

# The Mathematics textbooks authored by Harold R. Jacobs: An Analysis

**H**arold R. Jacobs was born in North Hollywood (1939), part of the San Fernando Valley in southern California where he still lives. While he was a student at Van Nuys High School, he realized that he wanted to become a teacher. He went to U.C.L.A. where, after earning a bachelor's degree and teaching credential, he began teaching at Ulysses S. Grant High School in Van Nuys in 1962. In 1970, he earned a master's degree from Wesleyan University in Connecticut.

During 35 years of teaching at Grant, Harold taught mathematics, chemistry and physics and also served for 12 years as chairman of the mathematics department. He was also an instructor of mathematics in the summer program for teachers at U.C.L.A. He has spoken at more than 200 national and regional mathematics conferences in the United States, Canada, and Australia. He was also a member of the advisory board for *The Challenge of the Unknown*, a mathematics film series of the American Association for the Advancement of Science.

Mr. Jacobs has written three mathematics textbooks, *Mathematics: A Human Endeavor* (1970, 1982, 1994), *Geometry: Seeing, Doing, Understanding* (1974, 1987, 2003), and *Elementary Algebra* (1979), all published by W. H. Freeman and Company, as well as articles for the Encyclopedia Britannica and *The Mathematics Teacher*.

He won the "Most Outstanding High School Mathematics Teacher in Los Angeles" award in 1984 and the Presidential Award for Excellence in Mathematics Teaching in 1988.

Now retired from the classroom, he still speaks at mathematics conferences and continues to write. He feels fortunate to be a member of Grace Community Church, a Christ-centered Bible-teaching church pastored by John MacArthur.

**I** first encountered the textbooks written by Harold R. Jacobs in 1982 (while teaching high school mathematics in Australia). I had read rave reviews of his textbooks in the late 1970s and decided to give his books "a go" (as they say "down under"). I've never regretted that decision.

According to extraordinary mathematician/author Martin Gardner (1914-), one of Jacobs' mentors, when *Mathematics: A Human Endeavor* was published in 1970 (when Mr. Jacobs was 31 years old), "the book astonished the author, publisher, and the entire mathematical community by how quickly it became the nation's most widely adopted high school and college introductory textbook." Gardner then identifies four basic reasons for the enormous reception, not only of this textbook, but of the two others written by him (*Geometry* and *Elementary Algebra*):

1. The author's choice of exciting topics, with emphasis on their recreational aspects.
2. The author's clear, friendly style.
3. The author's inclusion of amusing cartoons and comic strips along with other art.
4. Above all, the author's *enthusiasm* for mathematics (italics are mine).

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It is not often that one can think of an apt reply to a comment, so I am rather proud of one time that I could. Somebody came up to me after a talk I had given, and said, "You make mathematics seem like fun." I was inspired to reply, "If it isn't fun, why do it?"

Ralph P. Boas, Professor Emeritus of Mathematics, Northwestern University

In Gardner's words, "Other textbooks have since followed Jacobs style .... None has topped Jacobs' now classic work in its relevance, its popularity with teachers and professors, and in the delight with which students absorb its captivating content." The wonder of Jacobs' style is that by it he is able to teach students what mathematics is all about: its structure, purpose, and manifold applications. Unlike the dry and boring textbooks that were force fed to me during my high school and college days, Jacobs is a breath of fresh, invigorating air (with a little bit of humorous helium added in the mix).

It is a pity that so few people today are given a chance to appreciate mathematics. Somehow the subject has been lost from the liberal-arts course, where historically it had a central position ... When mathematics is taught, it is presented mainly as a collection of slightly related techniques and manipulations. The profound, yet simple, concepts get little attention. If art appreciation were taught in the same way, it would consist mostly of learning how to chip stone and mix paints.

George Boehm, *The New World of Math* (Dial Press, 1959)

There is one defining attribute that I look for when I read a mathematics book or textbook. I'm seeking an answer to this question: Does this author find pleasure in teaching or explaining mathematics? It doesn't take long to discover this passion in a writer or a teacher. The first writer I met that had this ethos was the late Dr. Morris Kline (1908-1992), long time professor of mathematics at New York University. I can remember reading one of his textbooks entitled *Calculus: An Intuitive and Physical Approach* and laughing ... let me repeat, *laughing* ... as I read his articulate and accurate expositions of the derivative and the integral. Now, let me ask you, dear reader, when was the last time your funny bone was tickled by reading a mathematics textbook? Morris Kline influenced many teachers of mathematics and Harold R. Jacobs is one of them. You will find in Mr. Jacobs a companion and a friend who will gently guide you through the wonderful and pleasurable world of mathematics. Through his masterful exegesis, you will not only learn how to do mathematics, you will *love* doing mathematics. Harold R. Jacobs is the epitome of a *master teacher*.

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In light of the methodology employed by Harold R. Jacobs, I would now like to grade his textbooks based upon the answers to several questions.

- Does it teach the Biblical Christian world view? Being a veteran teacher of the public schools, Jacobs, although a Christian, fails to incorporate the framework of the Biblical Christian world view in his textbooks. In spite of this deficiency, his textbooks are easily adaptable to the framework of Scripture (with some exceptions where he capitulates to evolutionary theory in some lessons and homework exercises). If you look at his Geometry text (2003 edition), it is replete with concrete exposure to God's creation (as are his other two texts). It does not take much effort to reinterpret his texts; i.e., put them into the Biblical Christian world view perspective. **Grade: C**
- Does it reflect the beauty, wonder, and applicability of mathematics? Mathematics, in terms of its structure, is a beautiful mosaic of interconnected thought patterns. The wonder of mathematics is that this beauty *connects* with the givens of the physical creation. Jacobs does a masterful job of unveiling this often neglected attribute of mathematics. **Grade: A**
- Does it teach that mathematics is a tool of dominion? Jacobs unveils many uses of mathematics in God's world whether it be scientific or whether it be vocational. Although Jacobs does not provide a self-conscious Biblical foundation for the toolship nature of mathematics, he does illustrate the instrumental nature of the subject. **Grade: B**
- Does it found mathematical principles on concrete, largely physical contexts? Jacobs always presents a topic or a lesson in terms of a resonating context. He catches the interest of the student immediately and then gently directs the reader to the mathematical principles illustrated thereby. In addition to the text itself, the supportive teacher's guides are replete with additional pedagogical insights and methods. In his *Geometry* text, he also makes use of [The Geometer's Sketchpad](#), a very powerful computer software tool that enables the student to picture a host of mathematical principles. **Grade: A**
- Does it encourage knowledge of the facts, understanding of the facts, and the application of wisdom to the facts? Jacobs combines the teaching of the knowledge of mathematics principles with an understanding of why these principles work. To encourage the application of wisdom to learned mathematical principles, he introduces many "challenge" exercises (usually in the Set III sections). **Grade: A**
- Does it reflect on the marvelous "unity and diversity" in mathematics? Jacobs understands the nature and structure of mathematics (not many teachers do) so that he is able to tie many of the apparent "loose strings" of the mathematical world together. Students will experience many "aha!" moments as Jacobs exposes them to both the internal interconnectedness of mathematics and the many mathematical connections to the external, physical creation. He could improve making these connections in some areas (both internally and externally), but he does a fine job overall. **Grade: B+**

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- Does it build upon foundations “line by line and precept by precept? Jacobs does a nice job of incrementally building the mathematical repertoire of the student. **Grade: A**
- It is rigorous and challenging? Jacobs does not "dumb down" the topics under consideration. Although his teaching approach is delightful, *he teaches serious mathematics*. A student who learns mathematics under his tutelage will be ready for any future rigorous mathematics courses he or she may take. **Grade: A**
- Does it employ review? Yes. Review of previously learned skills are usually found in the Set I exercises. Also, in his Geometry text, he provides constant review of Algebra. There is a nice student workbook (written by Susan Knueven Wong) for *Mathematics: A Human Endeavor* that contains plenty of extra review work (including calculator exercises). **Grade: B+**

**Students who are enjoying what  
they are learning do not  
continually ask why they have to  
learn it ...**

Harold R. Jacobs

Unfortunately, Jacobs only wrote three textbooks. A text that builds upon his *Geometry* and *Elementary Algebra* (i.e., Advanced Mathematics or pre-Calculus mathematics) is missing. My book, *Mathematics: Building on Foundations* (near completion), would be a good fit to use after *Mathematics: A Human Endeavor*, *Elementary Algebra* and *Geometry*..

You may purchase the three mathematics textbooks by Harold R. Jacobs [here](#).