

Review

Ari Mermelstein

May 15, 2018

1 Chapter 1

- Section 1.3
 - Definition of a set
 - Some special sets
 - * $\mathbb{N}$
 - * $\mathbb{Q}$
 - * $\mathbb{R}$
 - * $\mathbb{P}$
 - Set builder notation
 - Cardinality of finite sets
 - Definition of subset and $\emptyset$
 - Definition of power set
 - Alphabets and languages
 - * λ
 - * An alphabet (Σ)
 - * The set of all strings = Σ^*
 - * Language
- Section 1.4
 - Set operations
 - * intersection - $A \cap B$
 - * union - $A \cup B$
 - * relative complement - $A \setminus B$.
 - * symmetric difference - $A \oplus B$
 - * absolute complement - A^c with respect to some universe U
 - * Cartesian product - $A \times A$.
 - Venn Diagrams to visualize set operations
 - Set properties
 - * commutativity
 - * associativity
 - * distributive laws
 - * De Morgan laws
- Sections 1.5 and 1.6
 - Definitions of functions and sequences
 - Domain
 - Codomain
 - Image

- Characteristic function of a subset of a set – $\chi_A \ A \subseteq S$.
- Section 1.7
 - one-to-one
 - onto
 - one-to-one correspondence
 - inverse of a one-to-one correspondence.
- Section 2.1 and 2.2
 - Propositions
 - Logical connectors
 - * and $P \wedge Q$
 - * or $P \vee Q$
 - * not $\neg P$
 - * exclusive or $P \oplus Q$
 - *
 - truth tables
 - quantifiers
 - converse, inverse, contrapositive
- Section 13.1 and 13.2 – Quantifiers
- Section 13.3 – infinite sets
 - Countable vs. Uncountable
 - Proving countably infinite or not countably infinite
- Section 3.1, 3.4 – Relations
 - symmetric, transitive, reflexive
 - Equivalence relations
- Section 3.2–Graph and Digraphs
- Section 3.3 – Matrices
- Sections 2.4, Chapter 4 – Proofs
 - Direct Proofs
 - Indirect Proofs
 - Induction