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# **Pre-Algebra Essentials**

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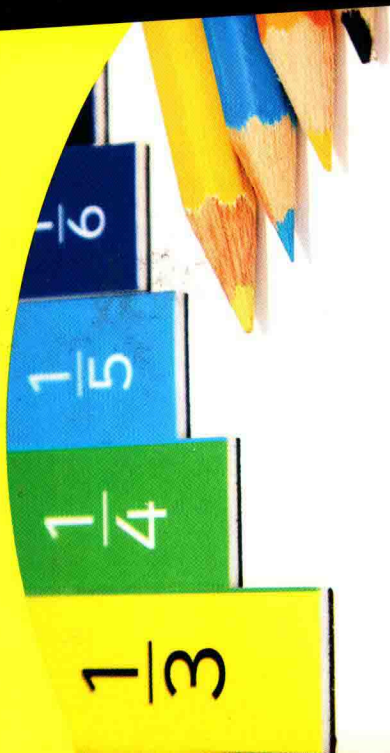
- Work with and convert fractions, decimals, and percents

• Solve for variables in algebraic expressions

• Find the right answer when solving basic math problems

**Mark Zegarelli**

*Author, Basic Math & Pre-Algebra  
Workbook For Dummies*



# ***Pre-Algebra Essentials*** FOR **DUMMIES®**

by Mark Zegarelli  
with Krista Fanning



Wiley Publishing, Inc.

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# Introduction

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**W**hy do people often enter preschool excited about learning how to count and leave high school as young adults convinced that they can't do math? The answer to this question would probably take 20 books this size, but solving the problem of math aversion can begin right here.

Remember, just for a moment, an innocent time — a time before math inspired panic attacks or, at best, induced irresistible drowsiness. In this book, I take you from an understanding of the basics to the place where you're ready to enter any algebra class and succeed.

## About This Book

Somewhere along the road from counting to algebra, most people experience the Great Math Breakdown. Please consider this book your personal roadside helper, and think of me as your friendly math mechanic (only much cheaper!). The tools for fixing the problem are in this book.

I've broken down the concepts into easy-to-understand sections. And because *Pre-Algebra Essentials For Dummies* is a reference book, you don't have to read the chapters or sections in order — you can look over only what you need. So feel free to jump around. Whenever I cover a topic that requires information from earlier in the book, I refer you to that section or chapter in case you want to refresh yourself on the essentials.

Note that this book covers only need-to-know info. For a broader look at pre-algebra, you can pick up a copy of *Basic Math & Pre-Algebra For Dummies* or the corresponding workbook.

## Conventions Used in This Book

To help you navigate your way through this book, I use the following conventions:

- ✓ *Italicized* text highlights new words and defined terms.
- ✓ **Boldfaced** text indicates keywords in bulleted lists and the action part of numbered steps.
- ✓ `Monofont` text highlights Web addresses.
- ✓ Variables, such as  $x$  and  $y$ , are in italics.

## Foolish Assumptions

If you're planning to read this book, you're likely

- ✓ A student who wants a solid understanding of the core concepts for a class or test you're taking
- ✓ A learner who struggled with algebra and wants a reference source to ensure success in the next level
- ✓ An adult who wants to improve skills in arithmetic, fractions, decimals, percentages, geometry, algebra, and so on for when you have to use math in the real world
- ✓ Someone who wants a refresher so you can help another person understand math

My only assumption about your skill level is that you can add, subtract, multiply, and divide. So to find out whether you're ready for this book, take this simple test:

$$5 + 6 = \underline{\quad}$$

$$10 - 7 = \underline{\quad}$$

$$3 \times 5 = \underline{\quad}$$

$$20 \div 4 = \underline{\quad}$$

If you can answer these four questions, you're ready to begin.

## Icons Used in This Book

Throughout the book, I use three icons to highlight what's hot and what's not:



This icon points out key ideas that you need to know. Make sure you understand before reading on! Remember this info even after you close the book.



Tips are helpful hints that show you the quick and easy way to get things done. Try them out, especially if you're taking a math course.



Warnings flag common errors that you want to avoid. Get clear about where these little traps are hiding so you don't fall in.

## Where to Go from Here

You can use this book in a few ways. If you're reading this book without immediate time pressure from a test or homework assignment, you can certainly start at the beginning and keep on going through to the end. The advantage to this method is that you realize how much math you *do* know — the first few chapters go very quickly. You gain a lot of confidence as well as some practical knowledge that can help you later on, because the early chapters also set you up to understand what follows.

Or how about this: When you're ready to work, read up on the topic you're studying. Leave the book on your nightstand and, just before bed, spend a few minutes reading the easy stuff from the early chapters. You'd be surprised how a little refresher on simple stuff can suddenly cause more-advanced concepts to click.

If your time is limited — especially if you're taking a math course and you're looking for help with your homework or an upcoming test — skip directly to the topic you're studying. Wherever you open the book, you can find a clear explanation of the topic at hand, as well as a variety of hints and tricks. Read through the examples and try to do them yourself, or use them as templates to help you with assigned problems.

# The 5<sup>th</sup> Wave

By Rich Tennant



"David's using algebra to calculate the tip.  
Barbara— would you mind being a fractional  
exponent?"



## Chapter 1

# Arming Yourself with Math Basics

### *In This Chapter*

- ▶ Identifying four important sets of numbers
- ▶ Reviewing addition, subtraction, multiplication, and division
- ▶ Examining commutative, associative, and distributive operations
- ▶ Knowing exponents, roots, and absolute values
- ▶ Understanding how factors and multiples are related

**Y**ou already know more about math than you think you know. In this chapter, you review and gain perspective on basic math ideas such as sets of numbers and concepts related to the Big Four operations (adding, subtracting, multiplying, and dividing). I introduce you (or reintroduce you) to properties and operations that will assist with solving problems. Finally, I explain the relationship between factors and multiples, taking you from what you may have missed to what you need to succeed as you move onward and upward in math.

## *Understanding Sets of Numbers*

You can use the number line to deal with four important *sets* (or groups) of numbers. Each set builds on the one before it:

- ✓ **Counting numbers (also called natural numbers):** The set of numbers beginning 1, 2, 3, 4, ... and going on infinitely
- ✓ **Integers:** The set of counting numbers, zero, and negative counting numbers