

# BOOK REVIEWS

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*Jim Totten's Problem of the Week* edited by John Grant McLoughlin, Joseph Khoury and Bruce Shawyer  
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Each week, during the Fall and Winter semesters, Jim Totten would post, on the bulletin board of the mathematics lab at Thompson Rivers University in Kamloops, B.C., a challenge. Namely, a mathematical poser chosen for the enjoyment of the undergraduate student body. This tradition lasted over twenty-five years, thereby leaving several hundred worthy problems for Grant McLoughlin, Khoury and Shawyer to select, categorize and publish in a single volume.

The name Totten should be familiar to many readers of *Crux Mathematicorum*. Jim Totten joined the editorial board of this journal in 1994. Bruce Shawyer was Editor-in-Chief of *Crux* from 1996 to 2002, a role which Jim undertook from 2003 until his untimely death in March 2008, just three months before his intended retirement from this post. John Grant McLoughlin was also on the editorial board of *Crux* during the Totten years and shared Jim's passion in mathematical outreach. It was fitting, therefore, that John would write an article about "Jim Totten's Reach" in the Totten Commemorative issue of *Crux* (issue 5 of volume 35 published September 2009).

*Jim Totten's Problem of the Week* is a collection which demonstrates Jim's desire to engage undergraduate students with an interest in mathematics. That means, each problem has the potential to pique the interest of both a freshman and senior undergraduate who will congratulate themselves upon reaching a correct solution; the level of difficulty of the problems suggest that those with an aptitude for mathematics will be successful more often than not. Most problems are posed for the mathematically literate audience and the chapter titles suggest as much. However, there are many brain teasers in this volume; enough to warrant a slim volume for a general audience.

Four hundred and six problems were selected for this book and distributed through ten chapters: Combinatorial Geometry; Functions; Higher Dimensional Geometry; Identities, Inequalities and Expressions; Logic, Games, Puzzles and Amusement in Math; Number Theory; Plane Geometry; Probability; Triangle Mathematics; Miscellaneous. Almost half these problems are contained in the chapters Logic, Games, Puzzles and Amusement in Math and Number Theory. The latter contains many problems of a combinatorial nature as well as problems which, a century ago, may well as been classified as arithmetic puzzles. As an

example, problem 211 in the book is essentially asking the reader to find all arrangements of  $\{1, 2, 3, 4, 5, 6\}$  which gives rise to a number where each of the first  $k$  digits is divisible by  $k$ . Totten defined such a number as cute and it is certainly a cute problem.

I would suspect that students would find the seventy odd problems in Plane Geometry and Triangle Mathematics the most challenging; one of the more arithmetic challenges in these chapters is problem 342 which asks the reader to prove that there exists no triangle with altitudes of 4, 7 and 10. A solver who is a whizz at trigonometry may enjoy problem 291 which requires one to find the length of  $BD$  in a quadrilateral  $ABCD$  with  $AB \parallel DC$ ,  $BC = \sqrt{2}$  and  $AB = AC = AD = \sqrt{3}$ .

The book is also a valuable resource for instructors who like to give an occasional challenge to their students. Finding necessary and sufficient conditions on the coefficients on a quadratic which has a number and its square as roots (problem 60) might be just the problem to stimulate a keen student in a pre-calculus course.

There are two quibbles I have with the publisher of the book. On the back cover they claim that: "It is a resource for those interested in mathematical competitions ranging from high school level to the William Lowell Putman Mathematical Competition." While it is true that students who plan to write the Putman would find Jim Totten's Problem of the Week interesting, there are better resources, such as *CruX*, than this book. No, this is a book containing problems that students with little interest in competitions may well find enjoyable.

A more serious concern are the solutions to the problems. Each problem has its precise and well written solution appearing immediately after the problem; so only the most careful reader will avoid a glimpse of the solution prior to tackling the problem. Hopefully, in a second edition, the solutions to problems will be placed at the end of each chapter.

All things considered though, I heartily recommend this book to any instructor of mathematics, for it contains a wealth of problems to share with students. I would also recommend this book to anyone who enjoys a mathematical challenge which does not require any machinery from a senior level mathematics course, or even first year calculus.

