

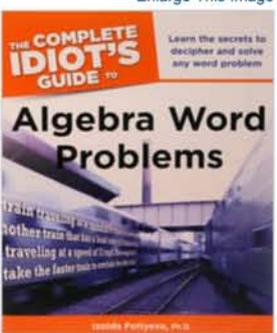
BOOKS | MATH

Algebra Refigured, Totally

By KENNETH CHANG
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MATH is not an easy subject. For many, the corollary conclusion is that learning math is unavoidably unpleasant.

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ALGEBRA WORD PROBLEMS
By Izolda Fotiyeva; Alpha, paperback

Test results support that view.

The Trends in International Mathematics and Science Study, commonly known as Timss, compares students by nation and asks them how much they like math. Over all, in countries where more students say they like the subject, the worse their skills.

By these measures, math education in the United States is improving. The percentage of eighth graders who possessed a "high positive affect" toward math dropped to 41 percent in 2007 from 52 percent in 1995, and Timss scores rose modestly.

That does not mean students who hate math get the highest scores — math lovers do. But it suggests that aiming to make the subject more likable to a wider swath of students risks diluting the curriculum and dismissing the effort needed to excel.

Mathematics is, in itself, an exercise in the abstract — twiddling funny squiggles on paper, really, which is fairly pointless except to mathematicians. It's when math is applied to the universe that the mental game becomes something useful. Budgets can be balanced, bridges designed and laws of physics deduced. So good math education is in society's best interest.

Effective teaching of math has two parts. One is imparting the particulars of symbol twiddling. The other is explaining how to use the symbol twiddling to solve a problem. Go too far in the first direction and students tend to tune out; emphasize practical applications but shortchange the symbol twiddling, and students get a better sense of how math relates to the real world but can't solve a problem.

Algebra is often a turning point. Until then, math is largely the manipulation of numbers: multiplication tables, long division, fractions of pizzas. Algebra is where the abstract notion of a variable x is introduced, signifying some unknown quantity that is to be uncovered.

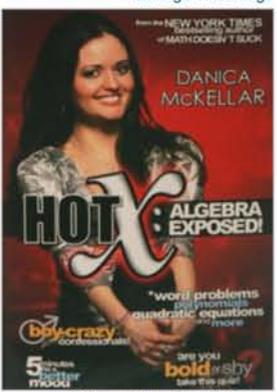
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HOT X: ALGEBRA EXPOSED!
By Danica McKellar; Hudson Street Press, hardcover

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Patricia Wall/The New York Times
THE MANGA GUIDE TO CALCULUS
 By Hiroiyuki Kojima; No Starch Press,
 paperback

For college-bound students, understanding algebra is critical: the [College Board](#) added algebra II to the SAT in 2005. Algebra now accounts for up to 40 percent of its math section and more than half of the ACTs.

“The Complete Idiot’s Guide to Algebra Word Problems,” a new addition to the cottage industry of books to help struggling math learners, is written clearly and covers the expected topics. But it also falls into the common trap of ridiculous word problems:

A tank contains 20 gallons of antifreeze solution. When it is full, it contains 15 percent antifreeze. How many gallons must be replaced by an 80 percent antifreeze solution to get 20 gallons of a 70 percent solution?

Why would a student years away from a driver’s license care about antifreeze? Who the heck is calculating antifreeze concentration? No wonder so many people slog through word problems to conclude math has no bearing on their lives. (The answer: a little less than 17 gallons.)

Danica McKellar, better known as Winnie Cooper, Kevin’s love interest on the TV series “The Wonder Years,” retains the rigor yet takes a friendlier approach (she substitutes the word “Happyland” for algebra in the first chapter) in her latest best seller, “Hot X: Algebra Exposed!”

Aimed at teenage girls, “Hot X” is a cross between a math class and a slumber party, and a perky, self-affirming slumber party at that: interspersed among the math are anecdotes about boys and testimonials about struggles and triumphs with math.

Beginning with the cover, which looks more like Cosmopolitan magazine than a math book, Ms. McKellar exhorts her readers to be smart and confident. (“I’m here to tell you that giving up on ourselves because of our own stereotypes and limited imagination is a far more destructive force than any change or obstacle ‘out there.’ ”)

Those parts sometimes come across like public service announcements, but Ms. McKellar knows her math.

After “The Wonder Years,” she majored in math at the [University of California, Los Angeles](#), and even helped prove, along with a professor and fellow undergraduate, an original theorem now known as the Chayes-McKellar-Winn Theorem. “Hot X” follows her other pre-algebra books, “Math Doesn’t Suck” and “Kiss My Math,” which took a similarly irreverent tone. There are no antifreeze problems here. Ms. Mc-Kellar employs chocolate syrup instead to explain the concept.

Even for someone who is not a teenage girl (me), it’s a fun read. But the underlying pedagogy is traditional. She covers greatest common factors and least common multiples. She presents the FOIL (an acronym for first, outer, inner, last) procedure of multiplying binomials, the same as I learned about 30 years ago.

To Ms. McKellar, the deficiency of math teaching is not the curriculum, but the presentation. “Hot X,” she says, “is math repackaged, totally.”

The next giant hurdle is calculus and its befuddling premise of adding up an infinite number of infinitesimally small numbers. A mash-up of rigorous calculus and pop culture can be found in “The Manga Guide to Calculus,” which, as its title indicates, presents calculus through Japanese-style animation. The book, by Hiroiyuki Kojima, an associate professor of economics at Teikyo University in Tokyo, is part of a series of comics exploring subjects like physics, statistics and molecular biology.

The framing story is of a newspaper bureau chief who gives her cub reporter calculus

lessons to give more depth to her reporting. Certainly more journalists with a working knowledge of calculus would not be a bad thing, and manga lovers might find enough entertainment to carry them through the arduous lessons. The characters start spouting dialogue that sounds like textbooks, and the narrative periodically grinds to a halt for a lesson. The first chapter, for example, ends with three artless pages on how to calculate a derivative.

I skipped over the math to the next comic panels — and then the plot petered out, too.

I found myself wishing that Ms. McKellar, who makes math relevant without dumbing it down, would cover the rest of the high school math curriculum — and that someone would do the equivalent for boys.

Kenneth Chang reports on science for The Times.

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