



Roads to Geometry (3rd Edition)

By Edward C. Wallace, Stephen F. West

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This new book clarifies, extends, and unifies concepts discussed in basic high school geometry courses. It gives readers a comprehensive introduction to plane geometry in a historical context. Chapter topics include axiomatic systems, axiom sets for geometry, neutral geometry, Euclidean geometry of the plane, analytic and transformational geometry, non-Euclidean geometries, and projective geometry. For anyone in need of a refresher course in geometry.

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Editorial Review

From the Publisher

This book provides a geometrical experience that unifies Euclidean concepts generally discussed in traditional high school geometry courses with various non-Euclidean views of the world. It offers the reader a "map" for a voyage through plane geometry and its various branches, as well as side-trips that discuss analytic and transformational geometry.

From the Back Cover

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The goal of this book is to provide a geometric experience that clarifies, extends, and unifies concepts that are generally discussed in traditional high school geometry courses and to present additional topics which assist in gaining a better understanding of elementary geometry. As its title indicates, this book is designed to provide the reader with a "map" for a voyage through plane geometry and its various branches. As prerequisites, this book assumes only a prior course in high school geometry and the mathematical maturity usually provided by a semester of calculus or discrete mathematics.

Preparations for our voyage begin in Chapter One with a discussion of the "Rules of the Road" during which time the reader is familiarized with the properties of axiomatic systems and the application of the axiomatic method to investigation of these systems. A discussion of several examples of finite and incidence geometries provides a framework upon which to investigate plane geometry.

With preparations complete, our voyage actually begins in Chapter Two, where we are confronted with "Many Ways to Go." Here, within a historical perspective, we travel a variety of "roads" through plane geometry by investigating different axiomatic approaches to the study of Euclidean plane geometry. Axiomatic developments of geometry as proposed by Euclid, David Hilbert, G. D. Birkhoff, and the School Mathematics Study Group (MSG) are compared and contrasted. A brief discussion of non-Euclidean geometries is also included.

In Chapter Three, by "Traveling Together," we investigate the content of Neutral Geometry. The first fifteen of the MSG postulates provide our pedagogical choice for a "main arterial" as we prepare ourselves to choose between the Euclidean and non-Euclidean "exits" that appear on the horizon.

Chapter Four provides "One Way to Go" as we travel through Euclidean Plane Geometry. In this chapter we extend ideas developed in Neutral Geometry to provide a traditional look at the geometric topics of congruence, area, similarity, circles, triangles, and constructions from a Euclidean perspective. At the end of Chapter Four you will find a set of laboratory investigations that make use of Geometer's SketchPad® or Cabri II Geometry™ software.

While still traveling through Euclidean Plane Geometry, Chapter Five offers "Side Trips" through analytical

and transformational approaches to geometry. The real numbers, algebra, isometries, similarities, analytical transformations, and inversion and their applications to proving geometric theorems are discussed.

In Chapter Six we consider "Other Ways to Go:" We return briefly to Neutral Geometry, in preparation for our venture into non-Euclidean Geometry. In addition to a discussion of hyperbolic geometry, this chapter contains a detailed description of the Poincare disk model and a brief excursion into elliptic geometry. Appendix E contains a collection of scripts, custom tools, and macros that allow for a dynamic investigation of the Poincare disk. Like Chapter Four, Chapter Six ends with a collection of laboratory activities that provide students with an opportunity to explore the hyperbolic plane first hand.

Finally, in Chapter Seven, "All Roads Lead To..." projective geometry. Here we delve into a more general geometry than we have studied in previous chapters as we investigate the real projective plane in addition to the ideas of duality, perspectivity, and a brief look at projective transformations.

New to the third edition of *Roads to Geometry* are enhanced problem sets at the end of each section and the inclusion of Laboratory Activities using Geometer's SketchPad® and Cabri II Geometry™ at the end of Chapter Four, Euclidean Geometry of the Plane, and of Chapter Six, Non-Euclidean Geometries.

This text is appropriate for several kinds of students. Pre-service teachers of geometry are provided with a rigorous yet accessible treatment of plane geometry in a historical context. Mathematics majors will find its axiomatic development sufficiently rigorous to provide a foundation for further study in the areas of Euclidean and non-Euclidean geometry. By using the MSG postulate set as a basis for the development of plane geometry, we avoid the pitfalls of many "foundations of geometry" texts that encumber the reader with such a detailed development of preliminary results that many other substantive and elegant results are inaccessible in a one-semester course.

The chapters of this book separate nicely into independent units. The material in Chapters One and Two provides preliminary groundwork for the study of geometry. Instructors who feel that their classes are exceptionally well prepared could omit these chapters in the interest of freeing time for material that is presented later in the book. Instructors teaching more typical classes will find the discussion of axiomatics in Chapter One and the comparisons of the various axiom sets in Chapter Two very helpful in conveying the notion of mathematical rigor. Instructors can teach a semester of Euclidean Geometry using Chapters 1, 2, 3, 4, and 5. Instructors more interested in nonEuclidean Geometries can opt to cover Chapters 1, 2, 3, and 6.

At the end of each section is an ample collection of exercises of varying difficulty that provides problems that both extend and clarify results of that section, as well as problems that apply those results. At the end of each of chapters, Three through Seven, is a summary which lists all of the new definitions and theorems of that chapter.

The authors gratefully acknowledge the following mathematicians who took of their time to review the current manuscript: David Bellamy, University of Delaware; Jack Tsui, Oakland University; Julia Wilson, State University College of New York at Fredonia; Peter Stiller, Texas A&M University; Money Davidson, Kent University; Kimberly Cervello, State University College of New York at Geneseo; and Joel Zeitlin, California State University at Northridge.

The authors hope that *Roads to Geometry* will in some way encourage the reader to more fully appreciate the marvelous worlds of Euclidean and non-Euclidean Geometry and to that end we wish you bon voyage.

E.C. Wallace
S.F. West

June 2003

Users Review

From reader reviews:

Jerry Brock:

People live in this new morning of lifestyle always aim to and must have the time or they will get large amount of stress from both lifestyle and work. So , if we ask do people have extra time, we will say absolutely of course. People is human not only a robot. Then we request again, what kind of activity have you got when the spare time coming to you of course your answer will probably unlimited right. Then do you try this one, reading ebooks. It can be your alternative in spending your spare time, typically the book you have read is definitely Roads to Geometry (3rd Edition).

Anna Thompson:

Roads to Geometry (3rd Edition) can be one of your beginning books that are good idea. Many of us recommend that straight away because this book has good vocabulary which could increase your knowledge in vocabulary, easy to understand, bit entertaining but nonetheless delivering the information. The writer giving his/her effort that will put every word into enjoyment arrangement in writing Roads to Geometry (3rd Edition) although doesn't forget the main place, giving the reader the hottest along with based confirm resource details that maybe you can be considered one of it. This great information could drawn you into brand new stage of crucial thinking.

Sandra Earnhardt:

The book untitled Roads to Geometry (3rd Edition) contain a lot of information on it. The writer explains the girl idea with easy approach. The language is very straightforward all the people, so do not really worry, you can easy to read this. The book was compiled by famous author. The author provides you in the new period of literary works. You can read this book because you can read on your smart phone, or device, so you can read the book in anywhere and anytime. In a situation you wish to purchase the e-book, you can start their official web-site and order it. Have a nice read.

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