (R)

range((R)) \quad \text{range of the relation } (R)

(x \ R \ y) \quad (x) \text{ is related to } (y)
\( x \sim y \) \( \) is related to \( y \)

\( x \nsim y \) \( \) is not related to \( y \)

\( R^{-1} \) the inverse of the relation \( R \)

\([a]\) equivalence class of \( a \)

\([a]\) congruence class of \( a \)

\( \mathbb{Z}_{n} \) the integers modulo \( n \)

\( [a] \oplus [c] \) addition in \( \mathbb{Z}_{n} \)

\( [a] \odot [c] \) multiplication in \( \mathbb{Z}_{n} \)

gcd(\( a \), \( b \)) greatest common divisor of \( a \) and \( b \)

\( f(A) \) image of \( A \) under the function \( f \)

\( f^{-1}(C) \) pre-image of \( C \) under the function \( f \)

\( A \thickapprox B \) \( A \) is equivalent to \( B \)

\( A \) and \( B \) have the same cardinality

\( \mathbb{N}_{k} \) \( \mathbb{N}_{k} = \{1, 2, ..., k\} \)

\( \text{card}(A) = k \) cardinality of \( A \) is \( k \)

\( \text{card}(\mathbb{N}) \) cardinality of \( \mathbb{N} \)

\( c \) cardinal number of the continuum