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The first volume (General Theory) differs from most textbooks as it emphasizes the mathematical structure and mathematical rigor, while being adapted to the teaching the first semester of an advanced course in Quantum Mechanics (the content of the book are the lectures of courses actually delivered.). It differs also from the very few texts in Quantum Mechanics that give emphasis to the mathematical aspects because this book, being written as Lecture Notes, has the structure of lectures delivered in a course, namely introduction of the problem, outline of the relevant points, mathematical tools needed, theorems, proofs. This makes this book particularly useful for self-study and for instructors in the preparation of a second course in Quantum Mechanics (after a first basic course). With some minor additions it can be used also as a basis of a first course in Quantum Mechanics for students in mathematics curricula. The second part (Selected Topics) are lecture notes of a more advanced course aimed at giving the basic notions necessary to do research in several areas of mathematical physics connected with quantum mechanics, from solid state to singular interactions, many body theory, semi-classical analysis, quantum statistical mechanics. The structure of this book is suitable for a second-semester course, in which the lectures are meant to provide, in addition to theorems and proofs, an overview of a more specific subject and hints to the direction of research. In this respect and for the width of subjects this second volume differs from other monographs on Quantum Mechanics. The second volume can be useful for students who want to have a basic preparation for doing research and for instructors who may want to use it as a basis for the presentation of selected topics. The present book is an edition of the manuscripts to the courses "Numerical Methods I" and "Numerical Mathematics I and II" which Professor H. Rutishauser held at the E.T.H. in Zurich. The first-named course was newly conceived in the spring semester of 1970, and intended for beginners, while the two others were given repeatedly as elective courses in the sixties. For an understanding of most chapters the funda mentals of linear algebra and calculus suffice. In some places a little complex variable theory is used in addition. However, the reader can get by without any knowledge of functional analysis. The first seven chapters discuss the direct solution of systems of linear equations, the solution of nonlinear systems, least squares prob lems, interpolation by polynomials, numerical quadrature, and approxima tion by Chebyshev series and by Remez' algorithm. The remaining chapters include the treatment of ordinary and partial differential equa tions, the iterative solution of linear equations, and a discussion of eigen value problems. In addition, there is an appendix dealing with the qd algorithm and with an axiomatic treatment of computer arithmetic. The goal of these notes is to provide a fast introduction to symplectic geometry for graduate students with some knowledge of differential geometry, de Rham theory and classical Lie groups. This text addresses symplectomorphisms, local forms, contact manifolds, compatible almost complex structures, Kaehler manifolds, hamiltonian mechanics, moment maps, symplectic reduction and symplectic toric manifolds. It contains guided problems, called homework, designed to complement the exposition or extend the reader's understanding. There are by now excellent references on symplectic geometry, a subset of which is in the bibliography of this book. However, the most efficient introduction to a subject is often a short elementary treatment, and these notes attempt to serve that purpose. This text provides a taste of areas of current research and will prepare the reader to explore recent papers and extensive books on symplectic geometry where the pace is much faster. For this reprint numerous corrections and clarifications have been made, and the layout has been improved. Describes the relation between classical and quantum mechanics. This book contains a discussion of problems related to group representation theory and to scattering theory. It intends to give a mathematically oriented student the opportunity to grasp the main points of quantum theory in a mathematical framework. From a mathematical point of view, physiologically structured population models are an underdeveloped branch of the theory of infinite dimensional dynamical systems. We have called attention to four aspects: (i) A choice has to be made about the kind of equations one extracts from the predominantly verbal arguments about the basic assumptions, and subsequently uses as a starting point for a rigorous mathematical analysis. Though differential equations are easy to formulate (different mechanisms don't interact in infinites imal time intervals and so end up as separate terms in the equations) they may be hard to interpret rigorously as infinitesimal generators. Integral equations constitute an attractive alternative. (ii) The ability of physiologically structured population models to increase our un derstanding of the relation between mechanisms at the i-level and phenomena at the p-level will depend strongly on the development of dynamical systems lab facilities which are applicable to this class of models. (iii) Physiologically structured population models are ideally suited for the for mulation of evolutionary questions. Apart from the special case of age (see Charlesworth 1980, Yodzis 1989, Caswell 1989, and the references given there) hardly any theory exists at the moment. This will, hopefully, change rapidly in the coming years. Again the development of appropriate software may turn out to be crucial. An awesome, globe-spanning, and New York Times bestselling journey through the beauty and power of mathematics What if you had to take an art class in which you were only taught how to paint a fence? What if you were never shown the paintings of van Gogh and Picasso, weren't even told they existed? Alas, this is how math is taught, and so for most of us it becomes the intellectual equivalent of watching paint dry. In Love and Math, renowned mathematician Edward Frenkel reveals a side of math we've never seen, suffused with all the beauty and elegance of a work of art. In this heartfelt and passionate book, Frenkel shows that mathematics, far from occupying a specialist niche, goes to the heart of all matter, uniting us across cultures, time, and space. Love and Math tells two intertwined stories: of the wonders of mathematics and of one young man's journey learning and living it. Having braved a discriminatory educational system to become one of the twenty-first century's leading mathematicians, Frenkel now works on one of the biggest ideas to come out of math in the last 50 years: the Langlands Program. Considered by many to be a Grand Unified Theory of mathematics, the Langlands Program enables researchers to translate findings from one field to another so that they can solve problems, such as Fermat's last theorem, that had seemed intractable before. At its core, Love and Math is a story about accessing a new way of thinking, which can enrich our lives and empower us to better understand the world and our place in it. It is an invitation to discover the magic hidden universe of mathematics. This book developed from classes in mathematical biology taught by the authors over several years at the Technische Universität München. The main themes are modeling principles, mathematical principles for the analysis of these models and model-based analysis of data. The key topics of modern biomathematics are covered: ecology, epidemiology, biochemistry, regulatory networks, neuronal networks and population genetics. A variety of mathematical methods are introduced, ranging from ordinary and partial differential equations to stochastic graph theory and branching processes. A special emphasis is placed on the interplay between stochastic and deterministic models. Computational geometry is a borderline subject related to pure and applied mathematics, computer science, and engineering. The book contains articles on various topics in computational geometry based on invited lectures and contributed papers presented during the program on computational geometry at the Morningside Center of Mathematics at the Chinese Academy of Sciences (Beijing). The opening article by R.-H. Wang gives a nice survey of various aspects of computational geometry, many of which are discussed in detail in the volume. Topics of the other articles include problems of optimal triangulation, splines, data interpolation, problems of curve and surface design, problems of shape control, quantum teleportation, and more. The book is suitable for graduate students and researchers interested in computational geometry and specialists in theoretical computer science. An introduction to the philosophy of mathematics grounded in mathematics and motivated by mathematical inquiry and practice. In this book, Joel David Hamkins offers an introduction to the philosophy of mathematics that is grounded in mathematics and motivated by mathematical inquiry and practice. He treats philosophical issues as they arise organically in mathematics, discussing such topics as platonism, realism, logicism, structuralism, formalism, infinity, and intuitionism in mathematical contexts. He organizes the book by mathematical themes--numbers, rigor, geometry, proof, computability, incompleteness, and set theory--that give rise again and again to philosophical considerations. Stochastic processes are as usual the main subject of the Séminaire, with contributions on Brownian motion (fractional or other), Lévy processes, martingales and probabilistic finance. Other probabilistic themes are also present: large random matrices, statistical mechanics. The contributions in this volume provide a sampling of recent results on these topics. All contributions with the exception of two are written in English language. In the late summer of 1893, following the Congress of Mathematicians held in Chicago, Felix Klein gave two weeks of lectures on the current state of mathematics. Rather than offering a universal perspective, Klein presented his personal view of the most important topics of the time. It is remarkable how most of the topics continue to be important today. Originally published in 1893 and republished by the AMS in 1911, we are pleased to bring this work into print once more with this new edition. Klein begins by highlighting the works of Clebsch and of Lie. In particular, he discusses Clebsch's work on Abelian functions and compares his approach to the theory with Riemann's more geometrical point of view. Klein devotes two lectures to Sophus Lie, focusing on his contributions to geometry, including sphere geometry and contact geometry. Klein's ability to connect different mathematical disciplines clearly comes through in his lectures on mathematical developments. For instance, he discusses recent progress in non-Euclidean geometry by emphasizing the connections to projective geometry and the role of transformation groups. In his descriptions of analytic function theory and of recent work in hyperelliptic and Abelian functions, Klein is guided by Riemann's geometric point of view. He discusses Galois theory and solutions of algebraic equations of degree five or higher by reducing them to normal forms that might be solved by non-algebraic means. Thus, as discovered by Hermite and Kronecker, the quintic can be solved "by elliptic functions". This also leads to Klein's well-known work connecting the quintic to the group of the icosahedron. Klein expounds on the roles of intuition and logical thinking in mathematics. He reflects on the influence of physics and the physical world on mathematics and, conversely, on the influence of mathematics on physics and the other natural sciences. The discussion is strikingly similar to today's discussions about "physical mathematics". There are a few other topics covered in the lectures which are somewhat removed from Klein's own work. For example, he discusses Hilbert's proof of the transcendence of certain types of numbers (including pi 1-systems are a mathematical formalism which was proposed by Aristid 1indenmayer in 1968 as a foundation for an axiomatic theory of develop ment. The notion promptly attracted the attention of computer scientists, who investigated 1-systems from the viewpoint of formal language theory. This theoretical line of research was pursued very actively in the seventies, resulting in over one thousand publications. A different research direction was taken in 1984 by Alvy Ray Smith, who proposed 1-systems as a tool for synthesizing realistic images of plants and pointed out the relationship between 1-systems and the concept of fractals introduced by Benoit Mandel brot. The work by Smith inspired our studies of the application of 1-systems to computer graphics. Originally, we were interested in two problems: • Can 1-systems be used as a realistic model of plant species found in nature? • Can 1-systems be applied to generate images of a wide class of fractals? It turned out that both questions had affirmative answers. Subsequently we found that 1-systems could be applied to other areas, such as the generation of tilings, reproduction of a geometric art form from East India, and synthesis of musical scores based on an interpretation of fractals. This book collects our results related to the graphical applications of- systems. It is a corrected version of the notes which we prepared for the ACM SIGGRAPH '88 course on fractals. In many biological models it is necessary to allow the rates of change of the variables to depend on the past history, rather than only the current values, of the variables. The models may require discrete lags, with the use of delay-differential equations, or distributed lags, with the use of integro-differential equations. In these lecture notes I discuss the reasons for including lags, especially distributed lags, in biological models. These reasons may be inherent in the system studied, or may be the result of simplifying assumptions made in the model used. I examine some of the techniques available for studying the solution of the equations. A large proportion of the material presented relates to a special method that can be applied to a particular class of distributed lags. This method uses an extended set of ordinary differential equations. I examine the local stability of equilibrium points, and the existence and frequency of periodic solutions. I discuss the qualitative effects of lags, and how these differ according to the choice of discrete or distributed lag. The models studied are drawn from the population dynamiCS of single species (logistic growth, the chemostat) and of interacting pairs of species (predation, mutualism), from cell population dynamiCS (haemopoiesis) and from biochemical kinetics (the Goodwin oscillator). The last chapter is devoted to a population model employing difference equations. All these models include non-linear terms. The amount of algebraic topology a graduate student specializing in topology must learn can be intimidating. Moreover, by their second year of graduate studies, students must make the transition from understanding simple proofs line-by-line to understanding the overall structure of proofs of difficult theorems. To help students make this transition, the material in this book is presented in an increasingly sophisticated manner. It is intended to bridge the gap between algebraic andgeometric topology, both by providing the algebraic tools that a geometric topologist needs and by concentrating on those areas of algebraic topology that are geometrically motivated. Prerequisites for using this book include basic set-theoretic topology, the definition of CW-complexes, someknowledge of the fundamental group/covering space theory, and the construction of singular homology. Most of this material is briefly reviewed at the beginning of the book. The topics discussed by the authors include typical material for first- and second-year graduate courses. The core of the exposition consists of chapters on homotopy groups and on spectral sequences. There is also material that would interest students of geometric topology (homology with local coefficients and obstructiontheory) and algebraic topology (spectra and generalized homology), as well as preparation for more advanced topics such as algebraic K-theory and the s-cobordism theorem. A unique feature of the book is the inclusion, at the end of each chapter, of several projects that require students to presentproofs of substantial theorems and to write notes accompanying their explanations. Working on these projects allows students to grapple with the ``big picture'', teaches them how to give mathematical lectures, and prepares them for participating in research seminars. The book is designed as a textbook for graduate students studying algebraic and geometric topology and homotopy theory. It will also be useful for students from other fields such as differential geometry, algebraic geometry, andhomological algebra. The exposition in the text is clear; special cases are presented over complex general statements. For several terms at Cambridge in 1939, Ludwig Wittgenstein lectured on the philosophical foundations of mathematics. A lecture class taught by Wittgenstein, however, hardly resembled a lecture. He sat on a chair in the middle of the room, with some of the class sitting in chairs, some on the floor. He never used notes. He paused frequently, sometimes for several minutes, while he puzzled out a problem. He often asked his listeners questions and reacted to their replies. Many meetings were largely conversation. These lectures were attended by, among others, D. A. T. Gasking, J. N. Findlay, Stephen Toulmin, Alan Turing, G. H. von Wright, R. G. Bosanquet, Norman Malcolm, Rush Rhees, and Yorick Smythies. Notes taken by these last four are the basis for the thirty-one lectures in this book. The lectures covered such topics as the nature of mathematics, the distinctions between mathematical and everyday languages, the truth of mathematical propositions, consistency and contradiction in formal systems, the logicism of Frege and Russell, Platonism, identity, negation, and necessary truth. The mathematical examples used are nearly always elementary. This book provides an introduction to the analysis of stochastic dynamic models in biology and medicine. The main aim is to offer a coherent set of probabilistic techniques and mathematical tools which can be used for the simulation and analysis of various biological phenomena. These tools are illustrated on a number of examples. For each example, the biological background is described, and mathematical models are developed following a unified set of principles. These models are then analyzed and, finally, the biological implications of the mathematical results are interpreted. The biological topics covered include gene expression, biochemistry, cellular regulation, and cancer biology. The book will be accessible to graduate students who have a strong background in differential equations, the theory of nonlinear dynamical systems, Markovian stochastic processes, and both discrete and continuous state spaces, and who are familiar with the basic concepts of probability theory. Borges and Mathematics is a short book of essays that explores the scientific thinking of the Argentine writer Jorge Luis Borges (1899-1986). Around half of the book consists of two "lectures" focused on mathematics. The rest of the book reflects on the relationship between literature, artistic creation, physics, and mathematics more generally. Written in a way that will be accessible even to those "who can only count to ten," the book presents a bravura demonstration of the intricate links between the worlds of sciences and arts, and it is a thought-provoking call to dialog for readers from both traditions. The author, Guillermo Mart nez, is both a recognized writer, whose murder mystery The Oxford Murders has been translated into thirty-five languages, and a PhD in mathematics. Contents: Borges and Mathematics: First Lecture; Borges and Mathematics: Second Lecture; The Golem and Artificial Intelligence; The Short Story as Logical System; A Margin Too Narrow; Euclid, or the Aesthetics of Mathematical Reasoning; Solutions and Disillusions; The Pythagorean Twins; The Music of Chance (Interview with Gregory Chaikin); Literature and Rationality; Who's Afraid of the Big Bad One?; A Small, Small God; God's Sinkhole. This book was originally published in Spanish as Borges y la matem tica (2003). It has been translated with generous support from the Latino Cultural Center at Purdue University. Modeling and analyzing the dynamics of chemical mixtures by means of differ- tial equations is one of the prime concerns of chemical engineering theorists. These equations often take the form of systems of nonlinear parabolic partial d- ferential equations, or reaction-diffusion equations, when there is diffusion of chemical substances involved. A good overview of this endeavor can be had by re- ing the two volumes by R. Aris (1975), who himself was one of the main contributors to the theory. Enthusiasm for the models developed has been shared by parts of the mathematical community, and these models have, in fact, provided motivation for some beautiful mathematical results. There are analogies between chemical reactors and certain biological systems. One such analogy is rather obvious: a single living organism is a dynamic structure built of molecules and ions, many of which react and diffuse. Other analogies are less obvious; for example, the electric potential of a membrane can diffuse like a chemical, and of course can interact with real chemical species (ions) which are transported through the membrane. These facts gave rise to Hodgkin's and Huxley's celebrated model for the propagation of nerve signals. On the level of populations, individuals interact and move about, and so it is not surprising that here, again, the simplest continuous space-time interaction-migration models have the same g- eral appearance as those for diffusing and reacting chemical systems. An early but still useful and frequently cited contribution to the science of mathematical economics, this volume is geared toward graduate students in the field. Prerequisites include familiarity with the basic theory of matrices and linear transformations and with elementary calculus. Author Jacob T. Schwartz begins his treatment with an exploration of the Leontief input-output model, which forms a general framework for subsequent material. An introductory treatment of price theory in the Leontief model is followed by an examination of the business-cycle theory, following ideas pioneered by Lloyd Metzler and John Maynard Keynes. In the final section, Schwartz applies the teachings of previous chapters to a critique of the general equilibrium approach devised by Léon Walras as the theory of supply and demand, and he synthesizes the notions of Walras and Keynes. 1961 edition. The notion of amenability has its origins in the beginnings of modern measure theory: Does a finitely additive set function exist which is invariant under a certain group action? Since the 1940s, amenability has become an important concept in abstract harmonic analysis (or rather, more generally, in the theory of semitopological semigroups). In 1972, B.E. Johnson showed that the amenability of a locally compact group G can be characterized in terms of the Hochschild cohomology of its group algebra L^1(G): this initiated the theory of amenable Banach algebras. Since then, amenability has penetrated other branches of mathematics, such as von Neumann algebras, operator spaces, and even differential geometry. Lectures on Amenability introduces second year graduate students to this fascinating area of modern mathematics and leads them to a level from where they can go on to read original papers on the subject. Numerous exercises are interspersed in the text. An introduction to the philosophy of mathematics grounded in mathematics and motivated by mathematical inquiry and practice. In this book, Joel David Hamkins offers an introduction to the philosophy of mathematics that is grounded in mathematics and motivated by mathematical inquiry and practice. He treats philosophical issues as they arise organically in mathematics, discussing such topics as platonism, realism, logicism, structuralism, formalism, infinity, and intuitionism in mathematical contexts. He organizes the book by mathematical themes--numbers, rigor, geometry, proof, computability, incompleteness, and set theory--that give rise again and again to philosophical considerations. This book contains a series of chapters by leading researchers and practitioners on community engagement approaches in the field of counterterrorism and counterinsurgency. It presents existing and emerging community engagement models in various parts of the world which could serve as effective models for governments keen to work with community leaders to manage and reduce the terrorist threat. The book emphasizes the strength of communities as central to government approaches in countering violent extremism. Prof. Newman is considered one of the great chemical engineers of his time. His reputation derives from his mastery of all phases of the subject matter, his clarity of thought, and his ability to reduce complex problems to their essential core elements. He is a member of the National Academy of Engineering, Washington, DC, USA, and has won numerous national awards including every award offered by the Electrochemical Society, USA. His motto, as known by his colleagues, is "do it right the first time." He has been teaching undergraduate and graduate core subject courses at the University of California, Berkeley (UC Berkeley), USA, since joining the faculty in 1966. His method is to write out, in long form, everything he expects to convey to his class on a subject on any given day. He has maintained and updated his lecture notes from notepad to computer throughout his career. This book is an exact reproduction of those notes. This book shows a clean and concise way on how to use different analytical techniques to solve equations of multiple forms that one is likely to encounter in most engineering fields, especially chemical engineering. It provides the framework for formulating and solving problems in mass transport, fluid dynamics, reaction kinetics, and thermodynamics through ordinary and partial differential equations. It includes topics such as Laplace transforms, Legendre's equation, vector calculus, Fourier transforms, similarity transforms, coordinate transforms, conformal mapping, variational calculus, superposition integrals, and hyperbolic equations. The simplicity of the presentation instils confidence in the readers that they can solve any problem they come across either analytically or computationally. Mathematical Models in Biology is an introductory book for readers interested in biological applications of mathematics and modeling in biology. A favorite in the mathematical biology community, it shows how relatively simple mathematics can be applied to a variety of models to draw interesting conclusions. Connections are made between diverse biological examples linked by common mathematical themes. A variety of discrete and continuous ordinary and partial differential equation models are explored. Although great advances have taken place in many of the topics covered, the simple lessons contained in this book are still important and informative. Audience: the book does not assume too much background knowledge--essentially some calculus and high-school algebra. It was originally written with third- and fourth-year undergraduate mathematical-biology majors in mind; however, it was picked up by beginning graduate students as well as researchers in math (and some in biology) who wanted to learn about this field. Higher Mathematics - Lectures Part Three includes the third semester material of a four-semester lecture course on higher mathematics as it is obligatory in many study courses for natural and engineering sciences at German universities. The content selection in this volume was based on the lecture notes the author took during the winter semester 1982/83 at the Technische Universität München where he attended the respective lecture course held by Prof. Dr. Armin Leutbecher. The eight chapters of this volume provide introductions to the following concepts of mathematics: Integrals with Parameters; Multiple Integrals; Integral Theorems in the Plane; Surfaces in Space, Surface Integrals; Quadratic Matrices & Determinants; Vector Spaces, Linear Self-mappings, Eigenvalues; Linear Differential Equations with Constant Coefficients; and Existence & Uniqueness Theorem for Explicit Ordinary Differential Equations. Prof. Newman is considered one of the great chemical engineers of his time. His reputation derives from his mastery of all phases of the subject matter, his clarity of thought, and his ability to reduce complex problems to their essential core elements. He is a member of the National Academy of Engineering, Washington, DC, USA, and has won numerous national awards including every award offered by the Electrochemical Society, USA. His motto, as known by his colleagues, is "do it right the first time." 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It includes topics such as Laplace transforms, Legendre’s equation, vector calculus, Fourier transforms, similarity transforms, coordinate transforms, conformal mapping, variational calculus, superposition integrals, and hyperbolic equations. The simplicity of the presentation instils confidence in the readers that they can solve any problem they come across either analytically or computationally. The 2-volume-book is an updated, reorganized and considerably enlarged version of the previous edition of the Research Problem Book in Analysis (LNM 1043), a collection familiar to many analysts, that has sparked off much research. This new edition, created in a joint effort by a large team of analysts, is, like its predecessor, a collection of unsolved problems of modern analysis designed as informally written mini-articles, each containing not only a statement of a problem but also historical and metho- dological comments, motivation, conjectures and discussion of possible connections, of plausible approaches as well as a list of references. There are now 342 of these mini- articles, almost twice as many as in the previous edition, despite the fact that a good deal of them have been solved! These notes are based on a course entitled ``Symplectic Geometry and Geometric Quantization" taught by Alan Weinstein at the University of California, Berkeley (fall 1992) and at the Centre Emile Borel (spring 1994). The only prerequisite for the course needed is a knowledge of the basic notions from the theory of differentiable manifolds (differential forms, vector fields, transversality, etc.). The aim is to give students an introduction to the ideas of microlocal analysis and the related symplectic geometry, with an emphasis on the role these ideas play in formalizing the transition between the mathematics of classical dynamics (hamiltonian flows on symplectic manifolds) and quantum mechanics (unitary flows on Hilbert spaces). These notes are meant to function as a guide to the literature. The authors refer to other sources for many details that are omitted and can be bypassed on a first reading. The first book to present the common mathematical foundations of big data analysis across a range of applications and technologies. Today, the volume, velocity, and variety of data are increasing rapidly across a range of fields, including Internet search, healthcare, finance, social media, wireless devices, and cybersecurity. Indeed, these data are growing at a rate beyond our capacity to analyze them. The tools—including spreadsheets, databases, matrices, and graphs—developed to address this challenge all reflect the need to store and operate on data as whole sets rather than as individual elements. This book presents the common mathematical foundations of these data sets that apply across many applications and technologies. Associative arrays unify and simplify data, allowing readers to look past the differences among the various tools and leverage their mathematical similarities in order to solve the hardest big data challenges. The book first introduces the concept of the associative array in practical terms, presents the associative array manipulation system D4M (Dynamic Distributed Dimensional Data Model), and describes the application of associative arrays to graph analysis and machine learning. It provides a mathematically rigorous definition of associative arrays and describes the properties of associative arrays that arise from this definition. Finally, the book shows how concepts of linearity can be extended to encompass associative arrays. Mathematics of Big Data can be used as a textbook or reference by engineers, scientists, mathematicians, computer scientists, and software engineers who analyze big data. The book consists of thirty lectures on diverse topics, covering much of the mathematical landscape rather than focusing on one area. The reader will learn numerous results that often belong to neither the standard undergraduate nor graduate curriculum and will discover connections between classical and contemporary ideas in algebra, combinatorics, geometry, and topology. The reader's effort will be rewarded in seeing the harmony of each subject. The common thread in the selected subjects is their illustration of the unity and beauty of mathematics. Most lectures contain exercises, and solutions or answers are given to selected exercises. A special feature of the book is an abundance of drawings (more than four hundred), artwork by an accomplished artist, and about a hundred portraits of mathematicians. Almost every lecture contains surprises for even the seasoned researcher.

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