

BOOK REVIEWS

Robert Bilinski

Solving Mathematical Problems: a personal perspective by Terence Tao

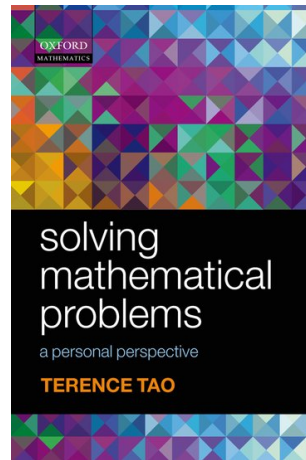
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Reviewed by **Robert Bilinski**, Collège Montmorency

Terence Tao is now a world renowned Fields Prize winning mathematician, but his exploits started much earlier as he participated for the first time in the IMO in 1986 at the tender age of 10. He won a bronze medal that year. He represented Australia again the next two years and won his next two IMO medals, first a silver medal then a gold. He is, to this date, the youngest medal winner ever for his bronze medal and the youngest gold medal winner. After that, he started university and retired from his IMO career at the age of 13. The first edition of this book was written by him at the age of 15 and was reworked in 2006.

Curiously, it has never been reviewed in *CruX*. I discovered this book by chance as I received the helm of the book review column and found it a fitting start for my hopefully long lasting return to the *CruX* editorial Board. I previously was Skoliad editor and am returning as Contest Corner Editor, both of which focus on problems oriented towards younger problem solvers. This book embodies the spirit of *CruX* and the inclusion of all problem solvers, the sharing of mathematical gems and of the beauty of their solutions. This book differs from other contest books, textbook, vulgarization of mathematics or any other general interest books I have read. It could have been taken out of a “Problem of the Month” or “Problem solver’s toolkit” sections of *CruX*. The aim of the book is not to show solutions to many problems; it is to highlight the thought process behind problem solving: rewriting, trial and error, backtracking, simplifying, generalizing and “sideways thinking” (changing math fields, using geometry in algebra or algebra in geometry...).

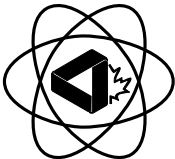
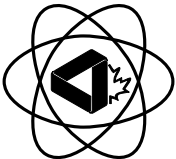


Through a limited list of typical contest problems handpicked by Tao, we are taken on a tour of problem solving. The chapters are organized around the techniques used in the problem solving: The first chapter deals with general techniques, the next chapters go through number theory, algebra and analysis, Euclidean geometry, then analytic geometry to end up with problems necessitating a multidisciplinary approach. But it is not a long list of problems per chapter that is exposed. Tao analyzes each problem in a real-time fashion that involves dead-ends and brainstorming bouts, and slowly builds up to a full resolution of each problem.

To give an example, the problem in the first chapter is centred on solving a triangle whose sides are in an arithmetic progression. Does one then go for algebra, geometry or number theory? Through an 8 step process specific to the situation, Tao guides us to a solution that ultimately borrows a bit from each. There are also a few problems in each section whose solutions are not provided, most of which were composed by the author, that are left as exercises for the readers to utilize the reasoning applied in that section. This book is not for you if you are looking for a compendium of 300 olympiad level problems, or for a pared down optimal solution guide or a book that gives out recipes for mathematical Olympic gold. This book is akin to a master class of problem solving, but given by a 15 year old virtuoso, full of maturity and skill, but also fun and simplicity.

As a problem solver, I enjoyed thoroughly reading Tao's perspective on problem solving and his analysis of each problem. Especially since it was written when he was only 15. I encourage our younger readers to pick up this book to get an insight into problem solving. I also encourage our more seasoned readers to be tempted: despite the fact that we each have our own styles, in problems we like and in the way we solve them, it is worthwhile to gain insight into the workings of one of the great mathematical minds of our age. All in all, the tone and style of the book make it eminently readable and down to earth.

Good reading!

 <div style="text-align: center;"> <p>A Taste Of Mathematics Aime-T-On les Mathématiques ATOM</p> </div> 
<p>ATOM Volume VIII: Problems for Mathematics Leagues III by Peter I. Booth, John McLoughlin and Bruce L.R. Shawyer.</p> <p>This volume is a follow up to our previous publications (Atom 6 and Atom 3) on Problems for Mathematics Leagues. It is the fourth book published by the authors based on their cooperation of devising problems for the Newfoundland and Labrador Senior Mathematics League over a period of more than 16 years. Since the publication of the first ATOM volume, other mathematics leagues, based on our model, have sprung up in other parts of Canada. We are always pleased to assist other leagues, and are prepared to provide current games to help them get started.</p> <p>There are currently 13 booklets in the series. For information on titles in this series and how to order, visit the ATOM page on the CMS website: http://cms.math.ca/Publications/Books/atom.</p>