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This book offers an introductory course in algebraic topology. Starting with general topology, it discusses differentiable manifolds, cohomology, products and duality, the fundamental group, homology theory, and homotopy theory. From the reviews: "An interesting and original graduate text in topology and geometry...a good lecturer can use this text to create a fine course....A beginning graduate student can use this text to learn a great deal of mathematics."—-MATHEMATICAL REVIEWS This introduction to first-order logic clearly works out the role of first-order logic in the foundations of mathematics, particularly the two basic questions of the range of the axiomatic method and of theorem-proving by machines. It covers several advanced topics not commonly treated in introductory texts, such as Fraïssé's characterization of elementary equivalence, Lindström's theorem on the maximality of first-order logic, and the fundamentals of logic programming. This is an introduction to Galois Theory along the lines of Galois’s Memoir on the Conditions for

Solvability of Equations by Radicals. It puts Galois's ideas into historical perspective by tracing their antecedents in the works of Gauss, Lagrange, Newton, and even the ancient Babylonians. It also explains the modern formulation of the theory. It includes many exercises, with their answers, and an English translation of Galois's memoir. From the Preface: "This book was written for the active reader. The first part consists of problems, frequently preceded by definitions and motivation, and sometimes followed by corollaries and historical remarks... The second part, a very short one, consists of hints... The third part, the longest, consists of solutions: proofs, answers, or contructions, depending on the nature of the problem.... This is not an introduction to Hilbert space theory. Some knowledge of that subject is a prerequisite: at the very least, a study of the elements of Hilbert space theory should proceed concurrently with the reading of this book." Designed for students preparing to engage in their first struggles to understand and write proofs and to read mathematics independently, this is well suited as a supplementary text in courses on introductory real analysis, advanced calculus, abstract algebra, or topology. The book teaches in detail how to construct examples and non-examples to help understand a new theorem or definition; it shows how to discover the outline of a proof in the form of the theorem and how logical structures determine the forms that proofs may take. Throughout, the text asks the reader to pause and work on an example or a problem before continuing, and encourages the student to engage the topic at hand and to learn from failed attempts at solving problems. The book may also be used as the main text for a "transitions" course bridging the gap between calculus and higher mathematics. The whole concludes with a set of "Laboratories" in which students can practice the skills learned in the earlier chapters on set theory and function theory. This book is about all kinds of numbers, from rationals to octonians, reals to infinitesimals. It is a story about a major thread of mathematics over thousands of years, and it answers everything from why Hamilton was obsessed with quaternions to what the prospect was for quaternionic analysis in the 19th century. It glimpses the mystery surrounding imaginary numbers in the 17th century and views some major developments of the 20th century. Designed for an undergraduate course or for independent study, this text presents sophisticated mathematical ideas in an elementary and friendly fashion. The fundamental purpose of this book is to teach mathematical thinking while conveying the beauty and elegance of mathematics. The book contains a large number of exercises of varying difficulty, some of which are designed to help reinforce basic concepts and others of which will challenge virtually all readers. The sole prerequisite for reading this text is high school algebra. Topics covered include: * mathematical induction * modular arithmetic * the Fundamental Theorem of Arithmetic * Fermat's Little Theorem * RSA encryption * the Euclidean algorithm * rational and irrational numbers * complex numbers * cardinality * Euclidean plane geometry * constructibility (including a proof that an angle of 60 degrees cannot be trisected with a straightedge and compass)* infinite series * higher dimensional spaces. This textbook is suitable for a wide variety of courses and for a broad range of students of mathematics and other subjects. Mathematically inclined senior high school students will also be able to read this book. From the reviews of the first edition: "It is carefully written in a precise but readable and engaging style... I thoroughly enjoyed reading this recent addition to the Springer Undergraduate Texts in Mathematics series and commend this clear, well-organised, unfussy text to its target audiences."

(Nick Lord, The Mathematical Gazette, Vol. 100 (547), 2016) “The book is an introduction to real mathematics and is very readable. ... The book is indeed a joy to read, and would be an excellent text for an ‘appreciation of mathematics’ course, among other possibilities.” (G.A. Heuer, Mathematical Reviews, February, 2015) “Many a benighted book misguidedly addresses the need [to teach mathematical thinking] by framing reasoning, or narrowly, proof, not as pervasive modality but somehow as itself an autonomous mathematical subject. Fortunately, the present book gets it right.... [presenting] well-chosen, basic, conceptual mathematics, suitably accessible after a K-12 education, in a detailed, self-conscious way that emphasizes methodology alongside content and crucially leads to an ultimate clear payoff. ... Summing Up: Recommended. Lower-division undergraduates and two-year technical program students; general readers.” (D.V. Feldman, Choice, Vol. 52 (6), February, 2015) " A group is defined by means of the laws of combinations of its symbols," according to a celebrated dictum of Cayley. And this is probably still as good a one-line explanation as any. The concept of a group is surely one of the central ideas of mathematics. Certainly there are a few branches of that science in which groups are not employed implicitly or explicitly. Nor is the use of groups confined to pure mathematics. Quantum theory, molecular and atomic structure, and crystallography are just a few of the areas of science in which the idea of a group as a measure of symmetry has played an important part. The theory of groups is the oldest branch of modern algebra. Its origins are to be found in the work of Joseph Louis Lagrange (1736-1813), Paulo Ruffini (1765-1822), and Evariste Galois (1811-1832) on the theory of algebraic equations. Their groups consisted of permutations of the variables or of the roots of polynomials, and indeed for much of the nineteenth century all groups were finite permutation groups. Nevertheless many of the fundamental ideas of group theory were introduced by these early workers and their successors, Augustin Louis Cauchy (1789-1857), Ludwig Sylow (1832-1918), Camille Jordan (1838-1922) among others. The concept of an abstract group is clearly recognizable in the work of Arthur Cayley (1821-1895) but it did not really win widespread acceptance until Walther von Dyck (1856-1934) introduced presentations of groups. An introduction to abstract algebraic geometry, with the only prerequisites being results from commutative algebra, which are stated as needed, and some elementary topology. More than 400 exercises distributed throughout the book offer specific examples as well as more specialised topics not treated in the main text, while three appendices present brief accounts of some areas of current research. This book can thus be used as textbook for an introductory course in algebraic geometry following a basic graduate course in algebra. Robin Hartshorne studied algebraic geometry with Oscar Zariski and David Mumford at Harvard, and with J.-P. Serre and A. Grothendieck in Paris. He is the author of "Residues and Duality", "Foundations of Projective Geometry", "Ample Subvarieties of Algebraic Varieties", and numerous research titles. Was plane geometry your favourite math course in high school? Did you like proving theorems? Are you sick of memorising integrals? If so, real analysis could be your cup of tea. In contrast to calculus and elementary algebra, it involves neither formula manipulation nor applications to other fields of science. None. It is Pure Mathematics, and it is sure to appeal to the budding pure mathematician. In this new introduction to undergraduate real analysis the author takes a different approach from past studies of the subject, by stressing the importance of pictures in mathematics and hard problems. The exposition is informal and relaxed, with many helpful asides, examples and occasional comments from mathematicians like Dieudonne, Littlewood and Osserman. The author has taught the subject many times over the last 35 years at Berkeley and this book is based on the honours version of this course. The book contains an excellent selection of more than 500 exercises. Finally a self-contained, one volume, graduate-level algebra text that is readable by the average graduate student and flexible enough to accommodate a wide variety of instructors and course contents. The guiding principle throughout is that the material should be presented as general as possible, consistent with good pedagogy. Therefore it stresses clarity rather than brevity and contains an extraordinarily large number of illustrative exercises. This book introduces the student to numerous modern applications of mathematics in technology. The authors write with clarity and present the mathematics in a clear and straightforward way making it an interesting and easy book to read. Numerous exercises at the end of every section provide practice and reinforce the material in the chapter. An engaging quality of this book is that the authors also present the mathematical material in a historical context and not just the practical one. Mathematics and Technology is intended for undergraduate students in mathematics, instructors and high school teachers. Additionally, its lack of calculus centricity as well as a clear indication of the more difficult topics and relatively advanced references make it suitable for any curious individual with a decent command of high school math. In this new textbook, acclaimed author John Stillwell presents a lucid introduction to Lie theory suitable for junior and senior level undergraduates. In order to achieve this, he focuses on the so-called "classical groups" that capture the symmetries of real, complex, and quaternion spaces. These symmetry groups may be represented by matrices, which allows them to be studied by elementary methods from calculus and linear algebra. This naive approach to Lie theory is originally due to von Neumann, and it is now possible to streamline it by using standard results of undergraduate mathematics. To compensate for the limitations of the naive approach, end of chapter discussions introduce important results beyond those proved in the book, as part of an informal sketch of Lie theory and its history. John Stillwell is Professor of Mathematics at the University of San Francisco. He is the author of several highly regarded books published by Springer, including The Four Pillars of Geometry (2005), Elements of Number Theory (2003), Mathematics and Its History (Second Edition, 2002), Numbers and Geometry (1998) and Elements of Algebra (1994). Assumes only a familiarity with algebra at the beginning graduate level; Stresses applications to algebra; Illustrates several of the ways Model Theory can be a useful tool in analyzing classical mathematical structures This textbook offers a rigorous presentation of mathematics before the advent of calculus. Fundamental concepts in algebra, geometry, and number theory are developed from the foundations of set theory along an elementary, inquiry-driven path. Thought-provoking examples and challenging problems inspired by mathematical contests motivate the theory, while frequent historical asides reveal the story of how the ideas were originally developed. Beginning with a thorough treatment of the natural numbers via Peano's axioms, the opening chapters focus on establishing the natural, integral, rational, and real number systems. Plane geometry is introduced via Birkhoff's axioms of metric geometry, and chapters on polynomials traverse arithmetical operations, roots, and factoring multivariate expressions. An elementary classification of conics is given, followed by an in-depth study of rational expressions. Exponential, logarithmic, and trigonometric functions complete the picture, driven by inequalities that compare them with polynomial and rational functions. Axioms and limits underpin the treatment throughout, offering not only powerful tools, but insights into non-trivial connections between topics. Elements of Mathematics is ideal for students seeking a deep and engaging mathematical challenge based on elementary tools. Whether enhancing the early undergraduate curriculum for high achievers, or constructing a reflective senior capstone, instructors will find ample material for enquiring mathematics majors. No formal prerequisites are assumed beyond high school algebra, making the book ideal for mathematics circles and competition preparation. Readers who are more advanced in their mathematical studies will appreciate the interleaving of ideas and illuminating historical details. This text aims to show that mathematics is useful to virtually everyone. And it seeks to accomplish this by offering the reader plenty of practice in elementary mathematical computations motivated by real-world problems. The prerequisite for this book is a little algebra and geometry-nothing more than entrance requirements at most colleges. I hope that users-especially those who "don't like math"-will complete the course with greater confidence in their ability to solve practical problems (without seeking help from someone who is "good at math"). Here is a sampler of some of the problems to be encountered: I. If a U. S. dollar were worth 1. 15 Canadian dollars, what would a Canadian dollar be worth in U. S. money? 2. If the tax rates are reduced 5% one year and then 10% in each of the next 2 years (as they were between 1981 and 1984), what is the overall reduction for the 3 years? 3. An automobile cooling system contains 10 liters ofa mixture of water and antifreeze which is 25% antifreeze. How much of this should be drained out and replaced with pure antifreeze so that the resulting 10 liters will be 40% antifreeze? 4. If you drive halfway at 30 mph and the rest of the distance at 50 mph, what is your average speed for the entire trip? 5. A tank storing solar heated water stands unmolested in a room having an approximately constant temperature of 80°F. This textbook provides a unified and concise exploration of undergraduate mathematics by approaching the subject through its history. Readers will discover the rich tapestry of ideas behind familiar topics from the undergraduate curriculum, such as calculus, algebra, topology, and more. Featuring historical episodes ranging from the Ancient Greeks to Fermat and Descartes, this volume offers a glimpse into the broader context in which these ideas developed, revealing unexpected connections that make this ideal for a senior capstone course. The presentation of previous versions has been refined by omitting the less mainstream topics and inserting new connecting material, allowing instructors to cover the book in a one-semester course. This condensed edition prioritizes succinctness and cohesiveness, and there is a greater emphasis on visual clarity, featuring full color images and high quality 3D models. As in previous editions, a wide array of mathematical topics are covered, from geometry to computation; however, biographical sketches have been omitted. Mathematics and Its History: A Concise Edition is an essential resource for courses or reading programs on the history of mathematics. Knowledge of basic calculus, algebra, geometry, topology, and set theory is assumed. From reviews of previous editions: “Mathematics and Its History is a joy to read. The writing is clear, concise and inviting. The style is very different from a traditional text. I found myself picking it up to read at the expense of my usual late evening thriller or detective novel.... The author has done a wonderful job of tying together the dominant themes of undergraduate mathematics.” Richard J. Wilders, MAA, on the Third Edition "The book...is presented in a lively style without unnecessary detail. It is very stimulating and will be appreciated not only by students. Much attention is paid to problems and to the development of mathematics before the end of the nineteenth century.... This book brings to the non-specialist interested in mathematics many interesting results. It can be recommended for seminars and will be enjoyed by the broad mathematical community." European Mathematical Society, on the Second Edition ‘A Concise Introduction to the Theory of Integration’ was once a best-selling Birkhäuser title which published 3 editions. This manuscript is a substantial revision of the material. Chapter one now includes a section about the rate of convergence of Riemann sums. The second chapter now covers both Lebesgue and Bernoulli measures, whose relation to one another is discussed. The third chapter now includes a proof of Lebesgue's differential theorem for all monotone functions. This is a beautiful topic which is not often covered. The treatment of surface measure and the divergence theorem in the fifth chapter has been improved. Loose ends from the discussion of the Euler-MacLauren in Chapter I are tied together in Chapter seven. Chapter eight has been expanded to include a proof of Carathéory's method for constructing measures; his result is applied to the construction of Hausdorff measures. The new material is complemented by the addition of several new problems based on that material. Category Theory has developed rapidly. This book aims to present those ideas and methods which can now be effectively used by Mathe maticians working in a variety of other fields of Mathematical research. This occurs at several levels. On the first level, categories provide a convenient conceptual language, based on the notions of category, functor, natural transformation, contravariance, and functor category. These notions are presented, with appropriate examples, in Chapters I and II. Next comes the fundamental idea of an adjoint pair of functors. This appears in many substantially equivalent forms: That of universal construction, that of direct and inverse limit, and that of pairs offunctors with a natural isomorphism between corresponding sets of arrows. All these forms, with their interrelations, are examined in Chapters III to V. The slogan is "Adjoint functors arise everywhere". Alternatively, the fundamental notion of category theory is that of a monoid -a set with a binary operation of multiplication which is associative and which has a unit; a category itself can be regarded as a sort of general ized monoid. Chapters VI and VII explore this notion and its generaliza tions. Its close connection to pairs of adjoint functors illuminates the ideas of universal algebra and culminates in Beck's theorem characterizing categories of algebras; on the other hand, categories with a monoidal structure (given by a tensor product) lead inter alia to the study of more convenient categories of topological spaces. This book is unique in that it looks at geometry from 4 different viewpoints - Euclid-style axioms, linear algebra, projective geometry, and groups and their invariants Approach makes the subject accessible to readers of all mathematical tastes, from the visual to the algebraic Abundantly supplemented with figures and exercises This undergraduate textbook is intended primarily for a transition course into higher mathematics, although it is written with a broader audience in mind. The heart and soul of this book is problem solving, where each problem is carefully chosen to clarify a concept, demonstrate a technique, or to enthuse. The exercises require relatively extensive arguments, creative approaches, or both, thus providing motivation for the reader. With a unified approach to a diverse collection of topics, this text points out connections, similarities, and differences among subjects whenever possible. This book shows students that mathematics is a vibrant and dynamic human enterprise by including historical perspectives and notes on the giants of mathematics, by mentioning current activity in the mathematical community, and by discussing many famous and less well-known questions that remain open for future mathematicians. Ideally, this text should be used for a two semester course, where the first course has no prerequisites and the second is a more challenging course for math majors; yet, the flexible structure of the book allows it to be used in a variety of settings, including as a source of various independent-study and research projects. This elementary presentation exposes readers to both the process of rigor and the rewards inherent in taking an axiomatic approach to the study of functions of a real variable. The aim is to challenge and improve mathematical intuition rather than to verify it. The philosophy of this book is to focus attention on questions which give analysis its inherent fascination. Each chapter begins with the discussion of some motivating examples and concludes with a series of questions. In this well-written presentation, motivated by numerous examples and problems, the authors introduce the basic theory of braid groups, highlighting several definitions that show their equivalence; this is followed by a treatment of the relationship between braids, knots and links. Important results then treat the linearity and orderability of the subject. Relevant additional material is included in five large appendices. Braid Groups will serve graduate students and a number of mathematicians coming from diverse disciplines. Covers a notably broad range of topics, including some topics not generally found in linear algebra books Contains a discussion of the basics of linear algebra This book provides a self-contained and rigorous introduction to calculus of functions of one variable, in a presentation which emphasizes the structural development of calculus. Throughout, the authors highlight the fact that calculus provides a firm foundation to concepts and results that are generally encountered in high school and accepted on faith; for example, the classical result that the ratio of circumference to diameter is the same for all circles. A number of topics are treated here in considerable detail that may be inadequately covered in calculus courses and glossed over in real analysis courses. Basic properties, homotopy classification, and characteristic classes of fibre bundles have become an essential part of graduate mathematical education for students in geometry and mathematical physics. The new edition of this text includes two additional chapters, one on the gauge group of a bundle and the other on the differential forms representing characteristic classes of complex vector bundles on manifolds. This textbook offers an approachable introduction to stochastic processes that explores the four pillars of random walk, branching processes, Brownian motion, and martingales. Building from simple examples, the authors focus on developing context and intuition before formalizing the theory of each topic. This inviting approach illuminates the key ideas and computations in the proofs, forming an ideal basis for further study. Consisting of many short chapters, the book begins with a comprehensive account of the simple random walk in one dimension. From here, different paths may be chosen according to interest. Themes span Poisson processes, branching processes, the Kolmogorov–Chentsov theorem, martingales, renewal theory, and Brownian motion. Special topics follow, showcasing a selection of important contemporary applications, including mathematical finance, optimal stopping, ruin theory, branching random walk, and equations of fluids. Engaging exercises accompany the theory throughout. Random Walk, Brownian Motion, and Martingales is an ideal introduction to the rigorous study of stochastic processes. Students and instructors alike will appreciate the accessible, example-driven approach. A single, graduate-level course in probability is assumed. "This book succeeds brilliantly by concentrating on a number of core topics...and by treating them in a hugely rich and varied way. The author ensures that the reader will learn a large amount of classical material and perhaps more importantly, will also learn that there is no one approach to the subject. The essence lies in the range and interplay of possible approaches. The author is to be congratulated on a work of deep and enthusiastic scholarship." --MATHEMATICAL REVIEWS Rarely has the history or philosophy of mathematics been written about by mathematicians, and the analysis of mathematical texts themselves has been an area almost entirely unexplored. Figures of Thought looks at ways in which mathematical works can be read as texts, examines their textual strategies and demonstrates that such readings provide a rich source of philosophical issues regarding mathematics: issues which traditional approaches to the history and philosophy of mathematics have neglected. David Reed, a professional mathematician himself, offers the first sustained and critical attempt to find a consistent argument or narrative thread in mathematical texts. In doing so he develops new and fascinating interpretations of mathematicians' work throughout history, from an in-depth analysis of Euclid's Elements, to the mathematics of Descartes and right up to the work of contemporary mathematicians such as Grothendeick. He also traces the implications of this approach to the understanding of the history and development of mathematics. This unusual and lively textbook offers a clear and intuitive approach to the classical and beautiful theory of complex variables. With very little dependence on advanced concepts from several-variable calculus and topology, the text focuses on the authentic complex-variable ideas and techniques. Accessible to students at their early stages of mathematical study, this full first year course in complex analysis offers new and interesting motivations for classical results and introduces related topics stressing motivation and technique. Numerous illustrations, examples, and now 300 exercises, enrich the text. Students who master this textbook will emerge with an excellent grounding in complex analysis, and a solid understanding of its wide applicability. While most texts on real analysis are content to assume the real numbers, or to treat them only briefly, this text makes a serious study of the real number system and the issues it brings to light. Analysis needs the real numbers to model the line, and to support the concepts of continuity and measure. But these seemingly simple requirements lead to deep issues of set theory—uncountability, the axiom of choice, and large cardinals. In fact, virtually all the concepts of infinite set theory are needed for a proper understanding of the real numbers, and hence of analysis itself. By focusing on the set-theoretic aspects of analysis, this text makes the best of two worlds: it combines a down-to-earth introduction to set theory with an exposition of the essence of analysis—the study of infinite processes on the real numbers. It is intended for senior undergraduates, but it will also be attractive to graduate students and professional mathematicians who, until now, have been content to "assume" the real numbers. Its prerequisites are calculus and basic mathematics. Mathematical history is woven into the text, explaining how the concepts of real number and infinity developed to meet the needs of analysis from ancient times to the late twentieth century. This rich presentation of history, along with a background of proofs, examples, exercises, and explanatory remarks, will help motivate the reader. The material covered includes classic topics from both set theory and real analysis courses, such as countable and uncountable sets, countable ordinals, the continuum problem, the

Cantor–Schröder–Bernstein theorem, continuous functions, uniform convergence, Zorn's lemma, Borel sets, Baire functions, Lebesgue measure, and Riemann integrable functions. Aimed at second year graduate students, this text introduces them to cohomology theory (involving a rich interplay between algebra and topology) with a minimum of prerequisites. No homological algebra is assumed beyond what is normally learned in a first course in algebraic topology, and the basics of the subject, as well as exercises, are given prior to discussion of more specialized topics. From the reviews: "In the world of mathematics, the 1980's might well be described as the "decade of the fractal". Starting with Benoit Mandelbrot's remarkable text The Fractal Geometry of Nature, there has been a deluge of books, articles and television programmes about the beautiful mathematical objects, drawn by computers using recursive or iterative algorithms, which Mandelbrot christened fractals. Gerald Edgar's book is a significant addition to this deluge. Based on a course given to talented high- school students at Ohio University in 1988, it is, in fact, an advanced undergraduate textbook about the mathematics of fractal geometry, treating such topics as metric spaces, measure theory, dimension theory, and even some algebraic topology. However, the book also contains many good illustrations of fractals (including 16 color plates), together with Logo programs which were used to generate them. ... Here then, at last, is an answer to the question on the lips of so many: 'What exactly is a fractal?' I do not expect many of this book's readers to achieve a mature understanding of this answer to the question, but anyone interested in finding out about the mathematics of fractal geometry could not choose a better place to start looking." #Mathematics Teaching#1 This is a gentle introduction to the vocabulary and many of the highlights of elementary group theory. Written in an informal style, the material is divided into short sections, each of which deals with an important result or a new idea. Includes more than 300 exercises and approximately 60 illustrations. This is a textbook for a one-term course whose goal is to ease the transition from lower-division calculus courses to upper-division courses in linear and abstract algebra, real and complex analysis, number theory, topology, combinatorics, and so on. Without such a "bridge" course, most upper division instructors feel the need to start their courses with the rudiments of logic, set theory, equivalence relations, and other basic mathematical raw materials before getting on with the subject at hand. Students who are new to higher mathematics are often startled to discover that mathematics is a subject of ideas, and not just formulaic rituals, and that they are now expected to understand and create mathematical proofs. Mastery of an assortment of technical tricks may have carried the students through calculus, but it is no longer a guarantee of academic success. Students need experience in working with abstract ideas at a nontrivial level if they are to achieve the sophisticated blend of knowledge, disci pline, and creativity that we call "mathematical maturity. " I don't believe that "theorem-proving" can be taught any more than "question-answering" can be taught. Nevertheless, I have found that it is possible to guide stu dents gently into the process of mathematical proof in such a way that they become comfortable with the experience and begin asking them selves questions that will lead them in the right direction. Thisbookisintendedasanintroductiontoallthe?nitesimplegroups.During themonumentalstruggletoclassifythe?nitesimplegroups(andindeedsince), a huge amount of information about these groups has been accumulated. Conveyingthisinformationtothenextgenerationofstudentsandresearchers, not to mention those who might wish to apply this knowledge, has become a major challenge. With the publication of the two volumes by Aschbacher and Smith [12, 13] in 2004 we can reasonably regard the proof of the Classi?cation Theorem for Finite Simple Groups (usually abbreviated CFSG) as complete. Thus it is timely to attempt an overview of all the (non-abelian) ?nite simple groups in one volume. For expository purposes it is convenient to divide them into four basic types, namely the alternating, classical, exceptional and sporadic groups. The study of alternating groups soon develops into the theory of per- tation groups, which is well served by the classic text of Wielandt [170]and more modern treatments such as the comprehensive introduction by Dixon and Mortimer [53] and more specialised texts such as that of Cameron [19]. Rational homotopy is a very powerful tool for differential topology and geometry. This text aims to provide graduates and researchers with the tools necessary for the use of rational homotopy in geometry. Algebraic Models in Geometry has been written for topologists who are drawn to geometrical problems amenable to topological methods and also for geometers who are faced with problems requiring topological approaches and thus need a simple and concrete introduction to rational homotopy. This is essentially a book of applications. Geodesics, curvature, embeddings of manifolds, blow-ups, complex and K hler manifolds, symplectic geometry, torus actions, configurations and arrangements are all covered. The chapters related to these subjects act as an introduction to the topic, a survey, and a guide to the literature. But no matter what the particular subject is, the central theme of the book persists; namely, there is a beautiful connection between geometry and rational homotopy which both serves to solve geometric problems and spur the development of topological methods. A relaxed and informal presentation conveying the joy of mathematical discovery and insight. Frequent questions lead readers to see mathematics as an accessible world of thought, where understanding can turn opaque formulae into beautiful and meaningful ideas. The text presents eight topics that illustrate the unity of mathematical thought as well as the diversity of mathematical ideas. Drawn from both "pure" and "applied" mathematics, they include: spirals in nature and in mathematics; the modern topic of fractals and the ancient topic of Fibonacci numbers; Pascals Triangle and paper folding; modular arithmetic and the arithmetic of the infinite. The final chapter presents some ideas about how mathematics should be done, and hence, how it should be taught. Presenting many recent discoveries that lead to interesting open questions, the book can serve as the main text in courses dealing with contemporary mathematical topics or as enrichment for other courses. It can also be read with pleasure by anyone interested in the intellectually intriguing aspects of mathematics.