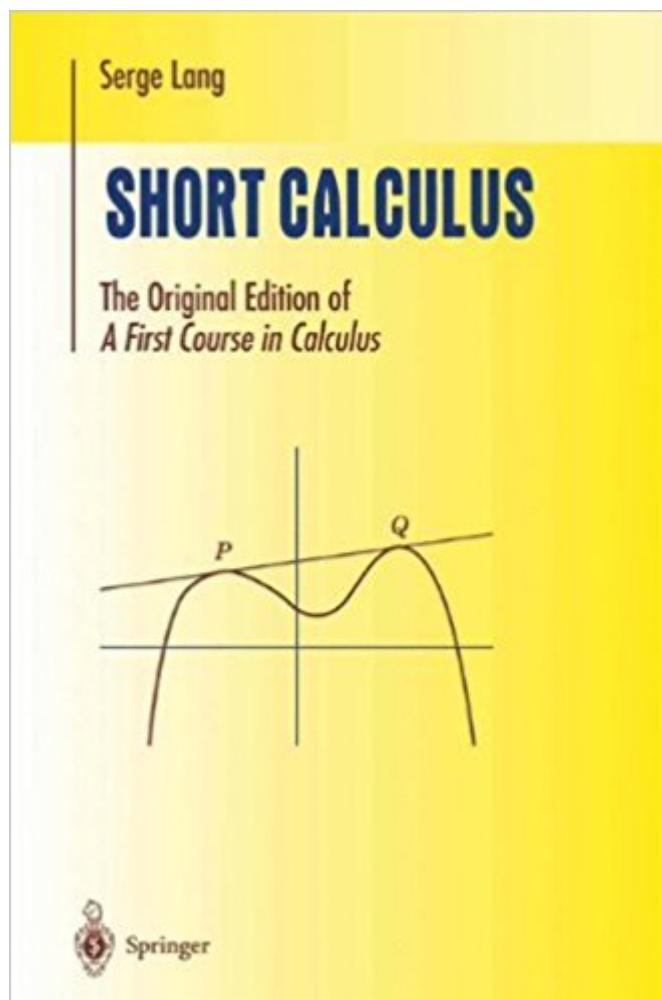


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# Short Calculus: The Original Edition Of "A First Course In Calculus". (Undergraduate Texts In Mathematics)



## Synopsis

From the reviews "This is a reprint of the original edition of Langâ™s "A First Course in Calculus", which was first published in 1964....The treatment is as rigorous as any mathematician would wish itâ™....[The exercises] are refreshingly simply stated, without any extraneous verbiage, and at times quite challenging....There are answers to all the exercises set and some supplementary problems on each topic to tax even the most able." --Mathematical Gazette

## Book Information

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## Customer Reviews

From the reviews: "...Lang's present book is a source of interesting ideas and brilliant techniques."Acta Scientiarum Mathematicarum"... It is an admirable straightforward introduction to calculus."Mathematika "A First Course in Calculus went through five editions since the early sixties. Now the original edition of A First Course in Calculus is available again. The approach is the one that was successful decades ago, involving clarity and adjusted to a time when the students' background was not as substantial as it might have been. | The audience is intended to consist of those taking the first calculus course, in high school or college." (G. Kirlanger, Internationale Mathematische Nachrichten, Vol. 57 (193), 2003) "This is a reprint of the original edition of Langâ™s A first course in calculus, which was first published in 1964. | The treatment is as rigorous as any mathematician would wish itâ™ | . There are quite a lot of exercises | they are refreshingly simply stated, without any extraneous verbiage, and at times quite challenging. |

There are answers to all the exercises set and some supplementary problems on each topic to tax even the most able." (Gerry Leversha, *The Mathematical Gazette*, Vol. 86 (507), 2002)

This is a reprint of "A First Course in Calculus," which has gone through five editions since the early sixties. It covers all the topics traditionally taught in the first-year calculus sequence in a brief and elementary fashion. As sociological and educational conditions have evolved in various ways over the past four decades, it has been found worthwhile to make the original edition available again. The audience consists of those taking the first calculus course, in high school or college. The approach is the one which was successful decades ago, involving clarity, and adjusted to a time when the students'background was not as substantial as it might be. We are now back to those times, so it's time to start over again. There are no epsilon-deltas, but this does not imply that the book is not rigorous. Lang learned this attitude from Emil Artin, around 1950.

Very succinct, has a small amount of problems. It is less intimidating than those huge calculus textbooks, but I think that if you really want to master the subject you need a source of more problems to work out, because this book does not have enough.

This is a reprint of the first edition of what was given its final form by Serge Lang in the 5th edition of his A First Course in Calculus. Both are published by Springer, so it's tempting to make page number comparisons and point out that it takes 500 pages to reach the appendix on epsilon and delta in the 5th edition "First Course" and it takes only 226 pages in the 1st edition "Short Calculus". But the fonts differ, and sometimes Lang broke a paragraph into more than one, and he often added more exercises. Sometimes the extra text is additional examples. He also added graphs and diagrams. The page layout sometimes differs, so occasionally graphs or diagrams take up more space in the 5th edition. It's not the case, then, that the final edition is really twice as long in content as the first. I have a copy of the 4th edition (Addison Wesley, pub.s) and also a copy of the Short Calculus. As soon as I got this Short Calculus home, I opened the 4th edition and started to compare page-by-page the two books. It's interesting to see what Lang kept and how he revised the chapters from their first edition form. Changes show up already in section 1 of chapter 1, where he adds what amounts to a half-page in the 4th edition within what is page 2 of the 1st edition. But then he's also deleted text from this section: text which amounts to a page and a quarter from the 1st edition version of this section is gone by the 4th edition. Sometimes the changes expand and clarify the text, sometimes they tighten it and make it move quicker. Interestingly, in the section on sums,

products, and quotients (Ch 3: The Derivative), he lists the rules at the end of the section of the 1st edition, and in the 4th they aren't there. Chapter 4, on sine and cosine, is significantly expanded from the 1st edition. The appendix on epsilon and delta is also expanded. From comparing my copy of the 4th edition to what I can see of the 5th through the page-view feature, Lang expanded on the 4th in making the 5th and moving to Springer as his publisher; so the 5th is one more revision removed from the Short Calculus. Another example of expansion in later editions is the section on rate of change, in chapter 3. In the 1st edition it is a single page long, and in the 4th around 6 pages longer. This is Lang's initial nod to physical applications. This 1st edition has a second appendix following the one on epsilon and delta. In the 4th edition, the content of that second appendix occurs as an introduction to chapter 12, on applications of integration. The appendix is entitled "Physics and Mathematics" and Lang there remarks: "For psychological reasons, it is impossible (for most people) to learn certain mathematical theories without seeing first a geometric or physical interpretation. ... These two [i.e. mathematical theories and the interpretations of them], however, should not be confused." (p. 239) Most calculus textbooks that are currently published mix together the mathematical concepts and scientific applications in which those mathematical concepts are used to model and interpret scientific concepts (or even other mathematical concepts). As Lang points out: "Nevertheless, it is important to keep in mind that the derivative (as the limit of  $f(x+h)-f(x)/h$ ) and the integral (as a unique number between upper and lower sums), are not to be confused with a slope or an area respectively. It is simply our mind which interprets the mathematical notion in physical or geometric terms. Besides, we frequently assign several such interpretations to the same mathematical notion (viz. the integral being interpreted as an area, or as the work done by a force)." (p. 240) This book, especially in its 1st edition, is about the mathematics of calculus. It is not a book on "calculus and its applications", as most current calculus textbooks are. The retail prices for the Short Calculus (paperback) and for the 5th edition of *A First Course in Calculus* (hardcover) differ by \$20 but currently they sell through for essentially equivalent prices. I was fortunate to come across a copy of the Short Calculus at a cost of even less. The advantage of this book is that you can get a first look at calculus in the span of 240 pages. But even Lang's full First Course is shorter than most calculus texts; and the First Course goes beyond the Short Calculus by the addition of four extra chapters, concerned with functions of several variables. Followups to this book (in any edition) are Lang's *Calculus of Several Variables*, from which the four additional chapters of the First Course are taken (the added chapters are the first chapters of the *Calculus of Several Variables*), and his *Undergraduate Analysis*.

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