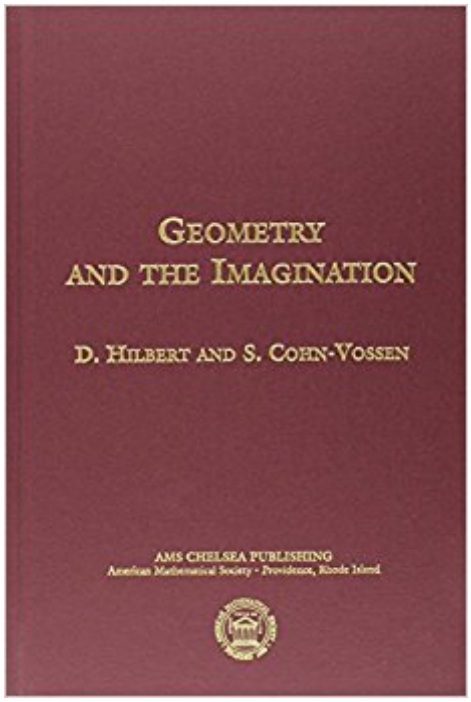
Geometry And The Imagination (AMS Chelsea Publishing)



Synopsis

This remarkable book has endured as a true masterpiece of mathematical exposition. There are few mathematics books that are still so widely read and continue to have so much to offer--after more than half a century! The book is overflowing with mathematical ideas, which are always explained clearly and elegantly, and above all, with penetrating insight. It is a joy to read, both for beginners and experienced mathematicians. "Hilbert and Cohn-Vossen" is full of interesting facts, many of which you wish you had known before, or had wondered where they could be found. The book begins with examples of the simplest curves and surfaces, including thread constructions of certain quadrics and other surfaces. The chapter on regular systems of points leads to the crystallographic groups and the regular polyhedra in $\mathbb^3$. In this chapter, they also discuss plane lattices. By considering unit lattices, and throwing in a small amount of number theory when necessary, they effortlessly derive Leibniz's series: $\pi/4 = 1 - 1/3 + 1/5 - 1/7 + - \ldots$. In the section on lattices in three and more dimensions, the authors consider sphere-packing problems, including the famous Kepler problem. One of the most remarkable chapters is "Projective Configurations". In a short introductory section, Hilbert and Cohn-Vossen give perhaps the most concise and lucid description of why a general geometer would care about projective geometry and why such an ostensibly plain setup is truly rich in structure and ideas. Here, we see regular polyhedra again, from a different perspective. One of the high points of the chapter is the discussion of Schlafli's Double-Six, which leads to the description of the 27 lines on the general smooth cubic surface. As is true throughout the book, the magnificent drawings in this chapter immeasurably help the reader. A particularly intriguing section in the chapter on differential geometry is Eleven Properties of the Sphere. Which eleven properties of such a ubiquitous mathematical object caught their discerning eye and why? Many mathematicians are familiar with the plaster models of surfaces found in many mathematics departments. The book includes pictures of some of the models that are found in the GÃƒÂ¶ttingen collection. Furthermore, the mysterious lines that mark these surfaces are finally explained! The chapter on kinematics includes a nice discussion of linkages and the geometry of configurations of points and rods that are connected and, perhaps, constrained in some way. This topic in geometry has become increasingly important in recent times, especially in applications to robotics. This is another example of a simple situation that leads to a rich geometry. It would be hard to overestimate the continuing influence Hilbert-Cohn-Vossen's book has had on mathematicians of this century. It surely belongs in the "pantheon" of great mathematics books.

Book Information

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Customer Reviews

This book is a masterpiece -- a delightful classic that should never go out of print. --Mathematical Association of America[This] superb introduction to modern geometry was co-authored by David Hilbert, one of the greatest mathematicians of the 20th century. --Steven Strogatz, Cornell UniversityA fascinating tour of the 20th century mathematical zoo ... Anyone who would like to see proof of the fact that a sphere with a hole can always be bent (no matter how small the hole), learn the theorems about Klein’s bottle--a bottle with no edges, no inside, and no outside--and meet other strange creatures of modern geometry, will be delighted with Hilbert and Cohn-Vossen’s book. --Scientific American

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The purpose of this book is very well described by the author in the preface.There Hilbert says "...In this book, it is our purpose to give a presentation of geometry, as it stands today, in its visual, intuitive aspects. With the aid of visual imagination we can illuminate the manifold facts and problems of geometry, and beyond this, it is possible in many cases to depict the geometric outline ot the methods of investigation and proof, without necessarily entering into the details connected with the strict definitions of concepts and with the actual calculations."A little further, he says "...This book was written to bring about a greater enjoyment of mathematics, by making it easier for the reader to penetrate to the essence of mathematics without having to weight himself down under a laborious course of studies."As a reader of this book, I can say that the key words are "visual

imagination" and "enjoyment of mathematics".The purpose described by Hilbert is completely (and excellently) achieved.The book is a masterpiece, written by one of the masters of Mathematics.In an elegant and clear style, Hilbert explains the most beautiful geometrical concepts.When reading it, you feel as if Hilbert was sit down besides you, just talking about geometry to you, (maybe with the aid of a sheet of paper and a pencil), and you can grasp the genius of the GÃƒÂ¶ttingen Professor.He does not use practically any formula or mathematical expression, however his prose is full of mathematical insights, geometrical facts, stimulating images and delicious "expository" proofs.All the chapters of the book are structured in a similar way: Hilbert exposes at the beginning the most elementary concepts of the subject, with plenty of "visual imagination" and mathematical ideas. Then, step by step, he goes further and deeper, connecting these ideas and images and generalizing them.The challenge for the reader is trying to follow Hilbert's thread of ideas until the end. It is not always easy but, after all, challenge is one of the ingredients of the "enjoyment of mathematics", isn't it?However, one thing is sure, you will enjoy the path, and when you get lost, you can read again the last paragraph and try to retake the thread of the exposition.I recommend this book very much. It is a joy to read, both for beginners and experienced mathematics.

The book is a thrilling journey in the wide (wild) world of geometry, instructive and sometimes illuminating, spanning an uncredible amount of concepts and subjects, enriched by splendid figures... But, but, by no means "easy".On the other hand, how can one ignore the work of such a giant of mathematics who's willing to guide you into his imagination ?

I agree that this book, co-authored by the co-greatest mathematician of the first quarter of the twentieth century, is a masterpiece to be treasured and kept in print, as other reviewers have stated.However: The Preface states: "This book was written to bring about a greater enjoyment of mathematics, by making it easier for the reader to penetrate to the essence of mathematics without having to weight himself down under a laborious course of studies."All I can say is that if you read this and find it "easy," then you have terrific mathematical talent! Yes, the drawings and the intuitive descriptions are helpful, but much of the book is so obscure that I have been told that one of the world's leading geometers is working on an annotated edition explaining what the authors were talking about. On topics which I had already studied elsewhere, I found the presentation illuminating.I still recommend this book.

I have no complaints about the written content of this book. It is lovely. The print quality, however, is

abysmal.ItÃƒÂ¢Ã â ¬Ã â„¢s apparently a printed-on-demand copy, perhaps printed by directly, and the text is blurry throughout. The images are filled with gray splotches. I recently bought several Springer books which had the same problem, so it seems to be a trend across purchases of new math books from .I decided to return the book and pick up a 50-year-old used copy instead and there is a night-and-day quality difference. The old book has crisp text and lovely illustrations. It was also $20 cheaper.It is a shame that and/or the AMS is charging almost $50 for such a shoddy product, without anything on the product page to warn of the possibility of getting a print-on-demand book. Customers should watch out and be cautious about buying new hardcover technical books from .

Everyone acquainted with math knows this book's content and accessible style has made it a classic.Anyone with a serious interest(occasional or consuming) in geometry should have this book handy.Anyone who confuses math with the style of exposition known as "Definition, Theorem, Proof" should read any page of this book.

Classical and very enlightening.

The AMS Chelsea edition of the book I received is a beautiful one. I'm very picky with the edition of the books but I have to say this is an enjoyable and carefully made edition. It's likely a reprint of the older original edition.The only fault I see is that looking closely at the fonts their edges are not perfectly clear, and also the ink is not very dark, I think it's because of the mentioned reprint, the fonts look kind of old, but it's not a big issue to me in any case. The font size is perfect and can be read comfortably. The leaves, the text in general, the bookbinding, the cover, the quality of the pictures, are all good enough.I attach some pictures to clarify it better.

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