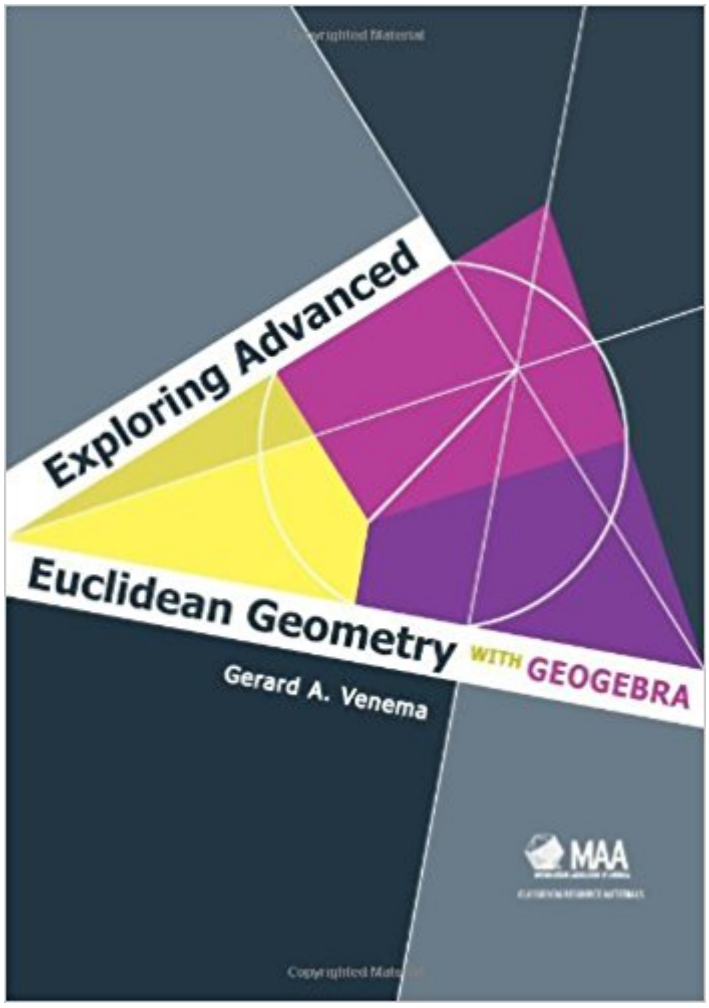
Exploring Advanced Euclidean Geometry With GeoGebra (Classroom Resource Materials)



Synopsis

This book provides an inquiry-based introduction to advanced Euclidean geometry. It utilizes dynamic geometry software, specifically GeoGebra, to explore the statements and proofs of many of the most interesting theorems in the subject. Topics covered include triangle centers, inscribed, circumscribed, and escribed circles, medial and orthic triangles, the nine-point circle, duality, and the theorems of Ceva and Menelaus, as well as numerous applications of those theorems. The final chapter explores constructions in the PoincarÃ© disk model for hyperbolic geometry. The book can be used either as a computer laboratory manual to supplement an undergraduate course in geometry or as a stand-alone introduction to advanced topics in Euclidean geometry. The text consists almost entirely of exercises (with hints) that guide students as they discover the geometric relationships for themselves. First the ideas are explored at the computer and then those ideas are assembled into a proof of the result under investigation. The goals are for the reader to experience the joy of discovering geometric relationships, to develop a deeper understanding of geometry, and to encourage an appreciation for the beauty of Euclidean geometry.

Book Information

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Customer Reviews

Theorems in advanced Euclidean geometry are gifts to us all of beauty, elegance, grace, and pure pleasure. In his book Exploring Advanced Euclidean Geometry with GeoGebra, Gerard Venema presents a treasure trove of mathematical joys that we can all delight in. Every mathematically inclined person enjoys the many ’aha’ moments that lie at the heart of elegant insights and proofs of

geometry. One of the great insights in mathematics is how much richness even apparently simple ideas and objects contain. The apparently simple triangle and circle contain amazing structure that we are led to discover using the twin tools of thought and the GeoGebra software. An abundance of triangle centers, the Euler line, the Nine Point Circle, many other insights into triangles and circles, and much more geometry fill this book with beautiful theorems and visual insights that the reader discovers and experiences through Venema's guidance. Geometrical thinking connects us to a mathematical theme that has enlivened thought for thousands of years, Venema's book lets us experience the exploration and discovery of geometrical insights that have brought joy to human beings for millennia and will bring delights to all of us for years to come. If you want to teach a course that conveys the joy of mathematical thinking to students, consider leading your students on a journey through Venema's book. The theorems are classics and Venema's presentation allows the reader to experience the discovery of insights, which make them all the more meaningful and memorable. An Inquiry Based Learning course based on Venema's book would be a perfect experience for any mathematics major, particularly, a person who might teach geometry later. Exploring Advanced Euclidean Geometry with GeoGebra is also a perfect book for individual or small group study. Students, teachers, or anyone who enjoys geometrical beauty can take their time and savor the many wonderful theorems that this book contains. Whether used in a classroom setting or for individual instruction, every reader of Gerard Venema's Exploring Advanced Euclidean Geometry with GeoGebra is in for a feast of delectable geometry. --Michael StarbirdDiscovery learning (or inquiry-based learning, or Moore Method, or many other related variants) deemphasizes lecture and reading in favor of allowing students to develop on their own much of the material as possible. Euclidean geometry is an excellent playground for this because you can start with a few comprehensible common notions and postulates and run with them. One step that is sometimes missing from the discovery learning process is the computer. Really understanding a result requires not just proof but probing deeply into assumptions and finding examples that illustrate what is happening. In geometry in particular, there is software available to help students find the examples that lead to understanding, proofs, and new conjectures. Gerard A. Venema's Exploring Advanced Euclidean Geometry with GeoGebra is a discovery learning text that embraces this approach. Exploring Advanced Euclidean Geometry with GeoGebra is written for an inquiry-based approach, with lots of exercises and just enough narrative and historical commentary to hold it all together. It is not the sort of book you read without some paper and probably a computer in front of you. What makes the book special is the inclusion of GeoGebra exercises (clearly identified with a *) to encourage experimentation. Exercises may ask students to construct a visualization of a theorem,

verify results, and build examples and conjectures. Eventually the student gets to proving a theorem, but not before playing with the statement quite a bit. The focuses on "advanced" planar Euclidean geometry, which the author defines to mean anything developed after Euclid's Elements. This makes it an excellent candidate text for a second course in Euclidean geometry using inquiry-based methods that minimize lecture and maximize student discovery. There is also much value to be mined as a supplement to other Euclidean geometry texts. The author suggests a structure in which this text is used as something of a lab manual rather than a primary text. Even if it does not fit for course adoption, this book is worth any geometry teacher's attention. The problem sequences shoe the author has thought much, and not just about how to guide the reader to theorem discovery. Teachers will find unfamiliar results to rediscover for themselves and perhaps reconnect with the learning experience they want for their students. As to content and prerequisites, the reader is expected to be familiar with elementary Euclidean geometry and generally be comfortable with definitions and proof. Some key Euclidean results are quickly reviewed in the first chapter. Topics include various notions of triangle "center," the nine-point circle, the theorems of Ceva and Menelaus, geometric inversion, and hyperbolic geometry. It has a lot of content for a slim volume (130 pages), but that's the point -- inquiry-based texts are necessarily short. There are only a couple of short chapters about GeoGebra itself, which was a good move. Print guides to software do not age well and such material is better consumed online. Venema keeps these discussions about building the tools relevant to the book's exercises and less about "click here to do that." This helps make the book adaptable to other software. Advanced Euclidean geometry is an uncommon course offering these days. This book would work as a sourcebook for directed study and as such is worth consideration for many academic libraries. Inquiry-minded instructors should absolutely give this some attention. Working through these exercises feels very much like the process of doing mathematics, which is about the most one can ask of a book like this. The engaged student will learn much about learning as well as geometry. --Bill Wood, MAA Reviews

An enquiry-based introduction to advanced Euclidean geometry using the dynamic geometry program GeoGebra that is ideal for both the computer lab and the classroom. The exposition consists mostly of exercises (with hints) that guide students as they explore some of the most interesting results in the subject.

Very good !

Worked good. Unfortunately, did not use it too much in my class.

Great condition

Exploring Advanced Euclidean Geometry with GeoGebra (Classroom Resource Materials) Foundations of Euclidean and non-Euclidean geometry Euclidean and Non-Euclidean Geometry: An Analytic Approach Euclidean and Non-Euclidean Geometries: Development and History Euclidean and Non-Euclidean Geometries Ideas of Space: Euclidean, non-Euclidean, and Relativistic Taxicab Geometry: An Adventure in Non-Euclidean Geometry (Dover Books on Mathematics) Episodes in Nineteenth and Twentieth Century Euclidean Geometry (Anneli Lax New Mathematical Library) Non-Euclidean Geometry for Babies (Math for Babies) Non-Euclidean Geometry (Dover Books on Mathematics) Introduction to Non-Euclidean Geometry (Dover Books on Mathematics) Non-Euclidean Geometry (Mathematical Association of America Textbooks) Modern Geometries: Non-Euclidean, Projective, and Discrete Geometry (2nd Edition) Non-Euclidean Geometry in the Theory of Automorphic Functions (History of Mathematics) Janos Bolyai, Non-Euclidean Geometry, and the Nature of Space The elements of non-Euclidean geometry Euclidean Geometry in Mathematical Olympiads (Maa Problem) Euclidean Geometry and Transformations (Dover Books on Mathematics) Visual Group Theory (MAA Classroom Resource Materials) (MAA Problem Book Series) Adobe InDesign CC Classroom in a Book (Classroom in a Book (Adobe))