

Solved and Unsolved Problems in Number Theory

Daniel Shanks

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Solved And Unsolved Problems In Number Theory

David R. Shanks



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Unsolved Problems in Number Theory Richard Guy, 2013-03-09 Mathematics is kept alive by the appearance of new unsolved problems problems posed from within mathematics itself and also from the increasing number of disciplines where mathematics is applied This book provides a steady supply of easily understood if not easily solved problems which can be considered in varying depths by mathematicians at all levels of mathematical maturity For this new edition the author has included new problems on symmetric and asymmetric primes sums of higher powers Diophantine m tuples and Conway's RATS and palindromes The author has also included a useful new feature at the end of several of the sections lists of references to OEIS Neil Sloane's Online Encyclopedia of Integer Sequences About the first Edition many talented young mathematicians will write their first papers starting out from problems found in this book András Székely MathSciNet

Solved and Unsolved Problems in Number Theory Daniel Shanks, 2001 The investigation of three problems perfect numbers periodic decimals and Pythagorean numbers has given rise to much of elementary number theory In this book Daniel Shanks past editor of Mathematics of Computation shows how each result leads to further results and conjectures The outcome is a most exciting and unusual treatment This edition contains a new chapter presenting research done between 1962 and 1978 emphasizing results that were achieved with the help of computers *Solved and Unsolved Problems in Number Theory* Daniel Shanks (f. 1917), 1964 Unsolved Problems in Number Theory Richard Guy, R.K. Guy, 2013-06-29 To many laymen mathematicians appear to be problem solvers people who do hard sums Even inside the profession we classify ourselves as either theorists or problem solvers Mathematics is kept alive much more than by the activities of either class by the appearance of a succession of unsolved problems both from within mathematics itself and from the increasing number of disciplines where it is applied Mathematics often owes more to those who ask questions than to those who answer them The solution of a problem may stimulate interest in the area around it But Fermat's Last Theorem because it is not yet a theorem has generated a great deal of good mathematics whether goodness is judged by beauty by depth or by applicability To pose good unsolved problems is a difficult art The balance between triviality and hopeless unsolvability is delicate There are many simply stated problems which experts tell us are unlikely to be solved in the next generation But we have seen the Four Color Conjecture settled even if we don't live long enough to learn the status of the Riemann and Goldbach hypotheses of twin primes or Mersenne primes or of odd perfect numbers On the other hand unsolved problems may not be unsolved at all or may be much more tractable than was at first thought Definitions, Solved and Unsolved Problems, Conjectures, and Theorems in Number Theory and Geometry Florentin Smarandache, 1999-12-01 *Solved and Unsolved Problems in Number Theory* David R. Shanks, 1978 *Unsolved Problems in Number Theory* Richard Guy, 2013-11-11 To many laymen mathematicians appear to be problem solvers people who do hard sums Even inside the profession we classify ourselves as either theorists or problem solvers Mathematics is kept alive much more than by the activities of either class by the

appearance of a succession of unsolved problems both from within mathematics itself and from the increasing number of disciplines where it is applied Mathematics often owes more to those who ask questions than to those who answer them The solution of a problem may stifle interest in the area around it But Fermat's Last Theorem because it is not yet a theorem has generated a great deal of good mathematics whether goodness is judged by beauty by depth or by applicability To pose good unsolved problems is a difficult art The balance between triviality and hopeless unsolvability is delicate There are many simply stated problems which experts tell us are unlikely to be solved in the next generation But we have seen the Four Color Conjecture settled even if we don't live long enough to learn the status of the Riemann and Goldbach hypotheses of twin primes or Mersenne primes or of odd perfect numbers On the other hand unsolved problems may not be unsolved at all or than was at first thought

Problem-Solving and Selected Topics in Number Theory Michael Th. Rassias, 2010-12-02 The book provides a self contained introduction to classical Number Theory All the proofs of the individual theorems and the solutions of the exercises are being presented step by step Some historical remarks are also presented The book will be directed to advanced undergraduate beginning graduate students as well as to students who prepare for mathematical competitions ex Mathematical Olympiads and Putnam Mathematical competition

Old and New Unsolved Problems in Plane Geometry and Number Theory Victor Klee, Stan Wagon, 1991 This book discusses 24 unsolved problems in number theory and geometry *Old and New Unsolved Problems in Plane Geometry and Number Theory* Victor Klee, Stan Wagon, 2020-07-31 Victor Klee and Stan Wagon discuss some of the unsolved problems in number theory and geometry many of which can be understood by readers with a very modest mathematical background The presentation is organized around 24 central problems many of which are accompanied by other related problems The authors place each problem in its historical and mathematical context and the discussion is at the level of undergraduate mathematics Each problem section is presented in two parts The first gives an elementary overview discussing the history and both the solved and unsolved variants of the problem The second part contains more details including a few proofs of related results a wider and deeper survey of what is known about the problem and its relatives and a large collection of references Both parts contain exercises with solutions The book is aimed at both teachers and students of mathematics who want to know more about famous unsolved problems

A Course in Number Theory H. E. Rose, 1995 The second edition of this undergraduate textbook is now available in paperback Covering up to date as well as established material it is the only textbook which deals with all the main areas of number theory taught in the third year of a mathematics course Each chapter ends with a collection of problems and hints and sketch solutions are provided at the end of the book together with useful tables

Number Theory R.P. Bambah, V.C. Dumir, R.J. Hans-Gill, 2012-12-06 The Indian National Science Academy on the occasion of the Golden Jubilee Celebration Fifty years of India's Independence decided to publish a number of monographs on the selected fields The editorial board of INS A invited us to prepare a special monograph in Number Theory In response to this assignment we

invited several eminent Number Theorists to contribute expository research articles for this monograph on Number Theory. Although some of those invited due to other preoccupations could not respond positively to our invitation we did receive a fairly encouraging response from many eminent and creative number theorists throughout the world. These articles are presented herewith in a logical order. We are grateful to all those mathematicians who have sent us their articles. We hope that this monograph will have a significant impact on further development in this subject.

R P Bambah v C Dumir R J Hans Gill A Centennial History of the Prime Number Theorem Tom M Apostol The Prime Number Theorem Among the thousands of discoveries made by mathematicians over the centuries some stand out as significant landmarks. One of these is the prime number theorem which describes the asymptotic distribution of prime numbers. It can be stated in various equivalent forms two of which are $\pi(x) \sim \frac{x}{\log x}$ and $\sum_{p \leq x} \frac{1}{p} \sim \log \log x$. $\pi(x)$ denotes the number of primes $p \leq x$ for any $x > 0$.

Certain Number-Theoretic Episodes In Algebra, Second Edition R Sivaramakrishnan, 2019-03-19 The book attempts to point out the interconnections between number theory and algebra with a view to making a student understand certain basic concepts in the two areas forming the subject matter of the book.

CRC Concise Encyclopedia of Mathematics Eric W. Weisstein, 2002-12-12 Upon publication the first edition of the CRC Concise Encyclopedia of Mathematics received overwhelming accolades for its unparalleled scope readability and utility. It soon took its place among the top selling books in the history of Chapman Hall CRC and its popularity continues unabated. Yet also unabated has been the demand for a new edition.

Encyclopaedia of Mathematics Michiel Hazewinkel, 1988 V 1 A B v 2 C v 3 D Feynman Measure v 4 Fibonacci method H v 5 Lituus v 6 Lobachevskii Criterion for Convergence Optical Sigma Algebra v 7 Orbital Rayleigh Equation v 8 Reaction Diffusion Equation Stirling Interpolation Formula v 9 Stochastic Approximation Zygmund Class of Functions v 10 Subject Index Author Index

The Math Encyclopedia of Smarandache type Notions Marius Coman, About the works of Florentin Smarandache have been written a lot of books he himself wrote dozens of books and articles regarding math physics literature philosophy. Being a globally recognized personality in both mathematics there are countless functions and concepts that bear his name and literature it is natural that the volume of writings about his research is huge. What we try to do with this encyclopedia is to gather together as much as we can both from Smarandache's mathematical work and the works of many mathematicians around the world inspired by the Smarandache notions. We structured this book using numbered Definitions Theorems Conjectures Notes and Comments in order to facilitate an easier reading but also to facilitate references to a specific paragraph. We divided the Bibliography in two parts Writings by Florentin Smarandache indexed by the name of books and articles and Writings on Smarandache notions indexed by the name of authors. We treated in this book about 130 Smarandache type sequences about 50 Smarandache type functions and many solved or open problems of number theory. We also have at the end of this book a proposal for a new Smarandache type notion i.e. the concept of a set of Smarandache Coman divisors of order k of a composite positive integer n with m prime factors notion that seems to have promising

applications at a first glance at least in the study of absolute and relative Fermat pseudoprimes Carmichael numbers and Poulet numbers This encyclopedia is both for researchers that will have on hand a tool that will help them navigate in the universe of Smarandache type notions and for young math enthusiasts many of them will be attached by this wonderful branch of mathematics number theory reading the works of Florentin Smarandache **Encyclopaedia of Mathematics** M. Hazewinkel,2013-12-01 *An Introduction to Algebraic Number Theory* Takashi Ono,2012-12-06 This book is a translation of my book Suron Josetsu An Introduction to Number Theory Second Edition published by Shokabo Tokyo in 1988 The translation is faithful to the original globally but taking advantage of my being the translator of my own book I felt completely free to reform or deform the original locally everywhere When I sent T Tamagawa a copy of the First Edition of the original work two years ago he immediately pointed out that I had skipped the discussion of the class numbers of real quadratic fields in terms of continued fractions and in a letter dated 2 15 87 sketched his idea of treating continued fractions without writing explicitly continued fractions an approach he had first presented in his number theory lectures at Yale some years ago Although I did not follow his approach exactly I added to this translation a section Section 4 9 which nevertheless fills the gap pointed out by Tamagawa With this addition the present book covers at least T Takagi s Shoto Seisuron Kogi Lectures on Elementary Number Theory First Edition Kyoritsu 1931 which in turn covered at least Dirichlet s Vorlesungen It is customary to assume basic concepts of algebra up to say Galois theory in writing a textbook of algebraic number theory But I feel a little strange if I assume Galois theory and prove Gauss quadratic reciprocity **The Mathematical Coloring Book** Alexander Soifer,2008-10-13 This is a unique type of book at least I have never encountered a book of this kind The best description of it I can give is that it is a mystery novel developing on three levels and imbued with both educational and philosophical moral issues If this summary description does not help understanding the particular character and allure of the book possibly a more detailed explanation will be found useful One of the primary goals of the author is to interest readers in particular young mathematicians or possibly pre mathematicians in the fascinating world of elegant and easily understandable problems for which no particular mathematical knowledge is necessary but which are very far from being easily solved In fact the prototype of such problems is the following If each point of the plane is to be given a color how many colors do we need if every two points at unit distance are to receive distinct colors More than half a century ago it was established that the least number of colors needed for such a coloring is either 4 or 5 or 6 or 7 Well which is it Despite efforts by a legion of very bright people many of whom developed whole branches of mathematics and solved problems that seemed much harder not a single advance towards the answer has been made This mystery and scores of other similarly simple questions form one level of mysteries explored In doing this the author presents a whole lot of attractive results in an engaging way and with increasing level of depth **The New Mathematical Coloring Book** Alexander Soifer,2024-03-11 The New Mathematical Coloring Book TNMCB includes striking results of the past 15 year renaissance that produced new approaches advances and solutions

to problems from the first edition A large part of the new edition Ask what your computer can do for you presents the recent breakthrough by Aubrey de Grey and works by Marijn Heule Jaan Parts Geoffrey Exoo and Dan Ismailescu TNMCB introduces new open problems and conjectures that will pave the way to the future keeping the book in the center of the field TNMCB presents mathematics of coloring as an evolution of ideas with biographies of their creators and historical setting of the world around them and the world around us A new thing in the world at the time TMCB I is now joined by a colossal sibling containing more than twice as much of what only Alexander Soifer can deliver an interweaving of mathematics with history and biography well seasoned with controversy and opinion Peter D Johnson Jr Auburn University Like TMCB I TMCB II is a unique combination of Mathematics History and Biography written by a skilled journalist who has been intimately involved with the story for the last half century The nature of the subject makes much of the material accessible to students but also of interest to working Mathematicians In addition to learning some wonderful Mathematics students will learn to appreciate the influences of Paul Erd s Ron Graham and others Geoffrey ExooIndiana State University The beautiful and unique Mathematical coloring book of Alexander Soifer is another case of good mathematics containing a lot of similar examples it is not by chance that Szemer di s Theorem story is included as well and presenting mathematics as both a science and an art Peter Mih kMathematical Reviews MathSciNet A postman came to the door with a copy of the masterpiece of the century I thank you and the mathematics community should thank you for years to come You have set a standard for writing about mathematics and mathematicians that will be hard to match Harold W KuhnPrinceton University I have never encountered a book of this kind The best description of it I can give is that it is a mystery novel I found it hard to stop reading before I finished in two days the whole text Soifer engages the reader s attention not only mathematically but emotionally and esthetically May you enjoy the book as much as I did Branko Gr nbaumUniversity of Washington I am in absolute awe of your 2008 book Aubrey D N J de Grey LEV Foundation

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