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Nota di contenuto	THE LANGUAGE OF MATHEMATICS; CONTENTS; LIST OF TABLES; PREFACE; PART A INTRODUCTORY OVERVIEW; 1 Introduction; 1.1 What Is Language?; 1.2 What Is Mathematics?; 1.3 Why Use Mathematics?; 1.4 Mathematics and Its Language; 1.5 The Role of Translating English to Mathematics in Applying Mathematics; 1.6 The Language of Mathematics vs. Mathematics vs. Mathematical Models; 1.7 Goals and Intended Readership; 1.8 Structure of the Book; 1.9 Guidelines for the Reader; 2 Preview: Some Statements in English and the Language of Mathematics; 2.1 An Ancient Problem: Planning the Digging of a Canal 2.2 The Wall Around the Ancient City of Uruk2.3 A Numerical Thought Puzzle; 2.4 A Nursery Rhyme; 2.5 Making a Pot of Tea; 2.6 Combining Data Files; 2.7 Selecting a Telephone Tariff; 2.8 Interest on Savings Accounts, Bonds, etc.; 2.9 Sales and Value-Added Tax on Sales of Goods and Services; 2.10 A Hand of Cards; 2.11 Shear and Moment in a Beam; 2.12 Forming Abbreviations of Names; 2.13 The Energy in Earth's Reflected Sunlight vs. That in Extracted Crude Oil; PART B

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4 Important Structures and Concepts in the Language of Mathematics4. 1 Common Structures of Values; 4.1.1 Sets; 4.1.2 Arrays (Indexed Variables), Subscripted Variables, and Matrices; 4.1.3 Sequences; 4.1.4 The Equivalence of Array Variables, Functions, Sequences, and Variables; 4.1.5 Direct Correspondence of Other Mathematical Objects and Structures; 4.1.6 Relations; 4.1.7 Finite State Machines; 4.2 Infinity; 4.3 Iterative Definitions and Recursion; 4.4 Convergence, Limits, and Bounds; 4.5 Calculus; 4.6 Probability Theory; 4.6.1 Mathematical Model of a Probabilistic Process
4.6.2 Mean, Median, Variance, and Deviation4.6.3 Independent Probabilistic Processes; 4.6.4 Dependent Probabilistic Processes and Conditional Probabilities; 4.7 Theorems; 4.8 Symbols and Notation; 5 Solving Problems Mathematically; 5.1 Manipulating Expressions; 5.2 Proving Theorems; 5.2.1 Techniques and Guidelines for Proving Theorems; 5.2.2 Notation for Proofs; 5.2.3 Lemmata and Examples of Proofs; 5.2.4 Additional Useful Identities; 5.3 Solving Equations and Other Boolean Expressions; 5.4 Solving Optimization Problems
PART C ENGLISH, THE LANGUAGE OF MATHEMATICS, AND TRANSLATING BETWEEN THEM

Sommario/riassunto

"The subject of this book is how to formulate a mathematical model from an English description of a problem. This book views mathematical notation as a language and develops the implications of this view for translating English text into mathematical expressions and mathematical models, i.e. for applying mathematics to problems described in English. In order to apply mathematics to a practical problem, one must first transform an English statement of the problem and the requirements for its solution into mathematical expressions. This book examines this process in detail, presents new insight into it, and develops explicit guidelines for this important step. This book identifies the basic elements (values, variables, and functions) of the language of mathematics and presents the grammatical rules for combining them into expressions and other structures. Different notational forms for expressions are described and defined. Correspondences between parts of speech and other grammatical elements in English and components of expressions in the language of mathematics are identified. These lead to useful guidelines for translating English into the language of mathematics. In addition, the book contains many examples of translating English into mathematics. The approach presented in this book makes mathematics accessible to many people who have been turned off from mathematics by their early exposure to it"--