



## Axiomatic Geometry (Pure and Applied Undergraduate Texts) (Sally: Pure and Applied Undergraduate Texts)

*By John M. Lee*

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The story of geometry is the story of mathematics itself: Euclidean geometry was the first branch of mathematics to be systematically studied and placed on a firm logical foundation, and it is the prototype for the axiomatic method that lies at the foundation of modern mathematics. It has been taught to students for more than two millennia as a model of logical thought. This book tells the story of how the axiomatic method has progressed from Euclid's time to ours, as a way of understanding what mathematics is, how we read and evaluate mathematical arguments, and why mathematics has achieved the level of certainty it has. It is designed primarily for advanced undergraduates who plan to teach secondary school geometry, but it should also provide something of interest to anyone who wishes to understand geometry and the axiomatic method better. It introduces a modern, rigorous, axiomatic treatment of Euclidean and (to a lesser extent) non-Euclidean geometries, offering students ample opportunities to practice reading and writing proofs while at the same time developing most of the concrete geometric relationships that secondary teachers will need to know in the classroom.

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### **Editorial Review**

#### **Review**

Lee's Axiomatic Geometry gives a detailed, rigorous development of plane Euclidean geometry using a set of axioms based on the real numbers. It is suitable for an undergraduate college geometry course, and since it covers most of the topics normally taught in American high school geometry, it would be excellent preparation for future high school teachers. There is a brief treatment of the non-Euclidean hyperbolic plane at the end. --Robin Hartshorne, University of California, Berkeley

The goal of Lee's well-written book is to explain the axiomatic method and its role in modern mathematics, and especially in geometry. Beginning with a discussion (and a critique) of Euclid's elements, the author gradually introduces and explains a set of axioms sufficient to provide a rigorous foundation for Euclidean plane geometry. Because they assume properties of the real numbers, Lee's axioms are fairly intuitive, and this results in a presentation that should be accessible to upper level undergraduate mathematics students. Although the pace is leisurely at first, this book contains a surprising amount of material, some of which can be found among the many exercises. Included are discussions of basic trigonometry, hyperbolic geometry and an extensive treatment of compass and straightedge constructions. --I. Martin Isaacs, University of Wisconsin-Madison

Jack Lee's book will be extremely valuable for future high school math teachers. It is perfectly designed for students just learning to write proofs; complete beginners can use the appendices to get started, while more experienced students can jump right in. The axioms, definitions, and theorems are developed meticulously, and the book culminates in several chapters on hyperbolic geometry--a lot of fun, and a nice capstone to a two-quarter course on axiomatic geometry. --John H. Palmieri, University of Washington

#### **About the Author**

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#### **Katy Pinkham:**

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