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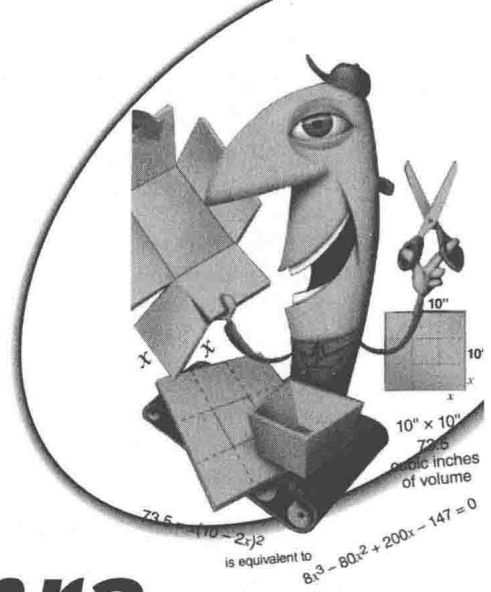

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To my friends
from the Pohl Rec Center:
Jessica Carmona, Whitney Cook, Melissa Jenkins, Christin Ledford, Angela McGuire,
Angela Plata, Kristen Resendez, Samantha Rota, Mary Ann Teel, and Kia Williams.

About the Author

Rhonda Huettenmueller has been teaching at the college level since 1990 and earned a PhD in mathematics in 2001. She is the author of several books in the *Demystified* series: *Algebra Demystified, College Algebra Demystified, Precalculus Demystified,* and *Business Calculus Demystified.*

Introduction

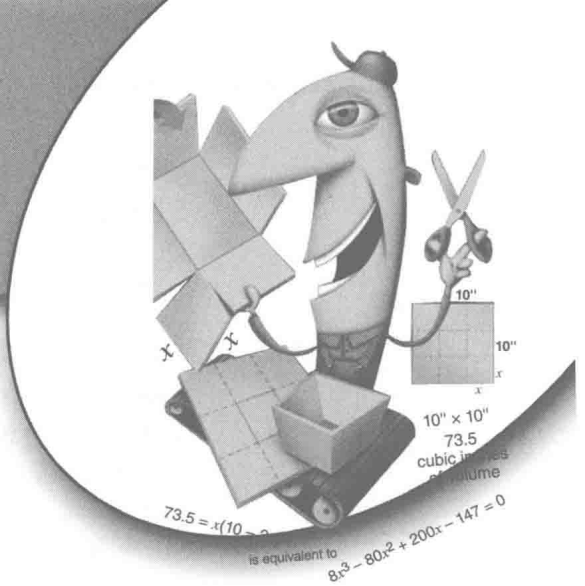
This book is meant to help you *understand* college algebra. While we will cover most of what a typical college algebra student must learn, we will cover it more carefully than an instructor can do so in class. I have found that most college algebra students struggle with the course because the material progresses too quickly.

So that you do not have to absorb too much at once, each subsection contains exactly one new idea. You will not be distracted by missing algebra steps because I have included many of the algebra steps that most authors and instructors skip. The explanations are brief but clear and the examples are worked out in detail. I have used my more than 20 years of teaching experience to anticipate the questions you might have.

You'll get the most from this book if you work at it a little at a time. Because the topics build on each other, make sure that you understand the material from the previous sections before beginning a new section. If you have trouble working the Practice problems, solutions are worked out in detail so that you can self-correct. At the end of each chapter is a summary and a quiz. You should take each quiz as if you were in a classroom, that is, without notes and with a time limit. This will help you decide how well you understand the chapter. Try to prepare for the final exam at the end of the book as if it really were a comprehensive exam. Study the reviews at the end of each chapter before attempting the final. In fact, instead of answering all 90 questions at once, you might treat the final exam as three separate 30-question exams, trying to improve your score each time.

With steady work and patience, I think you will surprise yourself with success. Good luck.

Rhonda Huettenmueller



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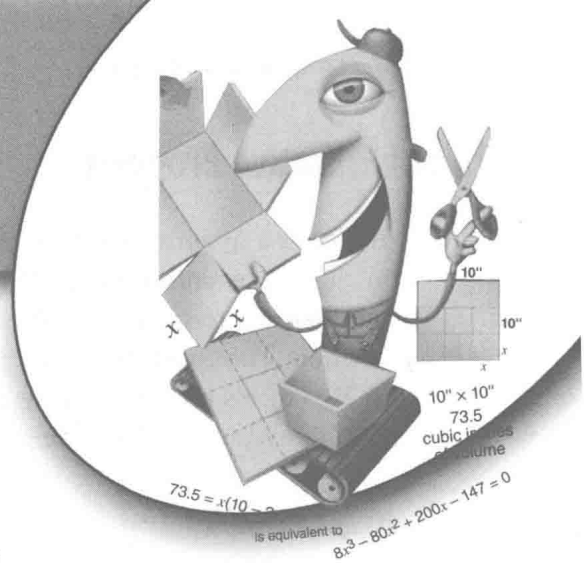

chapter 1

Fundamentals

Success in any math class depends on a solid foundation in fundamentals. For college algebra, this means the ability to do the basics: arithmetic, factoring, solving equations, and working with rational expressions, exponents, and roots. The first two chapters are meant to dust off your algebra skills. If you find anything in this chapter (or the next) that is covered too fast, you might consider using my book *Algebra Demystified*, which covers these topics more carefully. If you are already comfortable with the basics, then you can safely skip this chapter.

CHAPTER OBJECTIVES

In this chapter, you will

- Use the Distributive Property to expand and factor expressions
- Use the FOIL method to expand expressions
- Simplify rational expressions (fractions containing a variable)
- Perform arithmetic on rational expressions
- Work with exponent and radical properties

The Distributive Property

A *term* is a quantity separated by a plus or minus sign. For example, the terms in the expression $3x^2y + 10xy + 4xy^2 + 9$ are $3x^2y$, $10xy$, $4xy^2$, and 9. The number in a term is called the *coefficient*. A term without a variable is called a *constant*. The constant in this example is 9, and the coefficients are 3, 10, 4, and 9. Two terms are *alike* if they have the same variables to the same powers. We combine *like* terms by adding/subtracting coefficients on terms that are alike.

EXAMPLE 1-1

Combine like terms.

$$14x^2y + 8y + 3x + 2x^2y - 5y + 7x$$

We begin by rewriting the expression so that like terms are next to each other. After that, we simply add their coefficients.

$$14x^2y + 8y + 3x + 2x^2y - 5y + 7x = (14x^2 + 2x^2y) + (8y - 5y) + (3x + 7x) = 16x^2y + 3y + 10x$$

We use the Distributive Property a lot in algebra. This property allows us to write expressions both in *expanded form* and in *factored form*.

$$\underset{\text{Factored form}}{a(b \pm c)} = \underset{\text{Expanded form}}{ab \pm ac}$$

EXAMPLE 1-2

Use the Distributive Property to expand the expression.

- $3(2xy - 5xy^2)$

$$3(2xy - 5xy^2) = 3(2xy) - 3(5xy^2) = 6xy - 15xy^2$$

3 is distributed here.

- $10x(4y + 6xy - 7x)$

$$10x(4y + 6xy - 7x) = 10x(4y) + 10x(6xy) - 10x(7x) = 40xy + 60x^2y - 70x^2$$

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