

What is Calculus?: From Simple Algebra to Deep Analysis

By R Michael Range

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This unique book provides a new and well-motivated introduction to calculus and analysis, historically significant fundamental areas of mathematics that are widely used in many disciplines. It begins with familiar elementary high school geometry and algebra, and develops important concepts such as tangents and derivatives without using any advanced tools based on limits and infinite processes that dominate the traditional introductions to the subject. This simple algebraic method is a modern version of an idea that goes back to René Descartes and that has been largely forgotten. Moving beyond algebra, the need for new analytic concepts based on completeness, continuity, and limits becomes clearly visible to the reader while investigating exponential functions.

The author carefully develops the necessary foundations while minimizing the use of technical language. He expertly guides the reader to deep fundamental analysis results, including completeness, key differential equations, definite integrals, Taylor series for standard functions, and the Euler identity. This pioneering book takes the sophisticated reader from simple familiar algebra to the heart of analysis. Furthermore, it should be of interest as a source of new ideas and as supplementary reading for high school teachers, and for students and instructors of calculus and analysis.

Readership: Undergraduates, high school students, instructors and teachers, and scientifically literate readers with special interest in calculus and analysis.

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From the Inside Flap
This unique book provides a new and well-motivated introduction to calculus and analysis that are historically significant fundamental areas of mathematics and widely used in many disciplines. It begins with familiar elementary high school geometry and algebra, and develops important concepts such as tangents and derivatives without ever using any advanced tools based on limits and infinite processes that dominate the traditional introductions to the subject.

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About the Author
R Michael Range is an expert in multidimensional complex analysis. He has written numerous articles for professional journals, and he is the author of a widely known book in the field that was first published in 1986. He has also won a Lester R Ford award of the American Mathematical Association for one of his expository articles. Besides advanced graduate level courses, he has taught calculus and analysis at all levels over many years. These experiences have led him to search for alternate approaches and simplifications that are reflected in this path-breaking book.

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