

BOOK REVIEW

John Grant McLoughlin

Combinatorial Explorations

By Richard Hoshino and John Grant McLoughlin, published by the Canadian Mathematical Society, 2005.

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Combinatorial Explorations is Volume V in a series of booklets called “A Taste of Mathematics” (ATOM), published by the Canadian Mathematical Society (CMS). According to the CMS website, the booklets in the series “are designed as enrichment materials for high school students with an interest in and aptitude for mathematics.” Some of the booklets “also cover the materials useful for mathematical competitions at national and international levels”.

The booklet discusses three core problems and some extensions to those problems. The first core problem is the Handshake Problem (how many handshakes take place among n people if everyone shakes everyone else’s hand?); the second core problem is the Route Problem (in how many ways can one travel from point A to point B , located at diagonally opposite corners of a rectangle, by proceeding only along a given finite number of grid lines parallel to the edges of the rectangle, and ensuring that the minimum distance is travelled?); and the third core problem is the Checkerboard Problem (how many squares of all sizes appear on an 8×8 checkerboard?).

In the process of extending these core problems, the reader comes across many other interesting combinatorial ideas, including (but not limited to) Pascal’s Triangle, the Binomial Theorem, Fibonacci Numbers, sums of cubes, and telescoping series. Each of these core problems leads quite naturally to an investigation, where the ideas developed in that section need to be extended and applied to new problems. For example, the discussion of the Handshake Problem leads to a guided investigation of Ramsey Theory.

Since there is both a glossary at the end of the book and an introduction which defines all the terms needed to understand the material, even a novice to combinatorics is well-served by this book.

The book is very well written and is at a level that makes it understandable for most high school students. I would recommend this book for any student seeking some enrichment in mathematics, or for a teacher who is looking for ideas to enrich the mathematics course(s) she is teaching.