Imo 2012 Solutions

104 Number Theory ProblemsVessel-Source Marine PollutionMathematical Olympiads 1999-2000The IMO CompendiumThe ARML Power ContestWinning SolutionsMathematical Olympiads 2000-2001Lemmas in Olympiad GeometryA Path to Combinatorics for UndergraduatesMarine Navigation101 Problems in AlgebraBridge to Higher MathematicsMathematical Olympiad in China (2011-2014)Applied Stochastic Differential EquationsProblem-Solving StrategiesSoftware Systems ArchitectureFairplayMathematical Olympiad TreasuresPlaces of Refuge for Ships in DistressMathematical Olympiad in China (2009-2010)Computer ArchitectureReducing C02 and other emissions from shippingPractical Ship HydrodynamicsThe IMO Compendium103 Trigonometry ProblemsGreen Transportation LogisticsEuclidean Geometry in Mathematical OlympiadsGlobal Maritime Transport and Ballast Water ManagementGovernance of Arctic ShippingPlant Nutrition and Soil Fertility ManualAn Introduction to Diophantine EquationsTelematics in the Transport EnvironmentNumber Theory104 Number Theory ProblemsIMO NewsPlaces of Refuge for Ships in DistressAnalog Circuit DesignMaritime-Port Technology and DevelopmentViolent PythonProblems from the Book

104 Number Theory Problems

"The IMO Compendium" is the ultimate collection of challenging high-school-level mathematics problems and is an invaluable resource not only for high-school students preparing for mathematics competitions, but for anyone who loves and appreciates mathematics. The International Mathematical Olympiad (IMO), nearing its 50th anniversary, has become the most popular and prestigious competition for high-school students interested in mathematics. Only six students from each participating country are given the honor of participating in this competition every year. The IMO represents not only a great opportunity to tackle interesting and challenging mathematics problems, it also offers a way for high school students to measure up with students from the rest of the world. Until the first edition of this book appearing in 2006, it has been almost impossible to obtain a complete collection of the problems proposed at the IMO in book form. "The IMO Compendium" is the result of a collaboration between four former IMO participants from Yugoslavia, now Serbia and Montenegro, to rescue these problems from old and scattered manuscripts, and produce the ultimate source of IMO practice problems. This book attempts to gather all the problems and solutions appearing on the IMO through 2009. This second edition contains 143 new problems, picking up where the 1959-2004 edition has left off.

Vessel-Source Marine Pollution

This book constitutes the proceedings of the 12th International Conference on Transport Systems Telematics, TST 2012, held in Katowice-Ustron, Poland, in October 2012. The 48 papers included in this volume were carefully reviewed and selected for inclusion in this book. Transport telematics are the systems using the information and communication technologies in the area of infrastructure and of means of transport and its participants. An intelligent transport covers systems that allow, through the data transmission and analysis, to influence the behaviour of road users and the action of technical elements in means of transport or along the traffic route. Intelligent transport systems - in accordance with the European Directive - are used for the transport management informatisation. The research shows that the use of telematics can significantly increase the efficiency of the transport system, the road safety and the environmental protection. This book provides an overview of solutions being developed in the field of intelligent transportation systems, and includes theoretical and case studies in the countries of conference participants.

Mathematical Olympiads 1999-2000

This best-selling title, considered for over a decade to be essential reading for every serious student and practitioner of computer design, has been updated throughout to address the most important trends facing computer designers today. In this edition, the authors bring their trademark method of quantitative analysis

not only to high performance desktop machine design, but also to the design of embedded and server systems. They have illustrated their principles with designs from all three of these domains, including examples from consumer electronics, multimedia and web technologies, and high performance computing. The book retains its highly rated features: Fallacies and Pitfalls, which share the hard-won lessons of real designers; Historical Perspectives, which provide a deeper look at computer design history; Putting it all Together, which present a design example that illustrates the principles of the chapter; Worked Examples, which challenge the reader to apply the concepts, theories and methods in smaller scale problems; and Cross-Cutting Issues, which show how the ideas covered in one chapter interact with those presented in others. In addition, a new feature, Another View, presents brief design examples in one of the three domains other than the one chosen for Putting It All Together. The authors present a new organization of the material as well, reducing the overlap with their other text, Computer Organization and Design: A Hardware/Software Approach 2/e, and offering more in-depth treatment of advanced topics in multithreading, instruction level parallelism, VLIW architectures, memory hierarchies, storage devices and network technologies. Also new to this edition, is the adoption of the MIPS 64 as the instruction set architecture. In addition to several online appendixes, two new appendixes will be printed in the book: one contains a complete review of the basic concepts of pipelining, the other provides solutions a selection of the exercises. Both will be invaluable to the student or professional learning on her own or in the classroom.

Hennessy and Patterson continue to focus on fundamental techniques for designing real machines and for maximizing their cost/performance. * Presents state-of-the-art design examples including: * IA-64 architecture and its first implementation, the Itanium * Pipeline designs for Pentium III and Pentium IV * The cluster that runs the Google search engine * EMC storage systems and their performance * Sony Playstation 2 * Infiniband, a new storage area and system area network * SunFire 6800 multiprocessor server and its processor the UltraSPARC III * Trimedia TM32 media processor and the Transmeta Crusoe processor * Examines quantitative performance analysis in the commercial server market and the embedded market, as well as the traditional desktop market. Updates all the examples and figures with the most recent benchmarks, such as SPEC 2000. * Expands coverage of instruction sets to include descriptions of digital signal processors, media processors, and multimedia extensions to desktop processors. * Analyzes capacity, cost, and performance of disks over two decades. Surveys the role of clusters in scientific computing and commercial computing. * Presents a survey, taxonomy, and the benchmarks of errors and failures in computer systems. * Presents detailed descriptions of the design of storage systems and of clusters. * Surveys memory hierarchies in modern microprocessors and the key parameters of modern disks. * Presents a glossary of networking terms.

The IMO Compendium

This challenging problem book by renowned US Olympiad coaches, mathematics teachers, and researchers develops a multitude of problem-solving skills needed to excel in mathematical contests and in mathematical research in number theory. Offering inspiration and intellectual delight, the problems throughout the book encourage students to express their ideas in writing to explain how they conceive problems, what conjectures they make, and what conclusions they reach. Applying specific techniques and strategies, readers will acquire a solid understanding of the fundamental concepts and ideas of number theory.

The ARML Power Contest

This challenging problem book by renowned US Olympiad coaches, mathematics teachers, and researchers develops a multitude of problem-solving skills needed to excel in mathematical contests and in mathematical research in number theory. Offering inspiration and intellectual delight, the problems throughout the book encourage students to express their ideas in writing to explain how they conceive problems, what conjectures they make, and what conclusions they reach. Applying specific techniques and strategies, readers will acquire a solid understanding of the fundamental concepts and ideas of number theory.

Winning Solutions

The 12th International Conference on Marine Navigation and Safety of Sea Transportation (TransNav 2017) will take place on June 21-23 in Gdynia, Poland. Main themes of this conference include: electronic navigation, route planning, mathematical models, methods and algorithms, ships manoeuvring, navigational risks, Global Navigation Satellite Systems (GNSS), Automatic Identification System (AIS), marine radar, anti-collision, dynamic positioning, visualization of data, hydrometereological aspects and weather routing, safety at sea, inland navigation, autonomous water transport, communications and global maritime distress and safety system (GMDSS), port ant routes optimum location and magnetic compasses.

Mathematical Olympiads 2000-2001

Lemmas in Olympiad Geometry

A unique collection of competition problems from over twenty major national and international mathematical competitions for high school students. Written for trainers and participants of contests of all levels up to the highest level, this will appeal to high school teachers conducting a mathematics club who need a range of simple to complex problems and to those instructors wishing to pose a "problem

of the week", thus bringing a creative atmosphere into the classrooms. Equally, this is a must-have for individuals interested in solving difficult and challenging problems. Each chapter starts with typical examples illustrating the central concepts and is followed by a number of carefully selected problems and their solutions. Most of the solutions are complete, but some merely point to the road leading to the final solution. In addition to being a valuable resource of mathematical problems and solution strategies, this is the most complete training book on the market.

A Path to Combinatorics for Undergraduates

Stochastic differential equations are differential equations whose solutions are stochastic processes. They exhibit appealing mathematical properties that are useful in modeling uncertainties and noisy phenomena in many disciplines. This book is motivated by applications of stochastic differential equations in target tracking and medical technology and, in particular, their use in methodologies such as filtering, smoothing, parameter estimation, and machine learning. It builds an intuitive hands-on understanding of what stochastic differential equations are all about, but also covers the essentials of It calculus, the central theorems in the field, and such approximation schemes as stochastic Runge-Kutta. Greater emphasis is given to solution methods than to analysis of theoretical properties of the equations. The book's practical approach assumes only prior understanding of

ordinary differential equations. The numerous worked examples and end-of-chapter exercises include application-driven derivations and computational assignments. MATLAB/Octave source code is available for download, promoting hands-on work with the methods.

Marine Navigation

This unique approach to combinatorics is centered around unconventional, essay-type combinatorial examples, followed by a number of carefully selected, challenging problems and extensive discussions of their solutions. Topics encompass permutations and combinations, binomial coefficients and their applications, bijections, inclusions and exclusions, and generating functions. Each chapter features fully-worked problems, including many from Olympiads and other competitions, as well as a number of problems original to the authors; at the end of each chapter are further exercises to reinforce understanding, encourage creativity, and build a repertory of problem-solving techniques. The authors' previous text, "102 Combinatorial Problems," makes a fine companion volume to the present work, which is ideal for Olympiad participants and coaches, advanced high school students, undergraduates, and college instructors. The book's unusual problems and examples will interest seasoned mathematicians as well. "A Path to Combinatorics for Undergraduates" is a lively introduction not only to combinatorics, but to mathematical ingenuity, rigor, and the joy of solving puzzles.

101 Problems in Algebra

The emission of greenhouse gases from shipping is a serious problem for international climate change policy and they cannot be allowed to grow uncontrolled. The International Maritime Organization (IMO) has estimated that international shipping was responsible for annual emissions of around 843 million tonnes of carbon dioxide (MtCO2) in 2007, or around 3 per cent of total man-made carbon emissions. This report follows up an earlier inquiry (Reducing carbon emissions from transport, HC 981-I, 9th report of session 2005-06, ISBN 9780215030412)and examines what efforts the Government is making in three main respects: (a) negotiations to tackle shipping emissions at an international level (within the IMO, the UN Framework Convention on Climate Change and the EU); (b) measures by which the UK is to take into account its share of international shipping emissions in domestic carbon budgets (through the Climate Change Act 2008); and (c) support in the UK for operational improvements and technological R&D aimed at reducing emissions from shipping. Very little progress has been made at the international level. A lack of urgency shown by industrialised nations and blocking actions by developing economies share the blame. The Government admits that the current calculation of the UK's share of international shipping emissions is an underestimate and should consult on how to improve the methodology it uses to calculate the UK's share of international shipping emissions. Government support for research and development should focus on

technologies that can be retrofitted to existing ships, and offer a genuine alternative to fossil fuels, such as hydrogen fuel cells. There should be drastic acceleration of R&D into low- and zero-carbon propulsion systems.

Bridge to Higher Mathematics

This problem-solving book is an introduction to the study of Diophantine equations, a class of equations in which only integer solutions are allowed. The presentation features some classical Diophantine equations, including linear, Pythagorean, and some higher degree equations, as well as exponential Diophantine equations. Many of the selected exercises and problems are original or are presented with original solutions. An Introduction to Diophantine Equations: A Problem-Based Approach is intended for undergraduates, advanced high school students and teachers, mathematical contest participants — including Olympiad and Putnam competitors — as well as readers interested in essential mathematics. The work uniquely presents unconventional and non-routine examples, ideas, and techniques.

Mathematical Olympiad in China (2011-2014)

Mathematical Olympiad Treasures aims at building a bridge between ordinary high

school exercises and more sophisticated, intricate and abstract concepts in undergraduate mathematics. The book contains a stimulating collection of problems in the subjects of algebra, geometry, trigonometry, number theory and combinatorics. While it may be considered a sequel to "Mathematical Olympiad Challenges," the focus is on engaging a wider audience to apply techniques and strategies to real-world problems. Throughout the book students are encouraged to express their ideas, conjectures, and conclusions in writing. The goal is to help readers develop a host of new mathematical tools that will be useful beyond the classroom and in a number of disciplines.

Applied Stochastic Differential Equations

* Problem-solving tactics and practical test-taking techniques provide in-depth enrichment and preparation for various math competitions * Comprehensive introduction to trigonometric functions, their relations and functional properties, and their applications in the Euclidean plane and solid geometry * A cogent problem-solving resource for advanced high school students, undergraduates, and mathematics teachers engaged in competition training

Problem-Solving Strategies

Like all living things, plants require nutrient elements to grow. The Plant Nutrition Manual describes the principles that determine how plants grow and discusses all the essential elements necessary for successful crop production. The nutritional needs of plants that add color and variety to our visual senses are addressed as well. Altogether, nut

Software Systems Architecture

Challenging problems in maths plus solutions to those featured in the earlier Olympiad book.

Fairplay

Software Systems Architecture is a practitioner-oriented guide to designing and implementing effective architectures for information systems. It is both a readily accessible introduction to software architecture and an invaluable handbook of well-established best practices. It shows why the role of the architect is central to any successful information-systems development project, and, by presenting a set of architectural viewpoints and perspectives, provides specific direction for improving your own and your organization's approach to software systems architecture. With this book you will learn how to Design an architecture that

reflects and balances the different needs of its stakeholders Communicate the architecture to stakeholders and demonstrate that it has met their requirements Focus on architecturally significant aspects of design, including frequently overlooked areas such as performance, resilience, and location Use scenarios and patterns to drive the creation and validation of your architecture Document your architecture as a set of related views Use perspectives to ensure that your architecture exhibits important qualities such as performance, scalability, and security The architectural viewpoints and perspectives presented in the book also provide a valuable long-term reference source for new and experienced architects alike. Whether you are an aspiring or practicing software architect, you will find yourself referring repeatedly to the practical advice in this book throughout the lifecycle of your projects. A supporting Web site containing further information can be found at www.viewpoints-and-perspectives.info

Mathematical Olympiad Treasures

Analog circuit and system design today is more essential than ever before. With the growth of digital systems, wireless communications, complex industrial and automotive systems, designers are challenged to develop sophisticated analog solutions. This comprehensive source book of circuit design solutions will aid systems designers with elegant and practical design techniques that focus on common circuit design challenges. The book's in-depth application examples

provide insight into circuit design and application solutions that you can apply in today's demanding designs. Covers the fundamentals of linear/analog circuit and system design to guide engineers with their design challenges Based on the Application Notes of Linear Technology, the foremost designer of high performance analog products, readers will gain practical insights into design techniques and practice Broad range of topics, including power management tutorials, switching regulator design, linear regulator design, data conversion, signal conditioning, and high frequency/RF design Contributors include the leading lights in analog design, Robert Dobkin, Jim Williams and Carl Nelson, among others

Places of Refuge for Ships in Distress

Problems and solutions from Mathematical Olympiad. Ideal for anyone interested in mathematical problem solving.

Mathematical Olympiad in China (2009-2010)

Analysing the regulation of vessel-source pollution from the perspective of the political interests of key players in the ship transportation industry, this 2005 book by Alan Khee-Jin Tan offers a comprehensive and convincing account of how pollution of the marine environment by ships may be better regulated and

reduced. In this timely study, he traces the history of regulation at the International Maritime Organization (IMO) and investigates the political, economic and social forces influencing the IMO treaties. Also examined are the efforts of maritime states, ship-owners, cargo owners, oil companies and environmental groups to influence IMO laws and treaties. This is an important book, which uncovers the politics behind the law and offers solutions for overcoming the deficiencies in the regulatory system. It will be of great interest to professionals in the shipping industry as well as practitioners and students.

Computer Architecture

The International Mathematical Olympiad (IMO) is a competition for high school students. China has taken part in the IMO 21 times since 1985 and has won the top ranking for countries 14 times, with a multitude of golds for individual students. The six students China has sent every year were selected from 20 to 30 students among approximately 130 students who took part in the annual China Mathematical Competition during the winter months. This volume of comprises a collection of original problems with solutions that China used to train their Olympiad team in the years from 2009 to 2010. Mathematical Olympiad problems with solutions for the years 2002OCo2008 appear in an earlier volume, Mathematical Olympiad in China."

Reducing C02 and other emissions from shipping

Ballast water management is a complex subject with many issues and still limited knowledge, however, it is building up on new scientific researches and practical experience. The Ballast Water Management Convention is the global legal framework which still needs to be implemented. This book brings together a long-term and newest experience from practical work, scientific research, administration and policy involvements, offering unique insights to readers who would like to learn more about this subject. It also provides recommendations and practical solutions especially important for professionals, administrations and organizations in the process of the implementation of this Ballast Water Management Convention.

Practical Ship Hydrodynamics

The International Mathematical Olympiad (IMO) is a very important competition for high school students. China has taken part in the IMO 31 times since 1985 and has won the top ranking for countries 19 times, with a multitude of gold medals for individual students. The six students China has sent every year were selected from 60 students among approximately 300 students who took part in the annual China Mathematical Competition during the winter months. This book includes the

problems and solutions of the most important mathematical competitions from 2010 to 2014 in China, such as China Mathematical Competition, China Mathematical Olympiad, China Girls' Mathematical Olympiad. These problems are almost exclusively created by the experts who are engaged in mathematical competition teaching and researching. Some of the solutions are from national training team and national team members, their wonderful solutions being the feature of this book. This book is useful to mathematics fans, middle school students engaged in mathematical competition, coaches in mathematics teaching and teachers setting up math elective courses.

The IMO Compendium

This book examines the state of the art in green transportation logistics from the perspective of balancing environmental performance in the transportation supply chain while also satisfying traditional economic performance criteria. Part of the book is drawn from the recently completed European Union project Super Green, a three-year project intended to promote the development of European freight corridors in an environmentally friendly manner. Additional chapters cover both the methodological base and the application context of green transportation logistics. Individual chapters look at the policy context; the basics of transportation emissions; Green Corridors basics; the concept of TEN-T (Trans-European Network); Benchmarking of green corridors; the potential role of ICT (Information and

Communication Technologies); Green vehicle routing; Reducing maritime CO2 emissions via market based measures and speed and route optimization; Sulphur emissions; Lifecycle emissions; Green rail transportation; Green air transportation; Green inland navigation and possible areas for further research. Throughout, the book pursues the goal of "win-win" solutions and analyzes the phenomenon of "push-down, pop-up", wherein a change in one aspect of a problem can cause another troubling aspect to arise. For example, speed reduction in maritime transportation can reduce emissions and fuel costs, but could require additional ships and could raise in-transit inventory costs. Or, regulations to reduce sulphur emissions may ultimately increase CO2 elsewhere in the supply chain. The book takes stock at the various tradeoffs that are at stake in the goal of greening the supply chain and looks at where balances can be struck.

103 Trigonometry Problems

Practical Ship Hydrodynamics provides a comprehensive overview of hydrodynamic experimental and numerical methods for ship resistance and propulsion, maneuvering, seakeeping and vibration. Beginning with an overview of problems and approaches, including the basics of modeling and full scale testing, expert author Volker Bertram introduces the marine applications of computational fluid dynamics and boundary element methods. Expanded and updated, this new edition includes: Otherwise disparate information on the factors affecting ship

hydrodynamics, combined to provide one practical, go-to resource. Full coverage of new developments in computational methods and model testing techniques relating to marine design and development. New chapters on hydrodynamic aspects of ship vibrations and hydrodynamic options for fuel efficiency, and increased coverage of simple design estimates of hydrodynamic quantities such as resistance and wake fraction. With a strong focus on essential background for real-life modeling, this book is an ideal reference for practicing naval architects and graduate students.

Green Transportation Logistics

This introductory textbook takes a problem-solving approach to number theory, situating each concept within the framework of an example or a problem for solving. Starting with the essentials, the text covers divisibility, unique factorization, modular arithmetic and the Chinese Remainder Theorem, Diophantine equations, binomial coefficients, Fermat and Mersenne primes and other special numbers, and special sequences. Included are sections on mathematical induction and the pigeonhole principle, as well as a discussion of other number systems. By emphasizing examples and applications the authors motivate and engage readers.

Euclidean Geometry in Mathematical Olympiads

This book provides the mathematical tools and problem-solving experience needed to successfully compete in high-level problem solving competitions. Each section presents important background information and then provides a variety of worked examples and exercises to help bridge the gap between what the reader may already know and what is required for high-level competitions. Answers or sketches of the solutions are given for all exercises.

Global Maritime Transport and Ballast Water Management

Violent Python shows you how to move from a theoretical understanding of offensive computing concepts to a practical implementation. Instead of relying on another attacker's tools, this book will teach you to forge your own weapons using the Python programming language. This book demonstrates how to write Python scripts to automate large-scale network attacks, extract metadata, and investigate forensic artifacts. It also shows how to write code to intercept and analyze network traffic using Python, craft and spoof wireless frames to attack wireless and Bluetooth devices, and how to data-mine popular social media websites and evade modern anti-virus. Demonstrates how to write Python scripts to automate large-scale network attacks, extract metadata, and investigate forensic artifacts Write

code to intercept and analyze network traffic using Python. Craft and spoof wireless frames to attack wireless and Bluetooth devices Data-mine popular social media websites and evade modern anti-virus

Governance of Arctic Shipping

This engaging math textbook is designed to equip students who have completed a standard high school math curriculum with the tools and techniques that they will need to succeed in upper level math courses. Topics covered include logic and set theory, proof techniques, number theory, counting, induction, relations, functions, and cardinality.

Plant Nutrition and Soil Fertility Manual

An Introduction to Diophantine Equations

By examining the problem of places of refuge for ships in distress and proposed solutions under international, national and regional law, Places of Refuge for Ships in Distress by Anthony Morrison highlights the need for further solutions and presents alternative solutions.

Telematics in the Transport Environment

This book showcases the synthetic problem-solving methods which frequently appear in modern day Olympiad geometry, in the way we believe they should be taught to someone with little familiarity in the subject. In some sense, the text also represents an unofficial sequel to the recent problem collection published by XYZ Press, 110 Geometry Problems for the International Mathematical Olympiad, written by the first and third authors, but the two books can be studied completely independently of each other. The work is designed as a medley of the important Lemmas in classical geometry in a relatively linear fashion: gradually starting from Power of a Point and common results to more sophisticated topics, where knowing a lot of techniques can prove to be tremendously useful. We treat each chapter as a short story of its own and include numerous solved exercises with detailed explanations and related insights that will hopefully make your journey very enjoyable.

Number Theory

104 Number Theory Problems

This is the ultimate collection of challenging high-school-level mathematics problems. It is the result of a two year long collaboration to rescue these problems from old and scattered manuscripts, and produce the definitive source of IMO practice problems in book form for the first time. This book attempts to gather all the problems and solutions appearing on the IMO and contains a grand total of 1900 problems. It is an invaluable resource for high-school students preparing for mathematics competitions, and for anyone who loves math.

IMO News

The ARML (American Regions Math League) Power Contest is truly a unique competition in which a team of students is judged on its ability to discover a pattern, express the pattern in precise mathematical language, and provide a logical proof of its conjectures. Just as a team of students can be self-directed to solve each problem set, a teacher, math team coach, or math circle leader could take these ideas and questions and lead students into problem solving and mathematical discovery. This book contains thirty-seven interesting and engaging problem sets from the ARML Power Contests from 1994 to 2013. They are generally extensions of the high school mathematics classroom and often connect two remote areas of mathematics. Additionally, they provide meaningful problem situations for both the novice and the veteran mathlete. Thomas Kilkelly has been a mathematics teacher for forty-three years. During that time he has been

awarded several teaching honors and has coached many math teams to state and national championships. He has always been an advocate for more discovery, integration, and problem solving in the mathematics classroom. In the interest of fostering a greater awareness and appreciation of mathematics and its connections to other disciplines and everyday life, MSRI and the AMS are publishing books in the Mathematical Circles Library series as a service to young people, their parents and teachers, and the mathematics profession. Titles in this series are co-published with the Mathematical Sciences Research Institute (MSRI).

Places of Refuge for Ships in Distress

Analog Circuit Design

Maritime-Port Technology and Development contains the latest research results and innovations as presented at the 2014 International Maritime and Port Technology and Development Conference (Trondheim, Norway, 27- 29 October 2014). The volume is divided into a wide range of topics: Efficient and environmentally friendly energy use in ships and port

Maritime-Port Technology and Development

Violent Python

By examining the problem of places of refuge for ships in distress and proposed solutions under international, national and regional law, Places of Refuge for Ships in Distress by Anthony Morrison highlights the need for further solutions and presents alternative solutions.

Problems from the Book

This is a challenging problem-solving book in Euclidean geometry, assuming nothing of the reader other than a good deal of courage. Topics covered included cyclic quadrilaterals, power of a point, homothety, triangle centers; along the way the reader will meet such classical gems as the nine-point circle, the Simson line, the symmedian and the mixtilinear incircle, as well as the theorems of Euler, Ceva, Menelaus, and Pascal. Another part is dedicated to the use of complex numbers and barycentric coordinates, granting the reader both a traditional and computational viewpoint of the material. The final part consists of some more advanced topics, such as inversion in the plane, the cross ratio and projective transformations, and the theory of the complete quadrilateral. The exposition is friendly and relaxed, and accompanied by over 300 beautifully drawn figures. The

emphasis of this book is placed squarely on the problems. Each chapter contains carefully chosen worked examples, which explain not only the solutions to the problems but also describe in close detail how one would invent the solution to begin with. The text contains as selection of 300 practice problems of varying difficulty from contests around the world, with extensive hints and selected solutions. This book is especially suitable for students preparing for national or international mathematical olympiads, or for teachers looking for a text for an honor class.

ROMANCE ACTION & ADVENTURE MYSTERY & THRILLER BIOGRAPHIES & HISTORY CHILDREN'S YOUNG ADULT FANTASY HISTORICAL FICTION HORROR LITERARY FICTION NON-FICTION SCIENCE FICTION