



The Mathematics of the Heavens and the Earth: The Early History of Trigonometry

By Glen Van Brummelen

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The Mathematics of the Heavens and the Earth is the first major history in English of the origins and early development of trigonometry. Glen Van Brummelen identifies the earliest known trigonometric precursors in ancient Egypt, Babylon, and Greece, and he examines the revolutionary discoveries of Hipparchus, the Greek astronomer believed to have been the first to make systematic use of trigonometry in the second century BC while studying the motions of the stars. The book traces trigonometry's development into a full-fledged mathematical discipline in India and Islam; explores its applications to such areas as geography and seafaring navigation in the European Middle Ages and Renaissance; and shows how trigonometry retained its ancient roots at the same time that it became an important part of the foundation of modern mathematics.

The Mathematics of the Heavens and the Earth looks at the controversies as well, including disputes over whether Hipparchus was indeed the father of trigonometry, whether Indian trigonometry is original or derived from the Greeks, and the extent to which Western science is indebted to Islamic trigonometry and astronomy. The book also features extended excerpts of translations of original texts, and detailed yet accessible explanations of the mathematics in them.

No other book on trigonometry offers the historical breadth, analytical depth, and coverage of non-Western mathematics that readers will find in *The Mathematics of the Heavens and the Earth*.

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Editorial Review

Review

"Fans of the history of mathematics will be richly rewarded by this exhaustively researched book, which focuses on the early development of trigonometry. . . . Finally, the generous and lucid explanations provided throughout the text make Van Brummelen's history a rewarding one for the mathematical tourist."--**Mathematics Teacher**

"[T]his new and comprehensive history of trigonometry is more than welcome--even more so because it is the first in English. . . . [T]his book will be appreciated by many with an interest--general or more specific--in the history of mathematics."--**Steven Wepster, *Centaurus***

"[T]his book will have wide appeal, for students, researchers, and teachers of history and/or trigonometry. The excerpts selected are balanced and their significances well articulated. . . . It is a book written by an expert after many years of exposure to individual sources and in this way Van Brummelen uniquely advances the field. The book will no doubt become a necessary addition to the libraries of mathematicians and historians alike."--**Clemency Montelle and Kathleen M. Clark, *Aestimatio***

"Van Brummelen's history does far more than simply fill a vacant spot in the historical literature of mathematics. He recounts the history of trigonometry in a way that is both captivating and yet more than satisfying to the crankiest and most demanding of scholars. . . . *The Mathematics of the Heavens and the Earth* should be a part of every university library's mathematics collection. It's also a book that most mathematicians with an interest in the history of the subject will want to own."--**Rob Bradley, MAA Reviews**

"I highly recommend the book to all those interested in the way in which the ancient people solve their practical problems and hope that the next volume of this interesting history of spherical and plane trigonometry will appear soon."--**Cristina Blaga, *Studia Mathematica***

From the Back Cover

"There does not seem to have been a book-length history of trigonometry in English before this fine book. Van Brummelen takes us from the unnamed Egyptians and Babylonians who created trigonometry to the subject's first few centuries in Europe. In between, he deftly traces how it was studied by the astronomers Hipparchus and Ptolemy in classical Greece, and later by a host of scholars in India and the Islamic world."--**John H. Conway, coauthor of *The Book of Numbers***

"This book is the first detailed history of trigonometry in more than half a century, and it far surpasses any earlier attempts. *The Mathematics of the Heavens and the Earth* is an extremely important contribution to scholarship. It will be the definitive history of trigonometry for years to come. There is nothing like this out there."--**Victor J. Katz, professor emeritus, University of the District of Columbia**

"A pleasure to read. *The Mathematics of the Heavens and the Earth* is destined to become the standard reference on the history of trigonometry for the foreseeable future. Although other authors have attempted to tell the story, I know of no other book that has either the breadth or the depth of this one. Van Brummelen is one of the leading experts in the world on this subject."--**Dennis Duke, Florida State University**

"Van Brummelen presents a history of trigonometry from the earliest times to the end of the sixteenth century. He has produced a work that rises to the highest standards of scholarship but never strays into pedantry. His extensive bibliography cites every work of consequence for the history of trigonometry, copious footnotes and diagrams illuminate the text, and reproductions from old printed works add interest and texture to the narrative."--**J. Lennart Berggren, professor emeritus, Simon Fraser University**

"This book presents, for the first time in more than a century, a concise history of plane and spherical trigonometry, an important field within applied mathematics. It will appeal to a wide audience thanks to the pleasant style in which it is written, but at the same time it adheres to a very high scholarly standard."--
Benno van Dalen, Ludwig Maximilians University, Munich

About the Author

Glen Van Brummelen is professor of mathematics at Quest University Canada. He is the coeditor of "Mathematics and the Historian's Craft" and the coauthor of "Calculus Explorations Powered by Technology: Tales of History and Imagination".

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