

Mathematical Olympiad In China Problems And Solutions

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Sequences And Mathematical Induction:in Mathematical Olympiad And Competitions (2nd Edition)

Methods and Techniques for Proving Inequalities

The focus of this book is algebraic inequalities. Not only is it the current Mathematical Olympiad hot topic, it is also the basis of geometric inequalities. In addition, the book involves some analysis on inequality. This book serves as a good reference in the field of algebraic inequalities as faced in problems found in a Mathematical Olympiad.

Mathematical Olympiad Treasures

Functions and their properties have been part of the rigorous precollege curriculum for decades. And functional equations have been a favorite topic of the leading national and international mathematical competitions. Yet the subject has not received equal attention by authors at an introductory level. The majority of the books on the topic remain unreachable to the curious and intelligent precollege student. The present book is an attempt to eliminate this disparity. The book opens with a review chapter on functions, which collects the relevant foundational information on functions, plus some material potentially new to the reader. The next chapter presents a working definition of functional equations and explains the

difficulties in trying to systematize the theory. With each new chapter, the author presents methods for the solution of a particular group of equations. Each chapter is complemented with many solved examples, the majority of which are taken from mathematical competitions and professional journals. The book ends with a chapter of unsolved problems and some other auxiliary material. The book is an invaluable resource for precollege and college students who want to deepen their knowledge of functions and their properties, for teachers and instructors who wish to enrich their curricula, and for any lover of mathematical problem-solving techniques. 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.

Mathematical Olympiad in China (2011-2014)

The importance of mathematics competitions has been widely recognised for three reasons: they help to develop imaginative capacity and thinking skills whose value far transcends mathematics; they constitute the most effective way of discovering and nurturing mathematical talent; and they provide a means to combat the prevalent false image of mathematics held by high school students, as either a fearsomely difficult or a dull and uncreative subject. This book provides a comprehensive training resource for competitions from local and provincial to national Olympiad level, containing hundreds of diagrams, and graced by many light-hearted cartoons. It features a large collection of what mathematicians call "beautiful" problems - non-routine, provocative, fascinating, and challenging problems, often with elegant solutions. It features careful, systematic exposition of a selection of the most important topics encountered in mathematics competitions, assuming little prior knowledge. Geometry, trigonometry, mathematical induction, inequalities, Diophantine equations, number theory, sequences and series, the binomial theorem, and combinatorics - are all developed in a gentle but lively manner, liberally illustrated with examples, and consistently motivated by attractive "appetiser" problems, whose solution appears after the relevant theory has been expounded. Each chapter is presented as a "toolchest" of instruments designed for cracking the problems collected at the end of the chapter. Other topics, such as algebra, co-ordinate geometry, functional equations and probability, are introduced and elucidated in the posing and solving of the large collection of miscellaneous problems in the final toolchest. An unusual feature of this book is the attention paid throughout to the history of mathematics - the origins of the ideas, the terminology and some of the problems, and the celebration of mathematics as a multicultural, cooperative human achievement. As a bonus the aspiring "mathlete" may encounter, in the most enjoyable way possible, many of the topics that form the core of the standard school curriculum.

Adventures in Problem Solving

In China, lots of excellent students who are good at maths takes an active part in various maths contests and the best six senior high school students will be selected to form the IMO National Team to compete in the International Mathematical Olympiad. In the past ten years China's IMO Team has achieved

outstanding results — they have won the first place almost every year. The author is one of the coaches of China's IMO National Team, whose students have won many gold medals many times in IMO. This book is part of the Mathematical Olympiad Series which discusses several aspects related to maths contests, such as algebra, number theory, combinatorics, graph theory and geometry. The book elaborates on methods of discrete extremization, such as inequality control, repeated extremum, partial adjustment, exploiting symmetry, polishing transform, space estimates, etc.

103 Trigonometry Problems

This new volume of the Mathematical Olympiad Series focuses on the topic of geometry. Basic and advanced theorems commonly seen in Mathematical Olympiad are introduced and illustrated with plenty of examples. Special techniques in solving various types of geometrical problems are also introduced, while the authors elaborate extensively on how to acquire an insight and develop strategies in tackling difficult geometrical problems. This book is suitable for any reader with elementary geometrical knowledge at the lower secondary level. Each chapter includes sufficient scaffolding and is comprehensive enough for the purpose of self-study. Readers who complete the chapters on the basic theorems and techniques would acquire a good foundation in geometry and may attempt to solve many geometrical problems in various mathematical competitions. Meanwhile, experienced contestants in Mathematical Olympiad competitions will find a large collection of problems pitched at competitions at the international level, with opportunities to practise and sharpen their problem-solving skills in geometry.

Inequalities

* 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

Moscow Mathematical Olympiads, 2000-2005

The International Mathematical Olympiad (IMO) is an annual international mathematics competition held for pre-collegiate students. It is also the oldest of the international science olympiads, and competition for places is particularly fierce. This book is an amalgamation of the booklets originally produced to guide students intending to contend for placement on their country's IMO team. See also *A First Step to Mathematical Olympiad Problems* which was published in 2009. The material contained in this book provides an introduction to the main mathematical topics covered in the IMO, which are: Combinatorics, Geometry and Number Theory. In addition, there is a special emphasis on how to approach unseen questions in Mathematics, and model the writing of proofs. Full answers are given to all questions. Though *A Second Step to Mathematical Olympiad Problems* is

written from the perspective of a mathematician, it is written in a way that makes it easily comprehensible to adolescents. This book is also a must-read for coaches and instructors of mathematical competitions.

Combinatorial Extremization

In China, lots of excellent maths students take an active interest in various maths contests and the best six senior high school students will be selected to form the IMO National Team to compete in the International Mathematical Olympiad. In the past ten years China's IMO Team has achieved outstanding results — they won the first place almost every year. The author is one of the coaches of China's IMO National Team, whose students have won many gold medals many times in IMO. This book is part of the Mathematical Olympiad Series which discusses several aspects related to maths contests, such as algebra, number theory, combinatorics, graph theory and geometry. The book elaborates on Geometric Inequality problems such as inequality for the inscribed quadrilateral, the area inequality for special polygons, linear geometric inequalities, etc.

Mathematical Olympiads 1999-2000

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.

Mathematical Olympiad in China (2009-2010)

A collection of problems put together by coaches of the U.S. International Mathematical Olympiad Team.

USA and International Mathematical Olympiads, 2005

Over 300 challenging problems in algebra, arithmetic, elementary number theory and trigonometry, selected from Mathematical Olympiads held at Moscow University. Only high school math needed. Includes complete solutions. Features 27 black-and-white illustrations. 1962 edition.

A Friendly Mathematics Competition

Authored by a leading name in mathematics, this engaging and clearly presented

text leads the reader through the tactics involved in solving mathematical problems at the Mathematical Olympiad level. With numerous exercises and assuming only basic mathematics, this text is ideal for students of 14 years and above in pure mathematics.

The Art and Craft of Problem Solving

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 a 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.

A First Step to Mathematical Olympiad Problems

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.

The USSR Olympiad Problem Book

See also A SECOND STEP TO MATHEMATICAL OLYMPIAD PROBLEMS The International Mathematical Olympiad (IMO) is an annual international mathematics competition held for pre-collegiate students. It is also the oldest of the international science olympiads, and competition for places is particularly fierce. This book is an amalgamation of the first 8 of 15 booklets originally produced to guide students intending to contend for placement on their country's IMO team. The material contained in this book provides an introduction to the main

mathematical topics covered in the IMO, which are: Combinatorics, Geometry and Number Theory. In addition, there is a special emphasis on how to approach unseen questions in Mathematics, and model the writing of proofs. Full answers are given to all questions. Though *A First Step to Mathematical Olympiad Problems* is written from the perspective of a mathematician, it is written in a way that makes it easily comprehensible to adolescents. This book is also a must-read for coaches and instructors of mathematical competitions.

Combinatorial Problems in Mathematical Competitions

The Mathematical Olympiad books, covering the USA Mathematical Olympiad (USAMO) and the International Mathematical Olympiad (IMO), have been published annually by the MAA American Mathematics Competitions since 1976. This is the sixth volume in that series published by the MAA in its Problem Book series. The IMO is the work mathematics championship for high school students. It takes place annually in a different country each year. The aims of the IMO are (1) to discover, encourage and challenge mathematically gifted young people in all countries; (2) to foster friendships between mathematicians around the world; (3) to create an opportunity for the exchange of information on school syllabi and practice throughout the world. The USAMO and the Team Selection Test (TST) are the last two stages of the selection process for the United States of America IMO team. The preceding examinations are the AMC 10 or AMC12 and the American Invitational Mathematics Examination (AIME). Participation in the AIME, USAMO, and the TST is by invitation only, based on performance in the preceding exams of the sequence. Through the AMC contests and the IMO, young gifted mathematicians are identified and recognized while they are still in secondary school. Participation in the competitions provides them with the chance to measure themselves against other exceptional students from all over the world. This work was prepared by Zuming Feng, Melanie Matchett Wood, the Leader and Deputy Leader of the 2004 USA IMO team, and by Cecil Rousseau, the chair of the USAMO Committee. In addition to presenting their own carefully written solutions to the problems, Zuming and Melanie provide remarkable solutions developed by the examination committees, contestants, and experts, during or after the contests. They also provide a detailed report of the 2000-2004 USAMO/IMO results and a comprehensive guide to other material that emphasizes advanced problem-solving. This collection of excellent problems and beautiful solutions is a valuable companion for students who wish to develop their interest in mathematics outside the school curriculum and to deepen their knowledge of mathematics.

Mathematical Olympiad Challenges

Number theory is an important research field of mathematics. In mathematical competitions, problems of elementary number theory occur frequently. These problems use little knowledge and have many variations. They are flexible and diverse. In this book, the author introduces some basic concepts and methods in elementary number theory via problems in mathematical competitions. Readers are encouraged to try to solve the problems by themselves before they read the given solutions of examples. Only in this way can they truly appreciate the tricks of problem-solving.

Selected Problems of the Vietnamese Mathematical Olympiad (1962-2009)

This book is intended for the Mathematical Olympiad students who wish to prepare for the study of inequalities, a topic now of frequent use at various levels of mathematical competitions. In this volume we present both classic inequalities and the more useful inequalities for confronting and solving optimization problems. An important part of this book deals with geometric inequalities and this fact makes a big difference with respect to most of the books that deal with this topic in the mathematical olympiad. The book has been organized in four chapters which have each of them a different character. Chapter 1 is dedicated to present basic inequalities. Most of them are numerical inequalities generally lacking any geometric meaning. However, where it is possible to provide a geometric interpretation, we include it as we go along. We emphasize the importance of some of these inequalities, such as the inequality between the arithmetic mean and the geometric mean, the Cauchy-Schwarz inequality, the rearrangement inequality, the Jensen inequality, the Muirhead theorem, among others. For all these, besides giving the proof, we present several examples that show how to use them in mathematical olympiad problems. We also emphasize how the substitution strategy is used to deduce several inequalities.

Graph Theory

This book introduces the development of the International Mathematical Olympiad in China from 1986 to 2013, especially the questions and answers of all the previous International Mathematical Olympiad since 1986. This book is suitable for the students who want to participate in high school International Maths Olympic, tutors and fans of general mathematics. This reprint has been authorized by Harbin Institute of Technology Press in North America.

Problems of Number Theory in Mathematical Competitions

Trouble in the Barker's Class

Geometric Inequalities

In China, lots of excellent maths students takes an active part in various maths contests and the best six senior high school students will be selected to form the IMO National Team to compete in the International Mathematical Olympiad. In the past ten years, China's IMO Team has achieved outstanding results — they have won the first place almost every year. The author is one of the senior coaches of China's IMO National Team, he is the headmaster of Shanghai senior high school which is one of the best high schools of China. In the past decade, the students of this school have won the IMO gold medals almost every year. The author attempts to use some common characteristics of sequence and mathematical induction to fundamentally connect Math Olympiad problems to particular branches of mathematics. In doing so, the author hopes to reveal the beauty and joy involved with math exploration and at the same time, attempts to arouse readers' interest of learning math and invigorate their courage to challenge themselves with difficult

problems.

Introduction to Functional Equations

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

Lecture Notes on Mathematical Olympiad Courses

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

MATHEMATICAL OLYMPIAD IN CHINA

The book contains problems from the first 32 British Mathematical Olympiad (BMO) papers 1965-96 and gives hints and outline solutions to each problem from 1975 onwards. An overview is given of the basic mathematical skills needed, and a list of books for further reading is provided. Working through the exercises provides a valuable source of extension and enrichment for all pupils and adults interested in mathematics.

The IMO Compendium

In 1736, the mathematician Euler invented graph theory while solving the Königsberg seven-bridge problem. Over 200 years later, graph theory remains the skeleton content of discrete mathematics, which serves as a theoretical basis for computer science and network information science. This book introduces some basic knowledge and the primary methods in graph theory by many interesting problems and games.

The IMO Compendium

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 Mathematical Olympiad Handbook

The Moscow Mathematical Olympiad has been challenging high school students with stimulating, original problems of different degrees of difficulty for over 75 years. The problems are nonstandard; solving them takes wit, thinking outside the box, and, sometimes, hours of contemplation. Some are within the reach of most mathematically competent high school students, while others are difficult even for a mathematics professor. Many mathematically inclined students have found that tackling these problems, or even just reading their solutions, is a great way to develop mathematical insight. In 2006 the Moscow Center for Continuous Mathematical Education began publishing a collection of problems from the Moscow Mathematical Olympiads, providing for each an answer (and sometimes a hint) as well as one or more detailed solutions. This volume represents the years 2000-2005. The problems and the accompanying material are well suited for math circles. They are also appropriate for problem-solving classes and practice for regional and national mathematics competitions. 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).

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.

Euclidean Geometry in Mathematical Olympiads

"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.

Problem-Solving Strategies

Vietnam has actively organized the National Competition in Mathematics and since 1962, the Vietnamese Mathematical Olympiad (VMO). On the global stage, Vietnam has also competed in the International Mathematical Olympiad (IMO) since 1974 and constantly emerged as one of the top ten. To inspire and further challenge readers, we have gathered in this book selected problems of the VMO from 1962 to 2008. A number of Selection Test problems are also included to aid in the formation and training of a national team for IMO. The book is highly useful for high school students and teachers, coaches and instructors preparing for mathematical olympiads, as well as non-experts simply interested in having the edge over their opponents in mathematical competitions.

Algebraic Inequalities

A Second Step to Mathematical Olympiad Problems

The Mathematical Olympiad examinations, covering the USA Mathematical Olympiad (USAMO) and the International Mathematical Olympiad (IMO), have been published annually by the MAA American Mathematics Competitions since 1976. The IMO is the world mathematics championship for high school students. It takes place annually in a different country. The IMO competitions help to discover, encourage and challenge mathematically gifted young people all over the world. The USAMO and the Team Selection Test (TST) are the last two stages of the selection process leading to representing the United States of America in the IMO. The preceding examinations are the AMC 10 or AMC 12 and the American Invitational Mathematics Examination (AIME). Participation in the AIME, USAMO, and the TST is by invitation only, based on performance in the preceding exams of the sequence. Through the AMC contests and the IMO, young gifted mathematicians are identified and recognized while they are still in secondary school. Participation in these competitions provides them with the chance to measure themselves against other exceptional students from all over the world. Editors, Andreescu and Feng provide remarkable solutions developed by the examination committees, contestants, and experts, during or after the contests. They also provide a detailed report of the 1995-2000 USAMO/IMO results, and a comprehensive guide to other materials emphasizing advanced problem-solving. This collection of excellent problems and beautiful solutions is a valuable companion for students who wish to develop their interest in mathematics outside the school curriculum and to deepen their knowledge of mathematics. A Friendly Mathematics Competition tells the story of the Indiana College Mathematics

Competition (ICMC) by presenting the problems, solutions, and results of the first 35 years of the ICMC. The ICMC was organized in reaction to the Putnam Exam - its problems were to be more representative of the undergraduate curriculum, and students could work on them in teams. Originally participation was originally restricted to the small, private colleges and universities of the state, but was later opened up to students from all of the schools in Indiana. The competition was quickly nicknamed the ""Friendly"" Competition because of its focus on solving mathematical problems, which brought faculty and students together, rather than on the competitive nature of winning. Organized by year, the problems and solutions in this volume present an excellent archive of information about what has been expected of an undergraduate mathematics major over the past 35 years. With more than 245 problems and solutions, the book is also a must buy for faculty and students interested in problem-solving. The index of problems lists problems in: Algebraic Structures; Analytic Geometry, Arclength, Binomial Coefficients, Derangements, Differentiation, Differential Equations, Diophantine Equations, Enumeration, Field and Ring Theory, Fibonacci Sequences, Finite Sums, Fundamental Theorem of Calculus Geometry, Group Theory, Inequalities, Infinite Series, Integration, Limit Evaluation, Logic, Matrix Algebra, Maxima and Minima Problems, Multivariable Calculus, Number Theory, Permutations, Probability, Polar Coordinates, Polynomials, Real Valued Functions Riemann Sums, Sequences, Systems of Equations, Statistics, Synthetic Geometry, Taylor Series, Trigonometry, and Volumes.

A Primer for Mathematics Competitions

Annotation. This text provides basic knowledge on how to solve combinatorial problems in mathematical competitions, and also introduces important solutions to combinatorial problems and some typical problems with often-used solutions.

Math Olympiad Contest Problems for Elementary and Middle Schools

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 2002-2008 appear in an earlier volume, *Mathematical Olympiad in China*."

Probability and Expectation

In China, lots of excellent students who are good at maths take an active part in various maths contests and the best six senior high school students will be selected to form the IMO National Team to compete in the International Mathematical Olympiad. In the past ten years China's IMO Team has achieved

outstanding results -- they have won the first place almost every year. The author is one of the senior coaches of China's IMO National Team, whose students have won many gold medals many times in IMO. This book is part of the Mathematical Olympiad Series which discusses several aspects related to maths contests, such as algebra, number theory, combinatorics, graph theory and geometry. This book will, in an interesting problem-solving way, explain what probability theory is: its concepts, methods and meanings; particularly, two important concepts -- probability and mathematical expectation (briefly expectation) -- are emphasized. It consists of 65 problems, appended by 107 exercises and their answers.

Solving Problems in Geometry

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.

Mathematical Olympiads 2000-2001

In China, lots of excellent maths students take an active interest in various maths contests and the best six senior high school students will be selected to form the IMO National Team to compete in the International Mathematical Olympiad. In the past ten years China's IMO Team has achieved outstanding results -- they won the first place almost every year. The authors are coaches of China's IMO National Team, whose students have won many gold medals many times in IMO. This book is part of the Mathematical Olympiad Series which discusses several aspects related to maths contests, such as algebra, number theory, combinatorics, graph theory and geometry. The book explains many basic techniques for proving inequalities such as direct comparison, method of magnifying and reducing, substitution method, construction method, and so on.

Solving Mathematical Problems

Appealing to everyone from college-level majors to independent learners, *The Art and Craft of Problem Solving*, 3rd Edition introduces a problem-solving approach to mathematics, as opposed to the traditional exercises approach. The goal of *The Art and Craft of Problem Solving* is to develop strong problem solving skills, which it achieves by encouraging students to do math rather than just study it. Paul Zeitz draws upon his experience as a coach for the international mathematics Olympiad to give students an enhanced sense of mathematics and the ability to investigate and solve problems.

Graph Theory

Olympiad mathematics is not a collection of techniques of solving mathematical problems but a system for advancing mathematical education. This book is based

on the lecture notes of the mathematical Olympiad training courses conducted by the author in Singapore. Its scope and depth not only covers and exceeds the usual syllabus, but introduces a variety concepts and methods in modern mathematics. In each lecture, the concepts, theories and methods are taken as the core. The examples are served to explain and enrich their intension and to indicate their applications. Besides, appropriate number of test questions is available for reader's practice and testing purpose. Their detailed solutions are also conveniently provided. The examples are not very complicated so that readers can easily understand. There are many real competition questions included which students can use to verify their abilities. These test questions are from many countries, e.g. China, Russia, USA, Singapore, etc. In particular, the reader can find many questions from China, if he is interested in understanding mathematical Olympiad in China. This book serves as a useful textbook of mathematical Olympiad courses, or as a reference book for related teachers and researchers. Errata(s) Errata Sample Chapter(s) Lecture 1: Operations on Rational Numbers (145k) Request Inspection Copy

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