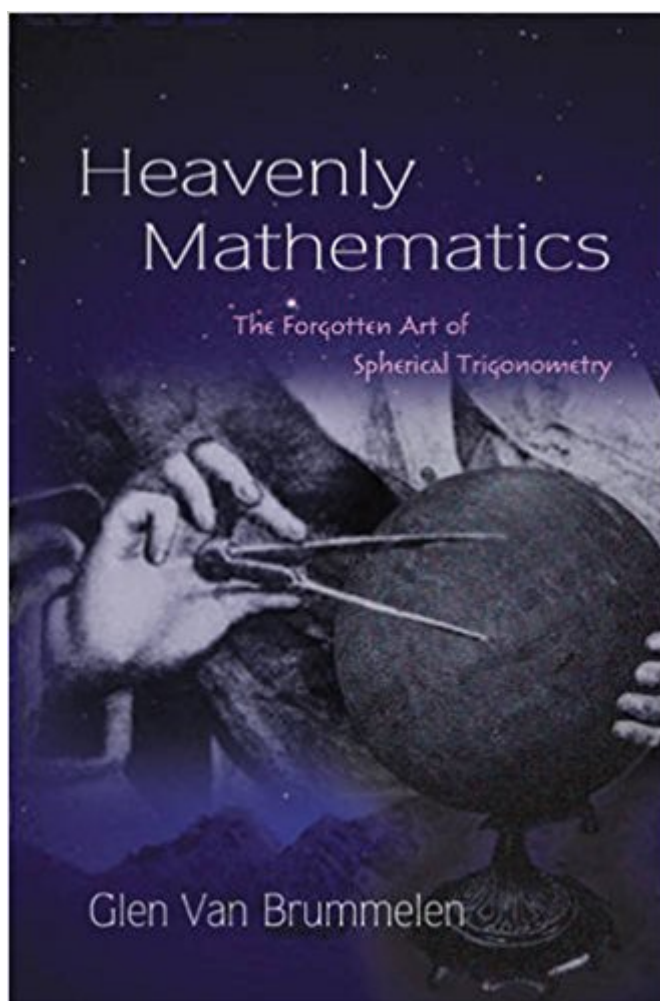The book was found

Heavenly Mathematics: The Forgotten Art Of Spherical Trigonometry

Synopsis

Heavenly Mathematics traces the rich history of spherical trigonometry, revealing how the cultures of classical Greece, medieval Islam, and the modern West used this forgotten art to chart the heavens and the Earth. Once at the heart of astronomy and ocean-going navigation for two millennia, the discipline was also a mainstay of mathematics education for centuries and taught widely until the 1950s. Glen Van Brummelen explores this exquisite branch of mathematics and its role in ancient astronomy, geography, and cartography; Islamic religious rituals; celestial navigation; polyhedra; stereographic projection; and more. He conveys the sheer beauty of spherical trigonometry, providing readers with a new appreciation of its elegant proofs and often surprising conclusions. Heavenly Mathematics is illustrated throughout with stunning historical images and informative drawings and diagrams. This unique compendium also features easy-to-use appendixes as well as exercises that originally appeared in textbooks from the eighteenth to the early twentieth centuries.

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Customer Reviews

One of Choice's Outstanding Academic Titles for 2013Shortlisted for the 2013 BSHM Neumann Book Prize, British Society for the History of Mathematics"Once a mainstay of mathematics, spherical trigonometry no longer appears on school curricula. Here, Glen Van Brummelen reasserts the field's importance, sharing in illuminating detail how it figured in astronomy, cartography and our understanding of Earth's rotation."--Rosalind Metcalfe, Nature"The present book is very well written; it leaves a clear impression that the author intended to endear--not merely present and

teach--spherical trigonometry to the reader. Although not a history book, there are separate chapters shedding light on the approaches to the subject in the ancient, medieval, and modern times. There are also chapters on spherical geometry, polyhedra, stereographic projection and the art of navigation. The book is thoroughly illustrated and is a pleasant read. Chapters end with exercises; the appendices contain a long list of available and not so available textbooks and recommendations for further reading organized by individual chapters. The book made a valuable addition to my library. I freely recommend it to math teachers and curious high schoolers."--Alexander Bogomolny, CTK Insights"A no-nonsense introduction to spherical trigonometry."--Book News, Inc."A beautiful popular book."--ThatsMaths.com"Full of academic, textbook content, the book is a delight to math students. So if you are game for a journey into the world of spherical trigonometry, pick up the book. Van Brummelen gives exercises at the end of the chapters that can be fun."--R. Balashankar, Organiser"Heavenly Mathematicsis a truly enjoyable description of the somewhat forgotten science of spherical trigonometry. . . . As readers discover this discipline, they will also appreciate the beauty inherent in the topic."--Choice"Heavenly Mathematics proves the value of bringing a fascinating piece of mathematical history within the grasp of the general reader."--Florin Diacu, Literary Review of Canada"Van Brummelen has written a wonderful introduction . . . that draws on the history of [spherical trigonometry] to illuminate the mathematics itself and at the same time gives readers a real sense of what research in the history of early mathematics is all about."--Metascience"[Heavenly Mathematics] is an excellent survey of spherical trigonometry. . . . Simply an appreciation of a beautiful lost subject, with historical overtones. . . . [D]istinguishable for its appealingly fresh style."--Mathematical Reviews"[Heavenly Mathematics] is a lovely book to read. . . . [A] wonderful introduction for anyone who wishes to learn more about this subject. . . . I am in full agreement with the author that spherical trigonometry ought to be brought to a wider audience, and I believe that this is the book to do it."--Mathematics Today"Engaging, clear and not overly technical; you can safely lend this book to your friends in the history department. . . . [Heavenly Mathematics] is excellent."--Zentralblatt MATH"Heavenly Mathematics will be of interest to mathematically inclined historians of science and also to students of mathematics and engineering. Because spherical trigonometry is relevant in applications of modern science, this elegant book may even contribute to a renaissance of the subject."--Jan P. Hogendijk, Isis"This book could serve as an excellent textbook for any secondary school mathematics classroom at or above the level of geometry and certainly trigonometry; as the basis for a high school honors class; or as a textbook and seminar topic for college students."--Teresa Floyd, Mathematics Teacher"Any reader of this book (and there should be many) will see how

present day mathematics may be viewed through the kaleidoscope of its historical origins. . . . Glen Van Brummelen has written a beautifully produced book that includes fascinating biographical detail at every stage of his narrative."--P.N. Ruane, Mathematical Gazette"An engaging read that will appeal to historians of science, mathematicians, trigonometry teachers, and anyone interested in the history of mathematics."--Elizabeth Hamm, Aestimatio Critical Reviews in the History of Science

"Heavenly Mathematicsis heavenly, is mathematics, and is so much more: history, astronomy, geography, and navigation, replete with historical illustrations, elegant diagrams, and charming anecdotes. I haven't followed mathematical proofs with such delight in decades. If, as the author laments, spherical trigonometry was in danger of extinction, this book will give it a long-lasting reprieve."--David J. Helfand, president of the American Astronomical Society"This beautifully written book on an unusual topic, with its wealth of historical information about astronomy, navigation, and mathematics, is greatly to be welcomed."--Robin Wilson, president of the British Society for the History of Mathematics, author of Four Colors Suffice: How the Map Problem Was Solved"Written by the leading expert on the subject, this engaging book provides an in-depth historical introduction to spherical trigonometry. Heavenly Mathematics breathes new and interesting life into a topic that has been slumbering for far too long."--June Barrow-Green, associate editor of The Princeton Companion to Mathematics"Heavenly Mathematics is a very good book. It offers an interesting, accessible, and entertaining introduction to spherical trigonometry, which used to be a standard school topic but is now rarely studied. Interesting stories, engaging illustrations, and practical examples come together to enhance the reader's pleasure and understanding."--Fernando Q. GouvÃƒÂªa, Colby College"Van Brummelen provides not only a wonderful historical treatment of spherical trigonometry but also a modern one that shows how the ancient and medieval methods were replaced by newer and simpler means of problem solving. Many students will find this a fascinating and worthwhile subject."--Victor J. Katz, editor of The Mathematics of Egypt, Mesopotamia, China, India, and Islam

The author is so wonderfully entranced and entrancing with this "lost art" that he kindof misses the fact that some of the "old" arts like quaternions (revolving around a world centered on the square root of negative 1 instead of 1!), triangular polygons on surfaces, Napier's pentagon, etc. are being reborn today in the art and craft of modeling, game programming, simulation, digital art and computer graphics (eg. Maya, ZBrush).Sure, there are now algorithms and calculus functions that "eclipse" the ancient navigational methods, not to mention GPS, but no self respecting GIS teacher

can ignore Spherical Trig even today! Wolfram in particular has spent a lot of time tinkering with Java and other applets in spherical trig, and many GIS (Geographical Information Systems) teachers I know will LOVE this text.This book is really about the beauty of mathematics, and in a Platonic sense, the translation of angular dimensions and fractals into the "real spherical" world not only of planets and stars, but more recently, molecules and RNA folding. If you're a math amateur, you'll love the beauty, and the trig is doable with a little review. If you're a pro, you might just find relationships that newer methods have obscured, but give you many "aha" moments about limits and even hyper modern applications like inverse kinematics, joints and robotics that often have to translate angular into circular momentum and are full of what we'd call trig functions and ODE's today. You'll love this whether you're doing robotics, or working on prosthetic limbs, as well as the more obvious celestial and navigational applications."Al-Jabr" (MuÃƒÂ¡Ã Â¸Ã Â¥ammad ibn MÃƒÆ'Ã Â»sÃƒÆ'Ã Â¢ al-KhwÃƒÆ'Ã Â¢rizmÃƒÆ'Ã Â®) is often given as the major example of Islamic contributions to math, with less reference to the Spanish Moor salvation of many Greek discoveries Justin tried to destroy, and nearly none to spherical trig. The author reprises these contributions with notes on how the lunar calendar posed problems whose Islamic solutions contributed to far more than the calendar. I'm not Islamic, but it is interesting to see the system presented in a science frame here in the West once in a while.There are also some very cool and accurate "corrections" to the history of astronomy. As many of you probably know, Kepler was credited with a lot of work actually done by Tycho Brahe, who's area of expertise was, among many others -- you guessed it-- Spherical trig. Although the theory of ST is deep, vast and ancient, applying it, without Maple, was far from easy, and the top math minds of the ancients were baffled by the "tiny" details (read calculus) when one tried to apply theory to the reality of polygon to sphere. Python programmers will smile at this when considering the brute force needed to x/y/z a asteroid pocked sphere in Maya, vs. using code.All in all, this book is highly recommended. The other reviewers give the glowing historical value, but I wanted to add another facet-- the fact that this art is far from irrelevant to today's most exciting topics in math in addition to the historical beauty and importance. A related field that might interest you as well (search it on Wiki) is Orthographic or Orthogonal Projection. This "old" cartography art also is being reborn in 2D to 3D and vice versa projection in as far ranging fields as biomedical visualization, galaxy modeling and gaming. The Etymology of some of these terms is fascinating, for example, Ortho-doxy translates as "the straight path to glory!" Certainly in the spirit of this volume, with wonder and beauty as important to the author as the math.I'm a technical consultant, digital artist and mathematician at ShaderJoes dot com and have nothing to do with this book's author, publisher, or . My review is solely for shoppers,

and we always buy the books we review here.

This is one of those books I wish I could get autographed by the author. Why oh why don't they teach this in high school anymore?

This book can't quite decide whether it wants to be a history of the neglected field of spherical trigonometry, or a textbook on it (complete with derivations and problem sets). Fortunately, it succeeds reasonably well at both. If you're more interested in the history, you can just skim lightly over the mathematical details and it still reads well. If you want to learn spherical trig, the history may be a bit of a digression but it's an interesting digression. The later chapters on applications are particularly noteworthy, since few math books nowadays condescend to discuss such mundane matters as how the mathematical methods might get used. An interesting and rewarding book.

From a 3rd year math major:I would definitely recomend this book to anyone interested in learning about spherical geometry, spherical trig, or anyone interested in mathematics generally. It starts with really good background information and progresses fluidly through spherical geometry, then into spherical trig, and practical applications. It is written in a way that if you just want the overview of the material you can get it, but if you really want to dig in there are numerous proofs and an abundance of in depth material as well. It is also nice that the author distinguishes where the detailed explanations are so you can skip over them if you so choose. There are also exercises at the end of each section that challenge your knowedge of what you just read and require you to use some creative mathematical skills as well. This could easily be used as a text book on this material. If you take the shorter route, this book can be read through quite quickly and easily, but if you choose to actually study the information and related proofs you can spend quite a bit of time on this material. I read it through completely once, taking time to understand the proofs and examples, and grasped the bulk of the information. I plan to read through it again shortly and try to make sense of the things I couldn't get through the first time. The better your beginning knowledge in Euclidean geometry, algebra, and trigonometry, the more you will gain from this book.

A needed review, or revival, of this subject. I recall when I took this subject in high school. It was an average city high school. But we also had Latin and Greek on the curriculum. Is spherical trigonometry on the curriculum any more? More to the point, is there anyone to teach it? This book is takes what can be seen as an erudite subject and makes it not only accessible but relevant to an

increasingly digitized and thoughtless society.

Excellent book! This is a fountain of mathematical history, and easy to understand. I have quoted it many times in giving explanations of concepts. It's a book that is easy to get into, but hard to put down. I do a lot of volunteer work at a museum, trying to explain the science behind popular historical and archaeological finds, to remove the mysticism behind how the "ancients" accomplished important achievements. It's important to know how the application of basic mathematical and scientific concepts can realize seemingly complex goals. This book shows clear scientific/mathematical ideas and how they influenced history. Plus, it's a great way to "remember" spherical trigonometry, and how it is applied. I hope the author continues with more books in this vein.

The author writes about as well as anyone on the subject. Math is sometimes hard to understand, but if you can handle high school geometry, then I think you will find the book interesting. Who would think the history of math would be interesting, but it is.

Great little book! Although I had a degree in math, I had not really spent much time on spherical trig, and this book very nicely filled the gaps. There is a nice balance of math and the history of the subject. All in all, a nice, enjoyable book.

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