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**Barry Schoenborn**

*Math and Technical Writing Specialist*



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**by Barry Schoenborn**



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Barry's the coauthor of *Technical Math For Dummies*, *Medical Dosage Calculations For Dummies*, *Physician Assistant Exam For Dummies*, and *Storage Area Networks: Designing and Implementing a Mass Storage System*.

He was a movie reviewer for the Los Angeles *Herald-Dispatch* newspaper and wrote a monthly political newspaper column for *The Union* newspaper of Grass Valley, California, for seven years. He also writes "dental humor," a funny genre that nobody except a dentist would want to read.

Barry's publishing company, Willow Valley Press, published *Dandelion Through the Crack*, which won the William Saroyan International Prize for Writing.





## ***Dedication***

I dedicate this book to Lynda Straus, my long-time intimate friend. She is one of the brightest people I know and is an excellent technical writer. However, she stays very busy, mostly acting as caregiver for her mother and has never made math a focus. Oops! In many ways, she is my model for the ideal reader of this book.

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# Contents at a Glance



<b><i>Introduction</i></b> .....	<b>1</b>
<b><i>Part I: Boning Up on Math Basics</i></b> .....	<b>7</b>
Chapter 1: Awesome Operations: Math Fundamentals .....	9
Chapter 2: High School Reunion: Revisiting Key Principles of Algebra and Geometry .....	27
Chapter 3: Becoming a Believer: Conversion, Statistics, Probability and More .....	47
Chapter 4: The Miracle of Mental Math .....	59
<b><i>Part II: Math for Everyday Activities</i></b> .....	<b>71</b>
Chapter 5: Let's Make a Deal! Math You Use When Shopping .....	73
Chapter 6: Mmm, Mmm, Good: Kitchen Calculations .....	97
Chapter 7: It Does a Body Good: Math for Health and Well-Being .....	109
Chapter 8: Putting Geometry to Work at Home .....	129
Chapter 9: Math and Statistics around Town and on the Road .....	141
<b><i>Part III: Math to Manage Your</i></b>	
<b><i>Personal Finances</i></b> .....	<b>161</b>
Chapter 10: Budgets, Bank Accounts, Credit Cards, and More .....	163
Chapter 11: Key Principles of Investment Math .....	183
Chapter 12: Covering Your Assets: Insurance Math .....	203
Chapter 13: Taking Math to Work .....	215
Chapter 14: How Taxing! (Almost) Understanding the Government .....	229
<b><i>Part IV: The Part of Tens</i></b> .....	<b>241</b>
Chapter 15: Ten Quick Calculations You Can Do in Your Head .....	243
Chapter 16: Ten Activities That Build Math Skills .....	249
<b><i>Index</i></b> .....	<b>255</b>



# Table of Contents

## ***Introduction..... 1***

About This Book .....	1
Conventions Used in This Book .....	2
What You're Not to Read .....	3
Foolish Assumptions .....	3
How This Book Is Organized .....	4
Part I: Boning Up on Math Basics .....	4
Part II: Math for Everyday Activities .....	4
Part III: Math to Manage Your Personal Finances.....	4
Part IV: The Part of Tens.....	5
Icons Used in This Book.....	5
Where to Go from Here .....	5

## ***Part 1: Boning Up on Math Basics ..... 7***

### **Chapter 1: Awesome Operations: Math Fundamentals ..... 9**

Numbers You Can Count On .....	9
Reviewing the Four Basic Operations .....	11
Addition .....	11
Subtraction .....	11
Multiplication .....	12
Division .....	12
Finagling Fractions.....	12
Getting familiar with types of fractions .....	13
Reducing fractions.....	13
Adding, subtracting, multiplying, and dividing fractions .....	14
Converting fractions.....	17
Processing Percentages .....	19
Converting a common fraction to a percentage .....	19
Converting a percentage to a fraction .....	20
Grasping Charts and Graphs .....	20
Looking at line charts.....	21
Gobbling up pie charts.....	21
Bellying up to bar charts .....	22
Working Wicked Word Problems .....	22
Doing the analysis.....	23
Applying the math .....	24
Other story problem tricks .....	25

**Chapter 2: High School Reunion: Revisiting Key Principles of Algebra and Geometry . . . . .27**

“A” Stands for “Algebra” and “Awesome” .....	27
Getting acquainted with variables and constants .....	28
Expressions and equations .....	29
Operating with variables .....	31
Applying the same operation on both sides of the equal sign.....	32
Keeping order with operations .....	33
Jousting with Geometry: Simple Rules about Shape and Size .....	35
Looking at geometry’s basic parts: Planes, points, and lines.....	35
What’s your angle? Acute, obtuse, right angles, and more .....	38
The shape of things .....	39
Calculating areas.....	41
Getting pushed to the edge: Perimeters .....	42
Speaking volumes about boxes .....	43
Summing up geometry .....	44

**Chapter 3: Becoming a Believer: Conversion, Statistics, Probability, and More . . . . .47**

Wrangling Ratio-Proportion: The Best Calculation Method .....	48
Doing Conversions: Lots of Pleasure and Hardly Any Pain...49	
Factoring in the conversion factor .....	50
Using United States customary units .....	50
Managing the metric system .....	51
Mastering Simple Statistics.....	51
An average is a mean thing.....	52
Mediating the median.....	53
Figuring percentiles.....	53
Being aware of statistical fallacies.....	54
Predicting the Probable .....	56
Determining probability.....	56
What are the odds?.....	58

**Chapter 4: The Miracle of Mental Math . . . . .59**

Mental Math Basics.....	59
Adding and Subtracting on the Fly .....	60
Adding numbers quickly.....	60
Subtracting numbers quickly.....	61
Making Hay of Multiplication and Division.....	61
Multiplying in your head.....	62
Dividing in your head.....	63

Estimating with Ease .....	64
Estimating sales tax and value added tax (VAT) .....	65
Estimating tips .....	66
Estimating guests at a banquet .....	66
Doing Simple Cerebral Statistics .....	66
Figuring averages .....	66
Managing medians .....	68

## ***Part 11: Math for Everyday Activities .....*** 71

### **Chapter 5: Let's Make a Deal! Math You Use When Shopping .....** 73

Determining Actual Cost .....	73
Finding the total cost of acquisition .....	74
Figuring the total cost of ownership .....	75
Uncovering hidden costs .....	76
Making Tradeoffs: A Fun Balancing Act .....	78
Buying in Quantity: A Good Deal? .....	79
Knowing the Real Cost of Sale Items .....	80
Counting coupons .....	81
Calculating percentage decreases: You save 10 percent! .....	82
Calculating the real percentages in “get one free” offers .....	83
Dealing with dining specials .....	84
Doubling down on discounts .....	85
How Do You Wanna Pay for That? .....	86
Capturing bargains with credit cards .....	87
Taking advantage of layaway .....	89
Discovering Deals at the Grocery .....	89
Estimating the whole grocery bill .....	90
Estimating how much to buy .....	90
Comparing unit prices .....	91
Comparing products per roll or square foot .....	92
Calculating volume (25 percent more free!) .....	93
Determining Where to Shop .....	93
Narrowing your choices .....	93
Looking at externalities .....	94
Gauging the impacts of different store types .....	95

### **Chapter 6: Mmm, Mmm, Good: Kitchen Calculations. . .** 97

Taking Measure .....	97
Knowing your units .....	97
Equivalencies — All things being equal .....	99
Scaling a Recipe .....	100
The keys to scaling a recipe .....	100
Scaling in action .....	101

Using Math to Buy and Cook Smart.....	104
Calculating per-serving costs.....	104
Taste by the ton: Buying in bulk.....	106

## **Chapter 7: It Does a Body Good: Math for Health and Well-Being . . . . . 109**

Figuring Your Nutritional Needs.....	109
Read the label, Mabel: Nutrition facts.....	111
Figuring out your ideal daily calorie intake.....	113
Following the recommended daily allowance.....	114
Calculating Calories.....	115
Counting calories in your food .....	115
Managing your weight with math .....	117
Comparing your current weight to your goal weight.....	118
Calculating BMI.....	121
Exercise Math.....	122
These METs won't win a pennant: Metabolic equivalent of task.....	122
Figuring an activity's calorie burn rate.....	123
Being the Doctor at Home.....	125
Understanding medicine labels .....	125
For good measure: Dispensing liquid medications .....	126

## **Chapter 8: Putting Geometry to Work at Home . . . . . 129**

Calculating Your Way to a Better Lawn and Garden.....	129
Figuring how much seed you need.....	130
Mulching math .....	131
Planting the seeds of success — mathematically....	132
Knowing how much you really mow .....	133
Fixing Up the Place .....	134
Laying carpet.....	134
Calculating paint amounts.....	135
Pouring a patio.....	136

## **Chapter 9: Math and Statistics around Town and on the Road . . . . . 141**

Automobile Arithmetic: Figuring Costs, Mileage, and More .....	141
It's a gas! Comparing fuel prices and mileage.....	142
Are we there yet? Figuring distance, time, and speed.....	144
Making sense of the mechanic's bill.....	146
Dining Out .....	148
Calculating the tip.....	148
Splitting hairs and bills .....	149



Taking a Vacation: To Drive or to Fly? .....	150
Leaving on a jet plane .....	151
Driving: The daring alternative .....	152
Gambling: Money You Take to Las Vegas Stays	
in Las Vegas .....	154
Understanding odds, bets, and payouts .....	154
Playing the most popular games .....	155
The worst casino bets .....	160

## ***Part III: Math to Manage Your Personal Finances* ..... 161**

### **Chapter 10: Budgets, Bank Accounts, Credit Cards, and More ..... 163**

Beginning with a Budget .....	163
Identifying what's in a budget .....	164
Using your math skills to make a budget .....	164
Applying budgeting principles .....	166
Balancing Your Checkbook .....	167
Homing in on Mortgage Math .....	170
Having a PITI party .....	170
Amortization: Paying down the loan .....	174
A second mortgage or home equity line of credit ...	176
Using Smart Math for Other Big Purchases .....	176
Cruising around car loan math .....	176
Studying up on education loans .....	178
Calculating How to Avoid or Get Out of a Credit	
Card Hole .....	178
Understanding how credit cards work .....	179
Avoiding annual and other fees .....	179
Paying down credit cards .....	180
Selecting Savings Accounts .....	181

### **Chapter 11: Key Principles of Investment Math. . . . 183**

Factoring Personal Info into Investment Decisions .....	183
Knowing your tolerance for risk .....	184
Looking at your investment horizon .....	184
Choosing between appreciation or income .....	185
Playing with Instruments: Not the Musical Kind .....	185
Basic financial instruments .....	185
Climbing the investment pyramid .....	186
Growing the Green Stuff: The Time Value of Money .....	188
Calculating simple interest .....	189
Calculating compound interest .....	189
Calculating future value .....	190
Oh, see how it grows! The joys of making	
regular deposits .....	191

Rounding Up Retirement Plans .....	192
The feisty 401(k)/403(b): Defined contribution plans .....	193
Adding up IRAs and their kin .....	194
Making sensing of Social Security.....	195
Calculating current and future tax advantages.....	196
Managing Mutual Funds .....	196
Paying attention to fees .....	197
Figuring the average annual return .....	198
Considering Common Stocks .....	199
Processing P/E ratios .....	199
Figuring your dividends .....	200
Investing in Bonds .....	201
Calculating interest on bonds .....	201
Calculating yield .....	201

## **Chapter 12: Covering Your Assets: Insurance Math . . . 203**

Honing in on How Insurance Works .....	203
Spreading risk around .....	205
Evaluating risks .....	205
Determining premiums .....	208
Making Calculations about Your Own Lines of Insurance .....	208
Auto insurance .....	209
Homeowner's insurance .....	210
Health insurance .....	211
Life insurance .....	213

## **Chapter 13: Taking Math to Work. . . . . 215**

Setting Prices .....	215
Managing markups .....	216
Figuring discounts .....	217
Predicting time and materials costs .....	217
Paying Attention to Profit .....	219
Calculating profit margin .....	219
Determining gross profit .....	219
Pre-tax profit .....	220
Net profit .....	220
Making Change .....	220
Tracking Your Time .....	221
The timesheet .....	221
Heavens, no — Not project accounting! .....	223
Parsing Your Paycheck .....	224
Calculating your gross pay .....	225
Figuring your net pay: All about deductions .....	226
Using Form W-4 to change how much is withheld... ..	227

<b>Chapter 14: How Taxing! (Almost)</b>	
<b>Understanding the Government . . . . .</b>	<b>229</b>
Illuminating Income Taxes . . . . .	230
Taming Form 1040 . . . . .	230
Deciding whether to itemize . . . . .	233
Observing Other Taxes . . . . .	236
Surveying sales tax . . . . .	236
Processing property tax . . . . .	237
Fee, fie, foe, fum . . . . .	237

***Part IV: The Part of Tens . . . . . 241***

<b>Chapter 15: Ten Quick Calculations</b>	
<b>You Can Do in Your Head . . . . .</b>	<b>243</b>
Miles to Kilometers . . . . .	243
Miles to Your Destination . . . . .	244
Time to Destination . . . . .	244
Sales Tax and VAT . . . . .	244
Tips . . . . .	245
How Much Paint to Buy . . . . .	245
Number of Pizzas to Buy . . . . .	245
Blood Alcohol Content (BAC) . . . . .	246
Dollars to Pounds or Euros . . . . .	246
Gas Mileage . . . . .	247

<b>Chapter 16: Ten Activities That Build Math Skills . . .</b>	<b>249</b>
Playing Sudoku . . . . .	249
Playing Elementary Math Games on the Internet . . . . .	250
Working through Logic Puzzles . . . . .	250
Noting the Birthday Paradox . . . . .	250
Knowing the Value of Pi . . . . .	251
Guessing a Friend's Age . . . . .	251
Playing Hidden Object Games . . . . .	251
Flipping Coins . . . . .	252
Playing Games with Your Kids . . . . .	252
Playing Angry Birds . . . . .	253

***Index . . . . . 255***



# Introduction

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**M**ath is great. I've spent my life enjoying math and getting the benefits from it. But many people don't think math is so hot: They have fear and loathing.

The trouble is, a lot of what you learned in school probably was boring or painful, and most likely you forgot it right away. Or you may have deliberately *not* learned some types of math at all just to save yourself the trouble of forgetting them later. Why? Mainly because a lot of the math taught in schools wasn't math you could use. Well, that nonsense stops here, because this book is filled with math you *can* use. Here's just a brief sampling of the areas where you'll find real-life math to be useful:

- ✔ At home, math comes in handy in the house, yard, workshop, and hobby room. It's also a big part of cooking in the kitchen, whether you're following a recipe or counting sticks of celery.
- ✔ The grocery store and shopping center are the places where most people buy the most items with the most frequency. You can use math when you're shopping to make better choices and get better deals.
- ✔ Real-life math helps with understanding food labels, losing weight, and exercising. You can get healthy by chance, but choice is better, and math helps you make choices.
- ✔ On the job, you'll find that a brush-up on math skills is very handy, whether you're filling out a timesheet, managing time on a project, making change, or doing any other math-related tasks.

## About This Book

Math for real life is math you need, because math for real life is math you *use*. And that's what I focus on in this book, which is different from other math books. Here's a quick rundown of the major differences:

- ✔ This book is all about *practical* math. Although I cover math fundamentals (which are the building blocks of math for real life), I quickly move to problems you might deal with every day and the specific math skills you need to handle them. Other math books are often filled with abstractions.

- ✔ The book doesn't include any high-level equations, because you don't need them to go shopping or to calculate your auto repair bill. Even the world of gambling operates on simple formulas.
- ✔ It takes a *comprehensive* look at applying math in real-life areas. I include a little bit about a lot of subjects, and no subject goes any deeper than you need it to go. Many books are devoted to one subject (for example, algebra, geometry, trigonometry, or pre-calculus). Not this one — it's devoted to everything.
- ✔ It's *not dull* (I hope), as other math books often are. Because it's a *For Dummies* book, you can be sure that it's easy to read and has touches of humor.

But wait! There's more! At the risk of sounding like a late-night infomercial, you'll find other unique features that I gar-on-tee you won't find in a more traditional math book:

- ✔ You get terms, definitions, and word origins. The reason is that topics such as investments and insurance use so many odd words — and they need to be defined and explained.
- ✔ You get special insights into our culture and the way we think. For example, a "sale" isn't always a sale, and "free" doesn't always mean free. Even so, we tend to buy. Math for real life shows you where the exaggerations are.

## Conventions Used in This Book

This book is user-friendly: easy to hold in your hands, easy to read, and easy to understand. On top of that, it's easy to navigate, too, because the table of contents, the index, and the "In This Chapter" section at the beginning of each chapter help you find information you're looking for.

The book uses the following conventions:

- ✔ *Italic type* highlights new terms. Once in a great while, you'll see italics used for emphasis.
- ✔ Although English teachers would cringe at my breaking the rules, I usually write numbers as numerals, not words. For example, the text will say "if you drive 30 miles on 2 gallons of gas," not "if you drive thirty miles on two gallons of gas."
- ✔ *Variables* in formulas appear as italics (for example,  $3a + 4b = 10$ ).

- ✓ Web addresses are in `monofont`. They are usually very short and shouldn't break across two lines of text. But if they do, no extra characters indicate the break. Just type what you see into your browser.

## *What You're Not to Read*

It would be great if you read all the words of this book in the order they appear, but life is short. You don't have to read chapters that don't interest you. This is a reference book, and it's designed to let you read only the parts you need. And if you get stuck, then you can go over to a chapter you skipped to get some help.

Here's a short list of "skippable" information. Information in these bits isn't essential to doing real-life math:

- ✓ You don't have to read anything with a Technical Stuff icon next to it. That text gives you a little extra information about a technique, the origin of a principle, or maybe a formal definition.
- ✓ Sidebars (that's what they're called in publishing) are blocks of text with a gray background. They are interesting (I think), but aren't critical to your understanding the main text.

## *Foolish Assumptions*

The book makes some assumptions about you and what you're looking for in a math book:

- ✓ **You were exposed to math fundamentals in *elementary school* but may have forgotten a few of them.** (Why not high school? Because in high school many people get bored, dazed, or frustrated with mathematics. So although you may have been in class, your mind was probably somewhere else.) Even if you missed some basic math concepts in school, don't fret: I review most of them in this book.
- ✓ **You're only interested in information that's relevant to you and are likely to skip concepts you're already comfortable with.** That's okay. This is a reference book, not a novel.
- ✓ **You have access to a computer and the Internet.** Although not essential, being able to access the Internet is very handy. You can use a search engine to find useful specialized calculators or to learn more about any topic in this book.

## *How This Book Is Organized*

This book has four parts, each representing a particular math topic. The chapters in the parts focus on different aspects of that topic. Overall, the book moves from an early review of basics to chapters about math that comes up in everyday life to topics related to personal finance. Of course, you don't have to read the chapters in the order they appear. Following is an overview of the kind of information you can find in each part.

### *Part I: Boning Up on Math Basics*

In this part, you get math basics, which amount mostly to counting and simple arithmetic. Chapters 1, 2, and 3 bring out broad concepts related to the arithmetic fundamentals. In Chapter 4, you work with simple and useful statistics. Chapter 5 is about mental math, a great shortcut when you don't have a calculator handy (which is most of the time).

### *Part II: Math for Everyday Activities*

Part II shows you how to do the calculations that spring up regularly in real life. Want to seed your lawn or plant a flower bed? Math is involved. How about preparing a dinner for six from a recipe designed to feed four? You need math for that, too. Ever tried to decide whether the higher-priced but bigger box of cereal is a better deal than the lower-priced but smaller box? Again, math comes to the rescue. Shopping, cooking, driving around town, dining out, or trying to lose weight — math makes all these tasks easier.

### *Part III: Math to Manage Your Personal Finances*

True, you may deal with personal finances daily, but they represent a sort of “special” kind of math. To handle these tasks well, you need to understand some general principles, a few specialized terms, and a few strategies. Fortunately, this part has you covered. Here you can get info to create a budget, better manage your bank account and check register, avoid credit card debt, invest more wisely, and more.



## Part IV: The Part of Tens

What better way to end a book chock-full of easy-to-apply math formulas and principles than a couple of lists highlighting calculations you can do in your head and games you can play to build your math skills and sharpen your critical thinking? Consider this the icing-on-top-of-the-cake part.

### Icons Used in This Book

In the margins of this book you'll see small drawings called *icons*. Each icon calls out a special kind of information.



A tip is a suggestion or a recommendation. It usually points out a quick and easy way to get things done or provides a handy piece of extra information.



A warning alerts you to conditions that, if you're not careful, could lead you to wrong answers, faulty conclusions, or otherwise mess up your day.



This icon appears beside information that's important enough to keep in mind, both for the task at hand and in general.



I use this icon to share esoteric or otherwise interesting but non-essential information.

### Where to Go from Here

You can go to any chapter of the book from here. Although I've written this book so that the basic info comes first, you can start anywhere you want. Need a little more guidance? Here are some suggestions:

- ✓ If you're browsing for a topic that piques your interest, check out the table of contents. Here you can see all the topics this book covers. Chances are one (or more) will call to you immediately. You can also try the "thumb test": Riffle through the pages until something catches your eye.
- ✓ If you haven't made a choice, begin with Chapter 1. It has broad concepts and is a good launching pad into the discussions elsewhere in the book.

✓ If you have a particular problem (for example, maybe with shopping or investments), head to the table of contents or the index to find what you're looking for.

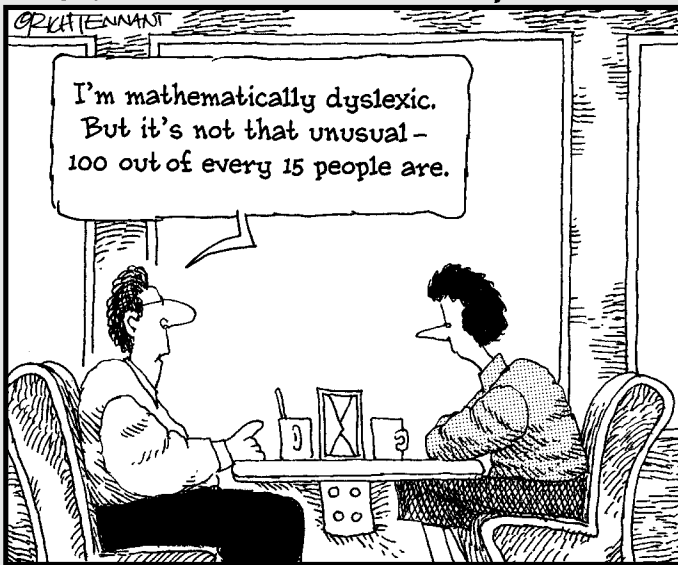
If you get stuck at any time, you'll probably find another chapter that can help you out. Just stop what you're reading and go visit that chapter.

# Part I

# Boning Up on Math Basics

## The 5th Wave

By Rich Tennant



## *In this part . . .*

**I**n this part, you'll find a review of math basics, including simple math concepts from your school days, like numbers, counting, and arithmetic operations. You also discover math principles like ratio-proportion, conversions, and statistics and probability. I also share the best all-purpose calculation method. Chapter 5, which is all about doing simple math in your head, is a math bonus. Mental math is a handy tool, and the techniques aren't hard to learn.

# Chapter 1

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# Awesome Operations: Math Fundamentals

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## *In This Chapter*

- ▶ Reviewing the four arithmetic operations
  - ▶ Manipulating fractions
  - ▶ Using charts to convey and understand information
  - ▶ Strategies to help you solve word problems
- .....

**M**ath has basic operations that you need to know. These operations — addition, subtraction, multiplication, and division — make all the other math in this book possible.

The good news is that you most likely learned about basics (like counting) even before you entered school, and you learned about basic arithmetic operations in elementary school. So you've been at it for a long time.

In this chapter, I review counting and the fundamentals of the four basic arithmetic operations. Other important topics I cover here are fractions, percentages, charts and graphs, and word problems. But don't worry: None of these are mysterious.

## *Numbers You Can Count On*

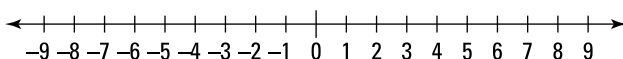
The most fundamental component of math is numbers. The first thing you do with numbers is count, and you probably started counting when you were very young. As soon as you could talk, your mother cajoled you to tell Aunt Lucy how old you were or to count from 1 to 5.

Counting was the first and most useful thing you did with math, and you still use it every day, whether you're buying oranges at the grocery store or checking the number of quarts of motor oil in a case.



Counting has been essential since people first walked the earth. In fact, the Ishango bone is a tally stick (a counting stick), and it's over 20,000 years old!

Several kinds of numbers exist. Over time, mathematicians have given them many names. The two most important kinds are whole numbers and fractions. To see a little bit about how these numbers work, use a *number line*, a simple display of numbers on a line (see Figure 1-1).



*Illustration by Wiley, Composition Services Graphics*

**Figure 1-1:** A number line.

The numbers to the right of 0 are called *natural* numbers or *counting* numbers. Of course, they are the numbers you use to count. They're easy for anyone to work with because they represent how many of something someone has (for example, 6 apples or 3 oranges).

Over many centuries and in different cultures, people made up the number 0, which represents the lack of a quantity. The numbers to the left of 0 on the number line, *negative* numbers, are a harder concept to grasp. You recognize negative number in real life. For example, if your checking account is overdrawn, you have a negative balance. If someone owes you \$3.00, you have "negative cash" in your pocket.

Here are the key points to know about the number line:

- ✓ All the numbers you see in Figure 1-1 are *whole* numbers, also called *integers*. An *integer* is a number with no fraction part. The word comes from Latin, and it means "untouched," so it's the whole deal.
- ✓ The numbers to the right of zero are *positive integers*. The numbers to the left of zero are *negative integers*.  
Mathematicians (and I'm not making this up) have trouble with zero. The best they can do is attach it to the positive integers and label the group *non-negative integers*.
- ✓ The number line stretches to the left and right, to infinity and beyond (as Buzz Lightyear says).
- ✓ Decimals (such as 0.75) and regular fractions (such as  $\frac{3}{5}$ ) are only a part of a whole number. They all have a place somewhere on the number line. They fit in between the integers. For example 2.75 "fits" between 2 and 3 on the number line, because it's greater than 2 but less than 3.

