

LEARNING MADE EASY



Grades 6-8

# Teaching Your Kids New Math

for  
**dummies**<sup>®</sup>  
A Wiley Brand



Get up to speed on  
“new math” concepts.

Make learning math more fun  
and relevant to real life.

Learn how to break math  
down, step by step.

**Kris Jamsa, PhD<sup>2</sup>**

*Old-school math whiz—new math  
convert and evangelist*





# Teaching Your Kids New Math, 6-8

by Kris Jamsa, PhD<sup>2</sup>

for  
**dummies**<sup>®</sup>  
A Wiley Brand

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# Contents at a Glance

<b>Introduction</b> .....	1
<b>Part 1: Securing the Foundation</b> .....	5
CHAPTER 1: Parent, Provider, and Now, Math Teacher .....	7
CHAPTER 2: Adding to What They Already Know .....	13
CHAPTER 3: Subtracting Any Knowledge Gaps .....	31
CHAPTER 4: Multiplying Their Multiplication Skills .....	49
CHAPTER 5: Divide and Conquer .....	67
CHAPTER 6: Mastering Fractions .....	83
CHAPTER 7: The Point of Decimals .....	101
CHAPTER 8: Prime Time Factors .....	119
<b>Part 2: Sailing through Sixth-Grade Math</b> .....	129
CHAPTER 9: Getting Around Shapes .....	131
CHAPTER 10: Working with Numbers Less than Zero .....	143
CHAPTER 11: Starting with Simple Statistics .....	161
CHAPTER 12: Making Sense of Ratios .....	185
CHAPTER 13: Working with Exponents .....	195
CHAPTER 14: Getting Started with Algebra .....	207
CHAPTER 15: Calculating and Applying Percentages .....	225
CHAPTER 16: Making Sense of the Metric System .....	239
<b>Part 3: Succeeding at Seventh-Grade Math</b> .....	247
CHAPTER 17: Revisiting Ratios with Unit Rates .....	249
CHAPTER 18: Converting Fractions to Decimals .....	255
CHAPTER 19: Properties of Operations .....	261
CHAPTER 20: The Geometry of Angles .....	269
CHAPTER 21: Statistics Aren't Perfect .....	283
CHAPTER 22: Introducing Probabilities .....	291
<b>Part 4: Graduating to Eighth-Grade Math</b> .....	303
CHAPTER 23: Solving Two-Variable Expressions .....	305
CHAPTER 24: Numbers, Like People, Aren't Always Rational .....	315
CHAPTER 25: Raising the Status with Exponents .....	319
CHAPTER 26: Calculating a Line's Slope and Intercept .....	335
CHAPTER 27: Circling Back to Geometry .....	351
CHAPTER 28: Taking Another Chance on Probability and Statistics .....	365

<b>Part 5: The Part of Tens</b> .....	383
CHAPTER 29: Ten Types of Mathematics .....	385
CHAPTER 30: Ten Things to Consider before High School.....	389
<b>Index</b> .....	393

# Table of Contents

<b>INTRODUCTION</b> .....	1
About This Book .....	1
Foolish Assumptions .....	2
Icons Used in This Book .....	2
Beyond the Book .....	3
Where to Go from Here .....	3
<b>PART 1: SECURING THE FOUNDATION</b> .....	5
<b>CHAPTER 1: Parent, Provider, and Now, Math Teacher</b> .....	7
New Math? What Was Wrong with Old Math? .....	8
Old Math, New Math, Common Core Math .....	9
Meeting Your Child’s Math Needs .....	10
Creating a Math Routine .....	11
Encouraging Your Child When the Going Gets Tough .....	11
<b>CHAPTER 2: Adding to What They Already Know</b> .....	13
Solving Addition Problems in Their Heads .....	14
Mastering timed addition tests .....	15
Counting cards — so to speak .....	17
Becoming One of “Those” People Who Does Math in Their Head .....	17
It’s Time to Regroup .....	18
Solving three-digit addition with regrouping .....	19
Removing the boxes .....	20
Leveraging a Number Line .....	22
Using number lines to solve two-digit addition problems .....	23
Using number lines to solve three-digit addition problems .....	25
Working Out Addition Word Problems .....	27
Getting Started with Simple Word Problems .....	27
Solving two-digit addition word problems .....	28
Solving three-digit addition word problems .....	29
<b>CHAPTER 3: Subtracting Any Knowledge Gaps</b> .....	31
Solving Subtraction Problems in Their Heads .....	32
Mastering timed subtraction tests .....	33
Counting cards — so to speak .....	33
Taking Flashcards to the Next Level .....	35
Subtraction with Regrouping .....	35
Borrowing with boxes .....	36
Using boxes to subtract three-digit numbers .....	37
Removing the boxes .....	39

	Subtracting Using a Number Line . . . . .	41
	Using number lines to practice two-digit subtraction . . . . .	41
	Using number lines to solve three-digit subtraction problems . . . . .	43
	Working Out Subtraction Word Problems . . . . .	45
	Getting started with subtraction word problems . . . . .	45
	Solving two-digit subtraction word problems . . . . .	47
	Solving three-digit subtraction word problems . . . . .	48
<b>CHAPTER 4:</b>	<b>Multiplying Their Multiplication Skills . . . . .</b>	<b>49</b>
	Break Out the Flashcards: Brushing Up on Multiplication Factors . . . . .	50
	Mastering timed multiplication tests . . . . .	51
	Back to counting cards for more multiplication fun. . . . .	51
	Becoming One of “Those” People Who Multiplies in their Head . . . . .	53
	Old-School Multi-digit Multiplication . . . . .	53
	Solving two-digit multiplication problems . . . . .	54
	Solving three-digit multiplication problems . . . . .	55
	Preparing Your Child for Success with New-Math Multiplication. . . . .	57
	Multiplying Using the Box Method . . . . .	60
	Using the box method to multiply two-digit numbers. . . . .	60
	Using the box method to multiply large numbers . . . . .	62
	Working Out Multiplication Word Problems . . . . .	64
	Solving word problems that require two-digit multiplication . . . . .	65
	Solving three-digit multiplication word problems . . . . .	66
<b>CHAPTER 5:</b>	<b>Divide and Conquer . . . . .</b>	<b>67</b>
	Performing Common Division Operations in Their Head . . . . .	68
	Working with flashcards to master basic division operations . . . . .	68
	Mastering timed division tests. . . . .	69
	Performing Long Division. . . . .	69
	Performing Long Division with Large Numbers . . . . .	74
	Solving Division Problems That Have a Remainder . . . . .	76
	Working Out Division Word Problems . . . . .	78
	Solving simple division word problems . . . . .	78
	Solving long-division word problems . . . . .	79
	Checking Their Work. . . . .	80
<b>CHAPTER 6:</b>	<b>Mastering Fractions . . . . .</b>	<b>83</b>
	Recognizing Fractions . . . . .	84
	Adding Like Fractions . . . . .	85
	Subtracting Like Fractions . . . . .	87
	Multiplying Fractions. . . . .	88
	Dividing Fractions . . . . .	89
	Adding and Subtracting Unlike Fractions. . . . .	91



	Adding unlike fractions . . . . .	91
	Subtracting unlike fractions . . . . .	93
	Converting Improper Fractions . . . . .	94
	Reducing Fractions to their Simplest Form . . . . .	96
	Working Out Word Problems with Fractions . . . . .	97
<b>CHAPTER 7:</b>	<b>The Point of Decimals . . . . .</b>	<b>101</b>
	Making Sense of Decimal Numbers . . . . .	101
	Adding Decimal Numbers . . . . .	103
	Subtracting Decimal Numbers . . . . .	105
	Multiplying Decimal Numbers . . . . .	106
	Dividing Decimal Numbers . . . . .	109
	Repeating Decimal Numbers . . . . .	112
	Converting Fractions to Decimals . . . . .	114
	Dividing a Decimal Value into Another . . . . .	116
	Working through Word Problems with Decimal Numbers . . . . .	117
<b>CHAPTER 8:</b>	<b>Prime Time Factors . . . . .</b>	<b>119</b>
	Understanding Factors . . . . .	120
	Knowing when to stop when factoring numbers . . . . .	120
	Understanding Prime Numbers . . . . .	122
	Creating Factor Trees . . . . .	123
	Understanding the Greatest Common Factor . . . . .	124
	Understanding the Least Common Multiples . . . . .	126
	<b>PART 2: SAILING THROUGH SIXTH-GRADE MATH . . . . .</b>	<b>129</b>
<b>CHAPTER 9:</b>	<b>Getting Around Shapes . . . . .</b>	<b>131</b>
	Measuring the Perimeter around Shapes . . . . .	131
	Calculating the Area within a Shape . . . . .	134
	Working with Circles . . . . .	137
	Working through Word Problems with Perimeters and Areas . . . . .	140
<b>CHAPTER 10:</b>	<b>Working with Numbers Less than Zero . . . . .</b>	<b>143</b>
	Understanding Negative Numbers . . . . .	144
	Comparing Positive and Negative Numbers . . . . .	146
	Adding Negative Numbers . . . . .	147
	Subtracting Negative Numbers . . . . .	148
	Multiplying Negative Numbers . . . . .	149
	Dividing Negative Numbers . . . . .	150
	Understanding the Additive Inverse . . . . .	151
	Understanding the Absolute Value . . . . .	152
	Charting Negative Values . . . . .	153
	Solving Word Problems with Negative Numbers . . . . .	158

<b>CHAPTER 11: Starting with Simple Statistics</b> .....	161
It All Starts with Data. ....	162
Calculating the Average (Mean) Value .....	162
Finding the Smallest and Largest Values (Minimum and Maximum) .....	165
Bringing Some Order to Data (Sorting) .....	167
Finding the Value That Occurs Most Often in Data (The Mode) .....	169
Finding the Middle Value in Data (The Median) .....	171
Identifying the Range of Values. ....	173
Understanding Box-and-Whiskers Charts .....	175
Reading a box-and-whiskers chart .....	175
Understanding quartiles. ....	177
Creating a Histogram .....	178
Working Out Statistical Word Problems. ....	179
 <b>CHAPTER 12: Making Sense of Ratios</b> .....	185
Understanding Ratios .....	185
Reducing Ratios (Equivalent Ratios) .....	188
Understanding Scale. ....	189
Understanding Proportions. ....	190
Working Out Word Problems with Ratios .....	193
 <b>CHAPTER 13: Working with Exponents</b> .....	195
Understanding Exponents .....	196
Understanding the exponent of 1. ....	198
Understanding the exponent of 0. ....	198
Practicing Values Raised to the Power of 2 .....	199
What About Negative Exponents?. ....	200
Understanding the Square Root .....	201
Multiplying Values with Exponents .....	202
Dividing Values with Exponents .....	204
 <b>CHAPTER 14: Getting Started with Algebra</b> .....	207
Algebra 101: Solving for x. ....	208
Solving for x in simple expressions. ....	208
Solving for x in more complex expressions. ....	209
Solving expressions that include multiples of x .....	211
Performing multiple operations to solve for x .....	212
Simplifying Expressions .....	214
Revisiting Exponents with Unknowns. ....	215
Solving for x with exponents .....	215
Solving for x with complex expressions. ....	216
Solving Inequalities .....	218

	Illustrating Inequalities . . . . .	219
	Representing an inequality visually . . . . .	219
	Interpreting visualized inequalities. . . . .	221
	Solving Algebra Word Problems . . . . .	222
<b>CHAPTER 15:</b>	<b>Calculating and Applying Percentages.</b> . . . . .	225
	Getting Started with Percentages . . . . .	226
	How Much Should I Tip? . . . . .	228
	How Much Will I Save? . . . . .	230
	Determining What Percent One Value is of Another . . . . .	232
	Solving Problems Like “10 is 15% of What Number?” . . . . .	234
	Working through Word Problems with Percentages . . . . .	235
<b>CHAPTER 16:</b>	<b>Making Sense of the Metric System</b> . . . . .	239
	The Need for a Metric System . . . . .	239
	Covering the Metric Units Your Kid Needs to Know. . . . .	240
	Water Freezes at 0 and Boils at 100 — Introducing Your Kid to Celsius. . . . .	243
	Working through Metric Word Problems. . . . .	245
	<b>PART 3: SUCCEEDING AT SEVENTH-GRADE MATH</b> . . . . .	247
<b>CHAPTER 17:</b>	<b>Revisiting Ratios with Unit Rates</b> . . . . .	249
	Calculating Unit Rates. . . . .	249
	Working Through Unit-Rate Word Problems. . . . .	253
<b>CHAPTER 18:</b>	<b>Converting Fractions to Decimals</b> . . . . .	255
	Knowing Common Fractions . . . . .	255
	Converting Any Fraction to Its Decimal Equivalent. . . . .	256
	Word Problems that Convert Fractions to Decimals . . . . .	259
<b>CHAPTER 19:</b>	<b>Properties of Operations</b> . . . . .	261
	Revisiting the Order of Operations — Good Ol’ PEMDAS . . . . .	262
	Identity Property of Addition . . . . .	263
	Identity Property of Multiplication . . . . .	263
	Multiplicative Property of Zero . . . . .	264
	Commutative Property of Addition. . . . .	264
	Associative Property of Addition. . . . .	265
	Commutative Property of Multiplication . . . . .	266
	Knowing Why Subtraction and Division Are Not Commutative . . . . .	266
	Associative Property of Multiplication . . . . .	267
	Distributive Property of Multiplication. . . . .	267

<b>CHAPTER 20: The Geometry of Angles</b> .....	269
Revisiting Angles .....	269
Understanding Angle Types .....	271
Understanding Angle Names .....	274
Understanding Angle Relationships .....	275
Understanding Triangle Types .....	278
<b>CHAPTER 21: Statistics Aren't Perfect</b> .....	283
Why Statistics Aren't Perfect .....	283
Calculating the Variance .....	285
Working through Word Problems .....	287
<b>CHAPTER 22: Introducing Probabilities</b> .....	291
Understanding Probability .....	291
Calculating Simple Probabilities .....	292
Understanding the Impact of Previous Events .....	295
Understanding Combined Probabilities .....	296
Understanding Dependent Probabilities .....	297
Working through Probability Word Problems .....	299
<b>PART 4: GRADUATING TO EIGHTH-GRADE MATH</b> .....	303
<b>CHAPTER 23: Solving Two-Variable Expressions</b> .....	305
Moving from One-Variable to Two Variable Expressions .....	306
Moving Up to Two-Variable Expressions .....	307
<b>CHAPTER 24: Numbers, Like People, Aren't Always Rational</b> ...	315
Reviewing Number Types .....	316
Getting a Handle on Rational and Irrational Numbers .....	317
Grasping the difference between rational and irrational numbers .....	317
Identifying rational and irrational numbers .....	318
<b>CHAPTER 25: Raising the Status with Exponents</b> .....	319
Solving Expressions with Exponents .....	320
Charting Expressions .....	321
Calculating Cube Roots .....	325
Understanding Negative Exponents .....	326
Multiplying Numbers with Exponents .....	327
Dividing Numbers with Exponents .....	328
Solving Problems with Exponents .....	329
Introducing Scientific Notation .....	330
Rewriting Numbers from Scientific Notation .....	332

<b>CHAPTER 26: Calculating a Line's Slope and Intercept</b> .....	335
Comparing Linear and Nonlinear Equations.....	335
Understanding the Slope and Intercept of a Linear Equation .....	341
Identifying the Y-Intercept.....	346
Understanding $y = mx + b$ .....	348
<b>CHAPTER 27: Circling Back to Geometry</b> .....	351
Revisiting Perimeters .....	351
Revisiting Areas .....	354
Understanding the Pythagorean Theorem .....	357
Calculating a 3D Shape's Volume .....	359
Working Out Geometric Word Problems.....	362
<b>CHAPTER 28: Taking Another Chance on Probability and Statistics</b> .....	365
Creating Scatter Plots .....	366
Understanding Correlation .....	368
Sample Size Matters .....	373
Using a Line of Best Fit .....	375
Working Through Word Problems .....	377
<b>PART 5: THE PART OF TENS</b> .....	383
<b>CHAPTER 29: Ten Types of Mathematics</b> .....	385
<b>CHAPTER 30: Ten Things to Consider before High School</b> .....	389
<b>INDEX</b> .....	393



# Introduction

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**D**ifferent people like different things. Some of us like to travel. Some like walks in the woods. And some people like pina coladas and getting caught in rain. But math? People can get emotional about math — they often either love it or hate it.

I've noticed that people who find that math is not their cup of tea never really mastered the basics. That's what this book is all about.

If you fall into the category of people who dislike “old math,” you may not be excited that there is now “new math.”

Relax. New math is just a result of finding better ways to solve problems. You're still going to use good ol' addition, subtraction, multiplication, and division, but you'll do it with new math. You're just going to show your kids better ways to do it, and this book will show you how.

This book provides step-by-step instructions for how to use both old and new math to solve problems that sixth- through eighth-graders must know. It also provides instructions, examples, and practice problems, and often suggests what you should say as you teach your child.

## About This Book

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You may have chosen this book for several reasons. If your child is struggling with math, they likely need to relearn some fundamentals. This book will help. Or, you may have a budding math genius to whom you want to teach the next set of concepts. Often, people buy this book because their kids just brought home an assignment that looks Greek to them. The good news is that this book can help you teach those concepts that the ancient Greeks passed down to us.

Regardless of your reasons, you've got the right book.

This book presents the math your child must know from sixth through eighth grade, with each chapter focusing on specific key concepts. If your child needs help with only algebra or statistics, you can turn to a specific chapter that addresses

that topic. If your child is struggling at their current grade level, you can take a step back and strengthen their foundation, knowledge, and confidence from previous grades. The first section of this book provides your child with a review of the concepts they should have mastered up through fifth grade.

Within each chapter, you will find step-by-step instructions for how to teach each concept. I've also provided many example problems for you to work through with your child. Let them solve the problems right on the book's pages if you want — after all, it's your book.

I understand that it may have been a while since you solved math problems without the help of your phone's calculator app. However, I think you'll be pleased with how much math you remember! You can do this!

## Foolish Assumptions

I like math. That, however, does not mean everyone does!

Don't worry if you normally turn to your phone's calculator to solve math problems. I often use mine, too!

I understand that math can be hard — Einstein, in fact, said, “Do not worry too much about your difficulties in mathematics; I can assure you that mine are still greater.”

Relax. We're going to look at sixth- through eighth-grade math. You can do this. In fact, you may be surprised at how many of the math concepts in this book you can use on an everyday basis!

Don't let the terms “new math” or “Common Core math” intimidate you. This book covers standard addition, subtraction, multiplication, and division, just in new ways.

## Icons Used in This Book



TIP

The Tip icon marks tips (duh!) and shortcuts that you can use to make learning new math easier, and sometimes how to know when it's time to take a break!





REMEMBER

The Remember icon points out things that you should, uh, remember! You and your child will examine a lot of topics throughout this book. I include this icon for those things you should keep in the back of your mind as you move forward.



FIND  
ONLINE

Throughout this book, I've included references to worksheets with additional problems your child should practice. This icon identifies those worksheets you can find on this book's companion website.

## Beyond the Book

Becoming a “math whiz” requires practice. I've sprinkled many math problems your child can complete throughout this book. But because I know “practice makes perfect,” I've provided many worksheets of problems on this book's companion website at [www.dummies.com/go/teachingyourkidsnewmath6-8fd](http://www.dummies.com/go/teachingyourkidsnewmath6-8fd). As you and your child work your way through this book, you should take the time to download and print the corresponding practice worksheets.

In addition, should you need quick help on a math process and you don't have this book handy, I've created a Cheat Sheet you can download and print that will help you with many key concepts. Head to [www.dummies.com](http://www.dummies.com) and type **Teaching Your Kids New Math 6-8 For Dummies Cheat Sheet** in the search bar.

## Where to Go from Here

This book's first section includes a review of the key math concepts taught through fifth grade. Often, the reason kids dislike math is because they are learning new concepts that build upon concepts that were previously taught, but which they don't fully understand. If your child is struggling with math, take time to review thoroughly this book's first section — that will be time well spent. You will not only build your child's math foundation, but also their confidence. With that, they may even start to like math!

The chapters of this book are meant to be read in order. That said, if your child drops their unfinished math homework in front of you while you are trying to drink your morning coffee, you can turn directly to the concept at hand. Later that evening, when you switch to a different beverage, you can take time to go over the concepts upon which your child's homework relies.

Most of this book's chapters introduce concepts with examples that you may find easier than your child's homework. That's intentional. I want your child to understand the concept, not struggle with larger and more difficult numbers. After your child masters a concept, you can always make the numbers larger or more complex. By then, however, your child will have the knowledge and confidence to complete such problems.

# 1

## Securing the Foundation

## IN THIS PART . . .

Becoming your child's math teacher

Making sense of old and new math

Adding old-school techniques to new math

Subtracting knowledge gaps

Multiplying their skills

Getting across the great divide

Putting together fractional pieces

Getting the point of decimals

Focusing on factors

## IN THIS CHAPTER

- » Understanding old math, new math, and Common Core math
- » Getting over the fact that old math has worked well for you
- » Meeting your child's math needs
- » Establishing a teaching routine
- » Understanding the return on your investment of your teaching time
- » Keeping things positive

# Chapter **1**

# Parent, Provider, and Now, Math Teacher

**M**any people have visions of parenthood being the joys of having a family and raising kids. There are visions of vacations on the beach, family barbecues, and happy evenings filled with board games at the kitchen table. Then, life happens. Evenings get interrupted by work calls and emails, work creeps into the weekends, and budgets that looked great on paper, never quite work out. On top of that, your pride about, and excitement for, parent-teacher conferences may get replaced by fear and nervousness at finding out that your child is learning new math and that the word “new” seems to mean only that the math is new to you!

The good news — yes, there is good news — is that you've picked up the right book! I get it! Old math may not have been one of your favorite things. In fact, you may worry that you have forgotten more old math than you remember. That's where this book fits in. It will remind you of, or possibly reteach you, the key old-math concepts. I think you will be surprised by how much you remember! This book will then teach you the new-math techniques you must know, and how to teach those concepts to your kids!

This chapter introduces you to new math — what it is and, more importantly, why you need it. It makes sense of Common Core math and how it relates to new math. Finally, this chapter helps you clarify why you have chosen to put on a math-teacher hat and gives you some pointers and hints to help you succeed.

## New Math? What Was Wrong with Old Math?

When I grew up, kids played outside all day, drank water from the hose, and knew to be home before dark. I also learned “old math,” which seems to have worked well for my adult needs. I know how much money I can spend, and how much change I should receive. I can recognize higher prices as well as good deals. If you had asked me a few years ago, I would have said that old math was just fine.

That said, things change over time. Many cars no longer stop for gas, but rather, to plug in. Drivers who couldn’t wait to get their learner’s permit when they were young, now look forward to self-driving cars. And teachers have found more effective ways to use math to solve problems.



REMEMBER

New math, simply put, provides new ways to solve problems. Carrying and borrowing to add and subtract have been replaced with number lines, and old-school multiplication has been replaced with new techniques that use boxes:

$$\begin{array}{r} 37 \\ \times 23 \\ \hline \end{array}$$

	30	7
20	600	140
3	90	21

$$\begin{array}{r} 1 \\ 600 \\ +140 \\ + 90 \\ + 21 \\ \hline 851 \end{array}$$

The good news is that numbers have not changed, and you still use the symbols +, −, ×, and ÷ for addition, subtraction, multiplication, and division.

All of that said, I like the new-math techniques. They are straightforward, they work, and they are fast to use. After you set aside your fears and nervousness, I think you will like them, too!



TIP

Starting out, the best tip I can offer you is to be open to new ways of learning — especially if you want to help your child master new math strategies. My goal in presenting the techniques in this book is to make it enjoyable for your child to learn new math with you. The bond you will create with your child is possibly more important than establishing their math foundation for future success.

## Old Math, New Math, Common Core Math

I can remember when there was just math. It was the third “R” in Reading, wRiting, and aRithmetic. Now, when someone uses the word *math*, you must ask, “Which one: old-school math, new math, or Common Core math?”

*Old-school math* is the math most of us learned. Like a trusty old pickup truck, old-school math still works. As such, throughout this book, I present many old-school-math techniques that you should teach to your child.

*New math* includes new ways to add, subtract, and multiply numbers. Like a brand-new, shiny pickup truck, new math also works. Unfortunately, most people are introduced to new math with their child’s homework assignment, which is due the following morning. Fortunately, this book will teach you what you must know to teach your child new-math techniques.

It used to be that smart people in each state would get together and establish the state’s learning curriculum — the things teachers in that state would teach. The problem was that each state’s curriculum was different. What a sixth-grader learned in New York might be different from what a sixth-grader learned in Arizona or Montana. Simultaneously, math scores within the United States were falling. In fact, as of 2015, math scores in the United States had fallen from first to 35th in the world!

In 2009, the National Governors Association and the Council of Chief State School Officers got together to create the Common Core State Standards Association. From that group, Common Core math was born.

If you ask a roomful of educators to comment on Common Core, you will hear a wide range of opinions. Some love it! They want to see standards across grade levels and across the country. Others hate it! They want the government to leave curriculum decisions to the individual states. This book does not debate for either

side. Instead, I simply present the math skills these groups identified as important for your child to know and for teachers to teach.



REMEMBER

Common Core math encompasses the recommended math concepts that teachers are directed to teach. Because Common Core math includes many new math techniques, many people use the terms interchangeably. That said, not all Common Core math is new math — many old-school math techniques remain.

## Meeting Your Child's Math Needs

I bet you're thinking, "Great! I can't wait to learn new math so I can teach it to my child!" It isn't like you didn't have anything else to do!

Given that you are reading this book, I know you are at least interested in math, or desperate because you are struggling to help your child solve their homework assignments.

The bottom line is that you can do this. You learned old-school math, and you can learn new math. In fact, you are likely to surprise yourself and amaze your friends with what you know.



TIP

If your child is struggling today, it's likely because they didn't master the skills in a previous grade level. That problem is easy to solve. This book starts with a review of key math concepts through to fifth grade. You may want to start there. Depending on your child's age and current skills, you may move through that content quickly. The successes your child will experience will give them greater confidence in their knowledge, and you may find that you're able to fill in a few key gaps. In any case, if your child is having trouble at their current grade level, you can simply turn back a few pages to a previous grade level and lay a better foundation. Remember, you paid for the entire book. Use it!

## INVESTING IN YOUR CHILD'S FUTURE

Math is important. That's why schools teach math every day in every grade. Kids who do well in math tend to do well in school. Further, kids who do well in school tend to go on to college.

Research has shown that college graduates tend to earn over one million dollars more throughout their career than non-college graduates. That's a one-million-dollar return on your investment of time to help your child succeed in math.





REMEMBER

You may be worried that you are too busy to help your child with math or that you can't learn new math. Relax. You have the right book. Raising kids can be hard. The good news is that teaching math is not. You can do this!

## Creating a Math Routine

Transforming your child into a math whiz takes time and effort. Following are a few tips for creating a solid math routine:

- » Plan on spending around 15 minutes a day on math with your child.
- » Try to pick a regular time each day to work with your child to establish consistency.
- » Try to pick a location that is away from other distractions, such as your television or smartphone.



REMEMBER

By establishing a routine, you will find that you can make time, and your child will have the expectation that you will be working together. Knowing that you care about their success is important to your child.

## Encouraging Your Child When the Going Gets Tough

Math can be hard, and your child will make mistakes. The key is in how you respond to your child after such errors occur. A positive attitude goes a long way. Be positive about the math problems your child gets right, as well as what they can learn from the ones they get wrong.



TIP

When your child makes a mistake, and they will, make the problem the focus by saying, “This is not correct—let’s look at it again,” rather than saying, “You got this wrong.”

Remember, your goal is to build your child’s math confidence and, ideally, their enjoyment of math.



REMEMBER

Have fun! You are setting out on an adventure that will forever change your child’s life.



#### IN THIS CHAPTER

- » Understanding mental math
- » Handling timed addition tests
- » Practicing addition with carrying (regrouping)
- » Adding with a number line
- » Cracking word problems that require addition

## Chapter 2

# Adding to What They Already Know

**T**here's an old adage in football that winning teams perform the basics well — meaning, they know how to block and tackle. The same adage applies to math. Whether your child is solving basic math problems or is a math prodigy destined to study advanced calculus, they will always use the basics: addition, subtraction, multiplication, and division.

This chapter focuses on addition. Although some of the topics may feel like review, your goal is to improve your future math whiz's ability to solve common addition problems mentally — you know, in their heads. In addition (no pun intended), solving math problems mentally will increase their confidence. Take your time with this chapter. Many students who struggle with and thus dislike math do so because they never mastered the basics.

This chapter starts with old-school addition — meaning, your child needs to solve addition problems using carrying (sometimes called regrouping). Then, you switch to using number lines (some new math) to solve addition problems. Finally, your child gets a refresher on solving word problems that require addition. You may remember those: “Two trains leave the station” The good news is that this chapter’s word problems do not have trains.

*Note:* Before you get started, you should buy some 3x5 index cards and a deck of playing cards.

## Solving Addition Problems in Their Heads

You probably know someone who can amazingly solve math problems in their head almost as fast as you can type the problems into your phone’s calculator app. In this section, your child will start to become one of those people.

To start, you create flashcards that you can use to help your child quickly add numbers through 20 in their heads.



TIP

Whoever said practice makes perfect was right. The key to success with flashcards is consistent practice. Plan to spend 10 minutes a day reviewing the flashcards with your child until they have mastered all the cards and can quickly solve the addition problems in their head.

Using your 3x5 index cards, create the following flashcards, or, if you are out shopping, you can buy flashcards:

0 +0	0 +1	0 +2	0 +3	0 +4	0 +5	0 +6	0 +7	0 +8	0 +9	0 +10
1 +0	1 +1	1 +2	1 +3	1 +4	1 +5	1 +6	1 +7	1 +8	1 +9	1 +10
2 +0	2 +1	2 +2	2 +3	2 +4	2 +5	2 +6	2 +7	2 +8	2 +9	2 +10
3 +0	3 +1	3 +2	3 +3	3 +4	3 +5	3 +6	3 +7	3 +8	3 +9	3 +10
4 +0	4 +1	4 +2	4 +3	4 +4	4 +5	4 +6	4 +7	4 +8	4 +9	4 +10
5 +0	5 +1	5 +2	5 +3	5 +4	5 +5	5 +6	5 +7	5 +8	5 +9	5 +10
6 +0	6 +1	6 +2	6 +3	6 +4	6 +5	6 +6	6 +7	6 +8	6 +9	6 +10
7 +0	7 +1	7 +2	7 +3	7 +4	7 +5	7 +6	7 +7	7 +8	7 +9	7 +10
8 +0	8 +1	8 +2	8 +3	8 +4	8 +5	8 +6	8 +7	8 +8	8 +9	8 +10
9 +0	9 +1	9 +2	9 +3	9 +4	9 +5	9 +6	9 +7	9 +8	9 +9	9 +10
10 +0	10 +1	10 +2	10 +3	10 +4	10 +5	10 +6	10 +7	10 +8	10 +9	10 +10



TIP

If you want your child to practice the flashcards on their own, write the correct answer on the back of each card so they can quickly check their result.

These flashcards all have results that are in the range 0 to 20. By helping your child master these flashcards, you are laying the foundation they will use when they perform multi-digit addition.

## Mastering timed addition tests



FIND  
ONLINE

Your goal in practicing addition with flashcards is for your child to solve key addition problems quickly and accurately in their head. After your child has mastered the flashcards, have them practice timed worksheets like that shown in Figure 2-1, which I have provided on this book's companion website at [www.dummies.com/go/teachingyourkidsnewmath6-8fd](http://www.dummies.com/go/teachingyourkidsnewmath6-8fd).

$$\begin{array}{r} 1 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +0 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +10 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ +0 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +1 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ +7 \\ \hline \end{array}$$

**FIGURE 2-1:**  
A timed addition  
worksheet.

$$\begin{array}{r} 10 \\ +10 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +10 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +3 \\ \hline \end{array}$$