

# ACROSS the BOARD

The Mathematics  
of Chessboard  
Problems



A surreal chessboard scene. In the background, a brick lighthouse stands on the left, and a bronze rearing horse is on the right. A red and white checkered lifebuoy is in the foreground on the left. A 4x4 grid of numbers is in the center. To the right of the grid are several 3D geometric shapes: a yellow cube, a brown cube, and a purple cube. A silver chess piece (a king) is on the board near the grid, and another silver piece (a rook) is in the foreground. The chessboard is black and white checkered, and the background is a blue sky with white clouds.

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

John J. Watkins





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*Across the Board* is the definitive work on chessboard problems. It is not simply about chess but the chessboard itself—that simple grid of squares so common to games around the world—and, more importantly, the fascinating mathematics behind it. From the Knight's Tour Problem and Queens Domination to their many variations, John Watkins surveys all the well-known problems in this surprisingly fertile area of recreational mathematics.

Each main topic is treated in depth from its historical conception through to its status today. Many beautiful solutions have emerged for basic chessboard problems since mathematicians first began working on them in earnest over three centuries ago. But now such problems, including those involving polyominoes, have been extended to three-dimensional chessboards and even to chessboards on unusual surfaces such as toruses (the equivalent of playing chess on a doughnut) and cylinders. Using the highly visual language of graph theory, Watkins gently guides the reader to the forefront of current research in mathematics.

Showing that chess puzzles are the starting point for important mathematical ideas that have resonated for centuries, *Across the Board* will captivate students and instructors, mathematicians, chess enthusiasts, and puzzle devotees.

"This book is extremely well written and is, no doubt, the best exposition of the connection between the chessboard problems and recreational mathematics. The author surveys all the well-known problems about chess and the chessboard. . . . The problems are treated in depth from their beginnings through to their status today."

—Mohammed Aassila, *MAA Review*

"Torus-shaped boards, three-dimensional boards, a shape called the Klein bottle—the simple checkerboard pattern proves to be creatively malleable when Watkins puts his mind to his hobbylike subject. Watkins' invitational tone ensures attention from the finite but enthusiastic audience for mathematical recreation."

—*Booklist*

"Watkins offers an excellent invitation to serious mathematics."

—*Choice*

**John J. Watkins** is Professor of Mathematics at Colorado College where, in 2005, he was given the Boettcher Award for Faculty Excellence in the Sciences. He is the coauthor of *Graph Theory: An Introductory Approach*.