

Anastasia's Notes on Discrete Mathematics and Applications 5e
(Epp, Susanna)

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1 Speaking Mathematically

This chapter will contain 1.1-1.4 from the textbook.

The topics included are Variables, The Language of Sets, The Language of Relations and Functions, and The Language of Graphs.

2 The Logic of Compound Statements

This chapter will contain 2.1-2.3 and 2.5 from the textbook.

The topics included are Logical Form and Logical Equivalence, Conditional Statements, Valid and Invalid Arguments, and Application: Number Systems and Circuits for Addition.

3 The Logic of Quantified Statements

This chapter will contain 3.1-3.4 from the textbook.

The topics included are Predicates and Quantified Statements, Statements with Multiple Quantifiers, and Arguments with Quantified Statements.

4 Elementary Number Theory and Methods of Proof

This chapter will contain 4.1-4.9 from the textbook.

The topics included are Direct Proof and Counterexample: Introduction, Writing Advice, Rational Numbers, Divisibility, Division into Cases and the Quotient-Remainder Theorem, Floor and Ceiling, Indirect Argument: Contradiction and Contraposition, Two Famous Theorems, and The Handshake Theorem.

5 Sequences, Mathematical Induction, and Recursion

This chapter will contain 5.1-5.4 and 5.6-5.8 from the textbook.

The topics included are Sequences, Mathematical Induction: Proving Formulas and Applications, Strong Mathematical Induction and the Well-Ordering Principle for the Integers, Defining Sequences Recursively, Solving Recurrence Relations by Iteration, Second-Order Linear Homogeneous Recurrence Relations with Constant Coefficients.

6 Set Theory

This chapter will contain 6.1-6.4 from the textbook.

The topics included are Set Theory: Definition and the Element Method of Proof, Properties of Sets, Disproofs and Algebraic Proofs, and Boolean Algebras, Russell's Paradox, and the Halting Problem.

7 Properties of Functions

This chapter will contain 7.1-7.4 from the textbook.

The topics included are Functions Defined on General Sets, One-to-One, Onto, and Inverse Functions, Composition of Functions, and Cardinality with Applications to Computability.

8 Properties of Relations

This chapter will contain 8.1-8.5 from the textbook.

The topics included are Relations on Sets, Reflexivity, Symmetry, and Transitivity, Equivalence Relations, Modular Arithmetic with Applications to Cryptography, and Partial Order Relations.

9 Counting and Probability

This chapter will contain 9.1-9.9 from the textbook.

The topics included are Introduction to Probability, Possibility Trees and the Multiplication Rule, Counting Elements of Disjoint Sets: The Addition Rule, The Pigeonhole Principle, Counting Subsets of a Set: Combinations, r -Combinations with Repetition Allowed, Pascal's Formula and the Binomial Theorem, Probability Axioms and Expected Value, and Conditional Probability, Bayes' Formula, and Independent Events.

10 Theory of Graphs and Trees

This chapter will contain 10.1-10.5 from the textbook.

The topics included are Trails, Paths, and Circuits, Matrix Representations of Graphs, Isomorphisms of Graphs, Trees: Examples and Basic Properties, and Rooted Trees.

11 Analysis of Algorithm Efficiency

This chapter will contain 11.1-11.2 and 11.4 from the textbook.

The topics included are Real-Valued Functions of a Real Variable and Their Graphs, Big- O , Big- Ω , and Big- Θ Notations, and Exponential and Logarithmic Functions: Graphs and Orders.

12 Regular Expressions and Finite-State Automata

This chapter will contain 12.1-12.3 from the textbook.

The topics included are Formal Languages and Regular Expressions, Finite-State Automata, and Simplifying Finite-State Automata.