Greenberg Euclidean Geometry 4th Edition

#Greenberg Euclidean Geometry 4th Edition #Euclidean geometry textbook #Greenberg geometry solutions #geometry undergraduate textbook #4th edition geometry concepts

Explore the foundational principles of Euclidean geometry with the highly acclaimed Greenberg Euclidean Geometry 4th Edition. This comprehensive textbook offers clear explanations, rigorous proofs, and a wealth of engaging problems, making it an indispensable resource for students and educators delving into classical geometry.

Euclidean and Non-Euclidean Geometries

This is the definitive presentation of the history, development and philosophical significance of non-Euclidean geometry as well as of the rigorous foundations for it and for elementary Euclidean geometry, essentially according to Hilbert. Appropriate for liberal arts students, prospective high school teachers, math. majors, and even bright high school students. The first eight chapters are mostly accessible to any educated reader; the last two chapters and the two appendices contain more advanced material, such as the classification of motions, hyperbolic trigonometry, hyperbolic constructions, classification of Hilbert planes and an introduction to Riemannian geometry.

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Euclidean and Non-Euclidean Geometries

Euclidean and Non-Euclidean Geometries presents the discovery of non-Euclidean geometry and the reformulation of the foundations of Euclidean geometry.

Euclidean and Non-Euclidean Geometries

Captain Ahab has an obsessive search for the Great White Whale who had bitten off his leg at the knee.

Euclidean and Non-Euclidean Geometries

This classic text provides overview of both classic and hyperbolic geometries, placing the work of key mathematicians/philosophers in historical context. Coverage includes geometric transformations, models of the hyperbolic planes, and pseudospheres.

Euclidean and Non-Euclidean Geometries

This is the second of three volumes that, together, give an exposition of the mathematics of grades 9–12 that is simultaneously mathematically correct and grade-level appropriate. The volumes are consistent with CCSSM (Common Core State Standards for Mathematics) and aim at presenting the mathematics of K–12 as a totally transparent subject. The first part of this volume is devoted to the study of standard algebra topics: quadratic functions, graphs of equations of degree 2 in two variables, polynomials, exponentials and logarithms, complex numbers and the fundamental theorem of algebra, and the binomial theorem. Having translations and the concept of similarity at our disposal enables us to clarify the study of quadratic functions by concentrating on their graphs, the same way the study of linear functions is greatly clarified by knowing that their graphs are lines. We also introduce the concept of formal algebra in the study of polynomials with complex coefficients. The last three chapters in this volume complete the systematic exposition of high school geometry that is consistent with CCSSM. These chapters treat the geometry of the triangle and the circle, ruler and compass constructions, and a general discussion of axiomatic systems, including non-Euclidean geometry and the celebrated work of Hilbert on the foundations. This book should be useful for current and future teachers of K–12 mathematics, as well as for some high school students and for education professionals.

Instructor's Manual for Euclidean and Non-Euclidean Geometries

In this monograph, the authors present a modern development of Euclidean geometry from independent axioms, using up-to-date language and providing detailed proofs. The axioms for incidence, betweenness, and plane separation are close to those of Hilbert. This is the only axiomatic treatment of Euclidean geometry that uses axioms not involving metric notions and that explores congruence and isometries by means of reflection mappings. The authors present thirteen axioms in sequence, proving as many theorems as possible at each stage and, in the process, building up subgeometries, most notably the Pasch and neutral geometries. Standard topics such as the congruence theorems for triangles, embedding the real numbers in a line, and coordinatization of the plane are included, as well as theorems of Pythagoras, Desargues, Pappas, Menelaus, and Ceva. The final chapter covers consistency and independence of axioms, as well as independence of definition properties. There are over 300 exercises; solutions to many of these, including all that are needed for this development, are available online at the homepage for the book at www.springer.com. Supplementary material is available online covering construction of complex numbers, arc length, the circular functions, angle measure, and the polygonal form of the Jordan Curve theorem. Euclidean Geometry and Its Subgeometries is intended for advanced students and mature mathematicians, but the proofs are thoroughly worked out to make it accessible to undergraduate students as well. It can be regarded as a completion, updating, and expansion of Hilbert's work, filling a gap in the existing literature.

Algebra and Geometry

This book contains carefully revised and expanded versions of eight courses that were presented at the University of Strasbourg during two geometry master classes in 2008 and 2009. The aim of the master classes was to give fifth-year students and Ph.D. students in mathematics the opportunity to learn new topics that lead directly to the current research in geometry and topology. The courses were taught by leading experts. The subjects treated include hyperbolic geometry, three-manifold topology, representation theory of fundamental groups of surfaces and of three-manifolds, dynamics on the hyperbolic plane with applications to number theory, Riemann surfaces, Teichmuller theory, Lie groups, and asymptotic geometry. The text is aimed at graduate students and research mathematicians. It can also be used as a reference book and as a textbook for short courses on geometry.

Euclidean Geometry and its Subgeometries

Lobachevsky wrote Pangeometry in 1855, the year before his death. This memoir is a resume of his work on non-Euclidean geometry and its applications and can be considered his clearest account on the subject. It is also the conclusion of his life's work and the last attempt he made to acquire recognition. The treatise contains basic ideas of hyperbolic geometry, including the trigonometric formulae, the techniques of computation of arc length, of area and of volume, with concrete examples. It also deals with the applications of hyperbolic geometry to the computation of new definite integrals. The techniques are different from those found in most modern books on hyperbolic geometry since they do not use models. Besides its historical importance, Lobachevsky's Pangeometry is a beautiful work, written in a simple and condensed style. The material that it contains is still very alive, and reading this book will be most useful for researchers and for students in geometry and in the history of science. It can be used as a textbook, as a sourcebook, and as a repository of inspiration. The present edition provides the first complete English translation of Pangeometry available in print. It contains facsimiles of both the Russian and the French original versions. The translation is accompanied by notes, followed by a biography of Lobachevky and an extensive commentary.

Strasbourg Master Class on Geometry

The story of geometry is the story of mathematics itself: Euclidean geometry was the first branch of mathematics to be systematically studied and placed on a firm logical foundation, and it is the prototype for the axiomatic method that lies at the foundation of modern mathematics. It has been taught to students for more than two millennia as a mode of logical thought. This book tells the story of how the axiomatic method has progressed from Euclid's time to ours, as a way of understanding what mathematics is, how we read and evaluate mathematical arguments, and why mathematics has achieved the level of certainty it has. It is designed primarily for advanced undergraduates who plan to teach secondary school geometry, but it should also provide something of interest to anyone who wishes to understand geometry and the axiomatic method better. It introduces a modern, rigorous, axiomatic treatment of Euclidean and (to a lesser extent) non-Euclidean geometries, offering students ample opportunities to practice reading and writing proofs while at the same time developing most of the concrete geometric relationships that secondary teachers will need to know in the classroom. -- P. [4] of cover.

Pangeometry

Geometry: The Line and the Circle is an undergraduate text with a strong narrative that is written at the appropriate level of rigor for an upper-level survey or axiomatic course in geometry. Starting with Euclid's Elements, the book connects topics in Euclidean and non-Euclidean geometry in an intentional and meaningful way, with historical context. The line and the circle are the principal characters driving the narrative. In every geometry considered—which include spherical, hyperbolic, and taxicab, as well as finite affine and projective geometries—these two objects are analyzed and highlighted. Along the way, the reader contemplates fundamental questions such as: What is a straight line? What does parallel mean? What is distance? What is area? There is a strong focus on axiomatic structures throughout the text. While Euclid is a constant inspiration and the Elements is repeatedly revisited with substantial coverage of Books I, II, III, IV, and VI, non-Euclidean geometries are introduced very early to give the reader perspective on questions of axiomatics. Rounding out the thorough coverage of axiomatics are concluding chapters on transformations and constructibility. The book is compulsively readable with great attention paid to the historical narrative and hundreds of attractive problems.

Axiomatic Geometry

An exploration of one of the most celebrated and well-known theorems in mathematics By any measure, the Pythagorean theorem is the most famous statement in all of mathematics. In this book, Eli Maor reveals the full story of this ubiquitous geometric theorem. Although attributed to Pythagoras, the theorem was known to the Babylonians more than a thousand years earlier. Pythagoras may have been the first to prove it, but his proof—if indeed he had one—is lost to us. The theorem itself, however, is central to almost every branch of science, pure or applied. Maor brings to life many of the characters that played a role in its history, providing a fascinating backdrop to perhaps our oldest enduring mathematical legacy.

Geometry: The Line and the Circle

Geometry Illuminated is an introduction to geometry in the plane, both Euclidean and hyperbolic. It is designed to be used in an undergraduate course on geometry, and as such, its target audience is undergraduate math majors. However, much of it should be readable by anyone who is comfortable with the language of mathematical proof. Throughout, the goal is to develop the material patiently. One of the more appealing aspects of geometry is that it is a very "visual" subject. This book hopes to takes full advantage of that, with an extensive use of illustrations as guides. Geometry Illuminated is divided into four principal parts. Part 1 develops neutral geometry in the style of Hilbert, including a discussion of the construction of measure in that system, ultimately building up to the Saccheri-Legendre Theorem. Part 2 provides a glimpse of classical Euclidean geometry, with an emphasis on concurrence results, such as the nine-point circle. Part 3 studies transformations of the Euclidean plane, beginning with isometries and ending with inversion, with applications and a discussion of area in between. Part 4 is dedicated to the development of the Poincaré disk model, and the study of geometry within that model. While this material is traditional, Geometry Illuminated does bring together topics that are generally not found in a book at this level. Most notably, it explicitly computes parametric equations for the pseudosphere and its geodesics. It focuses less on the nature of axiomatic systems for geometry, but emphasizes rather the logical development of geometry within such a system. It also includes sections dealing with trilinear and barycentric coordinates, theorems that can be proved using inversion, and Euclidean and hyperbolic tilings.

The Pythagorean Theorem

This is the first of three volumes that, together, give an exposition of the mathematics of grades 9–12 that is simultaneously mathematically correct and grade-level appropriate. The volumes are consistent with CCSSM (Common Core State Standards for Mathematics) and aim at presenting the mathematics of K–12 as a totally transparent subject. The present volume begins with fractions, then rational numbers, then introductory geometry that can make sense of the slope of a line, then an explanation of the correct use of symbols that makes sense of “variables”, and finally a systematic treatment of linear equations that explains why the graph of a linear equation in two variables is a straight line and why the usual solution method for simultaneous linear equations “by substitutions” is correct. This book should be useful for current and future teachers of K–12 mathematics, as well as for some high school students and for education professionals.

Geometry Illuminated

International investment law today consists of a network of multifaceted, multilayered international treaties that, in one way or another, involve virtually every country of the world. The evolution of this network raises a host of issues regarding international investment law and policy, especially in the area of international investment disputes.The Yearbook on International Investment Law & Policy 2013-2014 monitors current developments in international investment law and policy, focusing on recent trends and issues in foreign direct investment (FDI). With contributions by leading experts in the field, this title provides timely, authoritative information on FDI that can be used by a wide audience, including practitioners, academics, researchers, and policy makers. The 2013-2014 Yearbook begins with trends in international investment and the activities of multinational enterprises, a review of trends and new approaches in international investment agreements for 2013-2014, and a review of international investment law and arbitration for 2013. This edition contains a sample of the research and ideas generated by the Investment Treaty Forum at the British Institute of International and Comparative Law--The Investment Treaty Forum brings together experts in international investment law to engage in high-level debate about salient topics in investment law. This edition covers many important topics, such as the principle of proportionality and the problem of indeterminacy in international investment treaties; proportionality, reasonableness and standards of review in investment treaty arbitration; and the role of investors' legitimate expectations in defense of investment treaty claims. The general articles included in this volume provide analysis of balancing investor protection and regulatory freedom in international investment law. The jurisprudential interaction between ICSID tribunals and the International Court of Justice are also discussed, along with inconsistencies in investor-state awards, the role of state interpretations; old and new ways for host states to defend against investment arbitrations, and approaches and analogies in the countermeasures defense in investor-state disputes. This volume explores the political economy of crises and the international law of necessity after the great recession. In addition to this are articles on minilateral treaty-making and bilateral investment treaties; investment promotion, agencies; the trend toward open contracting; and new regulations on foreign acquisitions

of land in Brazil and Argentina. This volume concludes with the winning memorials from the 2013 FDI International Moot Competition.

Rational Numbers to Linear Equations

Never HIGHLIGHT a Book Again! Virtually all of the testable terms, concepts, persons, places, and events from the textbook are included. Cram101 Just the FACTS101 studyguides give all of the outlines, highlights, notes, and quizzes for your textbook with optional online comprehensive practice tests. Only Cram101 is Textbook Specific. Accompanys: 9780716799481 .

Yearbook on International Investment Law and Policy, 2013-2014

A series of snapshots of the history of mathematics from ancient times to the twentieth century.

Outlines and Highlights for Euclidean and Non-Euclidean Geometry by Marvin J Greenberg, Isbn

Geometry -- Grief -- Beauty -- Story -- Fractal -- Beyond -- Appendix: More Math.

An Episodic History of Mathematics

This unique mathematical volume brings together geometers, analysts, differential equations specialists and graph-theorists to provide a glimpse on recent mathematical trends whose commonalities have hitherto remained, for the most part, unnoticed. The applied mathematician will be pleasantly surprised with the interpretation of a voting system in terms of the fixed points of a mapping given in the book, as much as the classical analyst will be enthusiastic to find detailed discussions on the generalization of the notion of metric space, in which the metric takes values on an abstract monoid. Classical themes on fixed point theory are adapted to the diverse setting of graph theory, thus uncovering a set of tools whose power and versatility will be appreciated by mathematicians working on either area. The volume also includes recent results on variable exponent spaces which reveal much-needed connections with partial differential equations, while the incipient field of variational inequalities on manifolds, also explored here, will be of interest to researchers from a variety of fields.

Geometry of Grief

An inviting, intuitive, and visual exploration of differential geometry and forms Visual Differential Geometry and Forms fulfills two principal goals. In the first four acts, Tristan Needham puts the geometry back into differential geometry. Using 235 hand-drawn diagrams, Needham deploys Newton’s geometrical methods to provide geometrical explanations of the classical results. In the fifth act, he offers the first undergraduate introduction to differential forms that treats advanced topics in an intuitive and geometrical manner. Unique features of the first four acts include: four distinct geometrical proofs of the fundamentally important Global Gauss-Bonnet theorem, providing a stunning link between local geometry and global topology; a simple, geometrical proof of Gauss’s famous Theorema Egregium; a complete geometrical treatment of the Riemann curvature tensor of an n-manifold; and a detailed geometrical treatment of Einstein’s field equation, describing gravity as curved spacetime (General Relativity), together with its implications for gravitational waves, black holes, and cosmology. The final act elucidates such topics as the unification of all the integral theorems of vector calculus; the elegant reformulation of Maxwell’s equations of electromagnetism in terms of 2-forms; de Rham cohomology; differential geometry via Cartan’s method of moving frames; and the calculation of the Riemann tensor using curvature 2-forms. Six of the seven chapters of Act V can be read completely independently from the rest of the book. Requiring only basic calculus and geometry, Visual Differential Geometry and Forms provocatively rethinks the way this important area of mathematics should be considered and taught.

New Trends in Analysis and Geometry

A thoroughly revised second edition of a textbook for a first course in differential/modern geometry that introduces methods within a historical context.

Visual Differential Geometry and Forms

This book gives a rigorous treatment of the fundamentals of plane geometry: Euclidean, spherical, elliptical and hyperbolic.

Geometry from a Differentiable Viewpoint

This unique book overturns our ideas about non-Euclidean geometry and the fine-structure constant, and attempts to solve long-standing mathematical problems. It describes a general theory of "recursive" hyperbolic functions based on the "Mathematics of Harmony," and the "golden," "silver," and other "metallic" proportions. Then, these theories are used to derive an original solution to Hilbert's Fourth Problem for hyperbolic and spherical geometries. On this journey, the book describes the "golden" qualitative theory of dynamical systems based on "metallic" proportions. Finally, it presents a solution to a Millennium Problem by developing the Fibonacci special theory of relativity as an original physical-mathematical solution for the fine-structure constant. It is intended for a wide audience who are interested in the history of mathematics, non-Euclidean geometry, Hilbert's mathematical problems, dynamical systems, and Millennium Problems. Contents:The Golden Ratio, Fibonacci Numbers, and the "Golden" Hyperbolic Fibonacci and Lucas FunctionsThe Mathematics of Harmony and General Theory of Recursive Hyperbolic FunctionsHyperbolic and Spherical Solutions of Hilbert's Fourth Problem: The Way to the Recursive Non-Euclidean GeometriesIntroduction to the "Golden" Qualitative Theory of Dynamical Systems Based on the Mathematics of HarmonyThe Basic Stages of the Mathematical Solution to the Fine-Structure Constant Problem as a Physical Millennium ProblemAppendix: From the "Golden" Geometry to the Multiverse Readership: Advanced undergraduate and graduate students in mathematics and theoretical physics, mathematicians and scientists of different specializations interested in history of mathematics and new mathematical ideas.

Euclidean and Non-Euclidean Geometry International Student Edition

This book presents a concise exposition of modern mathematical concepts, models and methods with applications in computer graphics, vision and machine learning. The compendium is organized in four parts — Algebra, Geometry, Topology, and Applications. One of the features is a unique treatment of tensor and manifold topics to make them easier for the students. All proofs are omitted to give an emphasis on the exposition of the concepts. Effort is made to help students to build intuition and avoid parrot-like learning.There is minimal inter-chapter dependency. Each chapter can be used as an independent crash course and the reader can start reading from any chapter — almost. This book is intended for upper level undergraduate students, graduate students and researchers in computer graphics, geometric modeling, computer vision, pattern recognition and machine learning. It can be used as a reference book, or a textbook for a selected topics course with the instructor's choice of any of the topics.

The “Golden” Non-Euclidean Geometry

Complex Analysis is the powerful fusion of the complex numbers (involving the 'imaginary' square root of -1) with ordinary calculus, resulting in a tool that has been of central importance to science for more than 200 years. This book brings this majestic and powerful subject to life by consistently using geometry (not calculation) as the means of explanation. The 501 diagrams of the original edition embodied geometrical arguments that (for the first time) replaced the long and often opaque computations of the standard approach, in force for the previous 200 years, providing direct, intuitive, visual access to the underlying mathematical reality. This new 25th Anniversary Edition introduces brand-new captions that fully explain the geometrical reasoning, making it possible to read the work in an entirely new way—as a highbrow comic book!

Modern Mathematics And Applications In Computer Graphics And Vision

Containing a large and varied set of problems, this rich resource will allow students to stretch their mathematical abilities beyond the school syllabus, and bridge the gap to university-level mathematics. Many proofs are provided to better equip students for the transition to university. The author covers substantial extension material using the language of sixth form mathematics, thus enabling students to understand the more complex material. Exercises are carefully chosen to introduce students to some central ideas, without building up large amounts of abstract technology. There are over 1500 carefully graded exercises, with hints included in the text, and solutions available online. Historical and contextual asides highlight each area of mathematics and show how it has developed over time.

Visual Complex Analysis

Euclid, a Greek mathematician, flourished around 300 BCE. It was he who shaped geometry into what it is today. As a result, he became known as the father of geometry. Euclid founded his own school in Alexandria, Egypt, and gained a reputation as an exceptional geometry teacher. The Elements, his

thirteen-volume treatise on mathematics and geometry, was considered to be one of the most influential mathematical works in history. Readers consider some of the definitions and postulates from this great work. They also learn about ancient Greek civilization and the renowned Greek mathematicians and philosophers who influenced Euclid's thinking.

Towards Higher Mathematics: A Companion

Features the classical themes of geometry with plentiful applications in mathematics, education, engineering, and science Accessible and reader-friendly, Classical Geometry: Euclidean, Transformational, Inversive, and Projective introduces readers to a valuable discipline that is crucial to understanding bothspatial relationships and logical reasoning. Focusing on the development of geometric intuition-while avoiding the axiomatic method, a problem solving approach is encouraged throughout. The book is strategically divided into three sections: Part One focuses on Euclidean geometry, which provides the foundation for the rest of the material covered throughout; Part Two discusses Euclidean transformations of the plane, as well as groups and their use in studying transformations; and Part Three covers inversive and projective geometry as natural extensions of Euclidean geometry. In addition to featuring real-world applications throughout, Classical Geometry: Euclidean, Transformational, Inversive, and Projective includes: Multiple entertaining and elegant geometry problems at the end of each section for every level of study Fully worked examples with exercises to facilitate comprehension and retention Unique topical coverage, such as the theorems of Ceva and Menalaus and their applications An approach that prepares readers for the art of logical reasoning, modeling, and proofs The book is an excellent textbook for courses in introductory geometry, elementary geometry, modern geometry, and history of mathematics at the undergraduate level for mathematics majors, as well as for engineering and secondary education majors. The book is also ideal for anyone who would like to learn the various applications of elementary geometry.

Euclid

College-level text for elementary courses covers the fifth postulate, hyperbolic plane geometry and trigonometry, and elliptic plane geometry and trigonometry. Appendixes offer background on Euclidean geometry. Numerous exercises. 1945 edition.

Classical Geometry

The long-awaited new edition of a groundbreaking work on the impact of alternative concepts of space on modern art. In this groundbreaking study, first published in 1983 and unavailable for over a decade, Linda Dalrymple Henderson demonstrates that two concepts of space beyond immediate perception—the curved spaces of non-Euclidean geometry and, most important, a higher, fourth dimension of space—were central to the development of modern art. The possibility of a spatial fourth dimension suggested that our world might be merely a shadow or section of a higher dimensional existence. That iconoclastic idea encouraged radical innovation by a variety of early twentieth-century artists, ranging from French Cubists, Italian Futurists, and Marcel Duchamp, to Max Weber, Kazimir Malevich, and the artists of De Stijl and Surrealism. In an extensive new Reintroduction, Henderson surveys the impact of interest in higher dimensions of space in art and culture from the 1950s to 2000. Although largely eclipsed by relativity theory beginning in the 1920s, the spatial fourth dimension experienced a resurgence during the later 1950s and 1960s. In a remarkable turn of events, it has returned as an important theme in contemporary culture in the wake of the emergence in the 1980s of both string theory in physics (with its ten- or eleven-dimensional universes) and computer graphics. Henderson demonstrates the importance of this new conception of space for figures ranging from Buckminster Fuller, Robert Smithson, and the Park Place Gallery group in the 1960s to Tony Robbin and digital architect Marcos Novak.

Introduction to Non-Euclidean Geometry

This volume is a collection of essays on complex symmetries. It is curated, emphasizing the analysis of the symmetries, not the various phenomena that display those symmetries themselves. With this, the volume provides insight to nonspecialist readers into how individual simple symmetries constitute complex symmetry. The authors and the topics cover many different disciplines in various sciences and arts. Simple symmetries, such as reflection, rotation, translation, similitude, and a few other simple manifestations of the phenomenon, are all around, and we are aware of them in our everyday lives. However, there are myriads of complex symmetries (composed of a bulk of simple symmetries) as well.

For example, the well-known helix represents the combination of translational and rotational symmetry. Nature produces a great variety of such complex symmetries. So do the arts. The contributions in this volume analyse selected examples (not limited to geometric symmetries). These include physical symmetries, functional (meaning not morphological) symmetries, such as symmetries in the construction of the genetic code, symmetries in human perception (e.g., in geometry education as well as in constructing physical theories), symmetries in fractal structures and structural morphology, including quasicrystal and fullerene structures in stable bindings and their applications in crystallography and architectural design, as well as color symmetries in the arts. The volume is rounded of with beautiful illustrations and presents a fascinating panorama of this interdisciplinary topic.

The Fourth Dimension and Non-Euclidean Geometry in Modern Art, revised edition

The 10th Asian Logic Conference is part of the series of logic conferences inaugurated in Singapore in 1981. This meeting is held every three years and rotates among countries in the Asia-Pacific region, with interests in the broad area of logic, including theoretical computer science. It is now considered a major conference in this field and is regularly sponsored by the Association of Symbolic Logic. This volume contains papers from the 10th meeting held in Kobe, Japan.

Complex Symmetries

Where did math come from? Who thought up all those algebra symbols, and why? What is the story behind À À? negative numbers? … the metric system? … quadratic equations? … sine and cosine? … logs? The 30 independent historical sketches in Math through the Ages answer these questions and many others in an informal, easygoing style that is accessible to teachers, students, and anyone who is curious about the history of mathematical ideas. Each sketch includes Questions and Projects to help you learn more about its topic and to see how the main ideas fit into the bigger picture of history. The 30 short stories are preceded by a 58-page bird's-eye overview of the entire panorama of mathematical history, a whirlwind tour of the most important people, events, and trends that shaped the mathematics we know today. “What to Read Next” and reading suggestions after each sketch provide starting points for readers who want to learn more. This book is ideal for a broad spectrum of audiences, including students in history of mathematics courses at the late high school or early college level, pre-service and in-service teachers, and anyone who just wants to know a little more about the origins of mathematics.

Proceedings of the 10th Asian Logic Conference, Kobe, Japan, 1-6 September 2008

Exploring Geometry, Second Edition promotes student engagement with the beautiful ideas of geometry. Every major concept is introduced in its historical context and connects the idea with real-life. A system of experimentation followed by rigorous explanation and proof is central. Exploratory projects play an integral role in this text. Students develop a better sense of how to prove a result and visualize connections between statements, making these connections real. They develop the intuition needed to conjecture a theorem and devise a proof of what they have observed. Features: Second edition of a successful textbook for the first undergraduate course Every major concept is introduced in its historical context and connects the idea with real life Focuses on experimentation Projects help enhance student learning All major software programs can be used; free software from author

Proceedings of the 10th Asian Logic Conference

Mathematics is a poem. It is a lucid, sensual, precise exposition of beautiful ideas directed to specific goals. It is worthwhile to have as broad a cross-section of mankind as possible be conversant with what goes on in mathematics. Just as everyone knows that the Internet is a powerful and important tool for communication, so everyone should know that the Poincaré conjecture gives us important information about the shape of our universe. Just as every responsible citizen realizes that the mass-production automobile was pioneered by Henry Ford, so everyone should know that the P/NP problem has implications for security and data manipulation that will affect everyone. This book endeavors to tell the story of the modern impact of mathematics, of its trials and triumphs and insights, in language that can be appreciated by a broad audience. It endeavors to show what mathematics means for our lives, how it impacts all of us, and what new thoughts it should cause us to entertain. It introduces new vistas of mathematical ideas and shares the excitement of new ideas freshly minted. It discusses the significance and impact of these ideas, and gives them meaning that will travel well and cause people to reconsider their place in the universe. Mathematics is one of mankind's oldest disciplines. Along with philosophy, it has shaped the very modus of human thought. And it continues to do so. To

be unaware of modern mathematics is to miss out on a large slice of life. It is to be left out of essential modern developments. We want to address this point, and do something about it. This is a book to make mathematics exciting for people of all interests and all walks of life. Mathematics is exhilarating, it is ennobling, it is uplifting, and it is fascinating. We want to show people this part of our world, and to get them to travel new paths.

Math through the Ages: A Gentle History for Teachers and Others Expanded Second Edition

Geometry was considered until modern times to be a model science. To be developed more geometrico was a seal of quality for any endeavor, whether mathematical or not. In the 17th century, for example, Spinoza set up his Ethics in a more geometrico manner, to emphasize the perfection, certainty, and clarity of his pronouncements. Geometry achieved this status on the heels of Euclid's Elements, in which, for the first time, a theory was built up in an axiomatic-deductive manner. Euclid started with obvious axioms - he called them "common notions" and "postulates" -, statements whose validity raised no doubts in the reader's mind. His propositions followed deductively from those axioms, so that the truth of the axioms was passed on to the propositions by means of purely logical proofs. In this sense, Euclid's geometry consisted of "eternal truths." Given its prominence, Euclid's Elements was also used as a textbook until the 20th Century. Today geometry has lost the central importance it had during earlier centuries, but it still is an important area of mathematics, and is truly fundamental for mathematics from a variety of points of view. The "Introduction to Geometry" by Ewald tries to address some of these points of view, whose significance will be examined in what follows from a historical perspective.

Exploring Geometry

This book is a text for junior, senior, or first-year graduate courses traditionally titled Foundations of Geometry and/or Non Euclidean Geometry. The first 29 chapters are for a semester or year course on the foundations of geometry. The remaining chap ters may then be used for either a regular course or independent study courses. Another possibility, which is also especially suited for in-service teachers of high school geometry, is to survey the the fundamentals of absolute geometry (Chapters 1 -20) very quickly and begin earnest study with the theory of parallels and isometries (Chapters 21 -30). The text is self-contained, except that the elementary calculus is assumed for some parts of the material on advanced hyperbolic geometry (Chapters 31 -34). There are over 650 exercises, 30 of which are 10-part true-or-false questions. A rigorous ruler-and-protractor axiomatic development of the Euclidean and hyperbolic planes, including the classification of the isometries of these planes, is balanced by the discussion about this development. Models, such as Taxicab Geometry, are used exten sively to illustrate theory. Historical aspects and alternatives to the selected axioms are prominent. The classical axiom systems of Euclid and Hilbert are discussed, as are axiom systems for three and four-dimensional absolute geometry and Pieri's system based on rigid motions. The text is divided into three parts. The Introduction (Chapters 1 -4) is to be read as quickly as possible and then used for ref erence if necessary.

A Mathematical Odyssey

Geometry an Introduction