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Common Core Math For Parents

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- **Make sense of Common Core math, grade by grade**
- **Effectively help with homework**
- **Team up with teachers and promote your child's success**

Christopher Danielson, PhD
Math teacher and curriculum writer



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by Christopher Danielson, PhD

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Common Core Math For Parents For Dummies®

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Introduction

Math shouldn't be scary. This idea is at the heart of this book. The big reason that many people find math scary (and I know you're out there — you confess it to me when we meet for the first time and I tell you that I teach math) is that math has always felt like one big club with a bunch of rules that make no sense, but that absolutely must be followed.

This book presents a very different vision of math — one that should be empowering rather than frightening. A major goal of the Common Core State Standards is raising the mathematics achievement of large populations of students to whom quality mathematics instruction has previously been denied. Part of this effort involves bringing children's ways of thinking into the classroom and developing these ways of thinking into powerful, useful, and efficient strategies. I wrote *Common Core Math For Parents For Dummies* to help parents like you understand this development.

I have been writing about students' math learning at all levels for many years now, with an audience of both parents and teachers. With this book, I want to bring together many of these ideas into a coherent and comprehensive guide to classroom math learning. *Common Core Math For Parents For Dummies* is that book. So go ahead and join in — the mathematical welcome mat has been laid out for you.

About This Book

This book is your guide to math class in the 21st century. Education policy can be highly political and contentious, so this book cuts through it all and tells you what you need to know about what and how your child is likely to be learning math in the era of Common Core.

In place of inflated claims about the perfect world that will supposedly result from adopting these standards, you can find honest information about the goals and intent of these standards. Instead of scary tales of data mining and big government, you can find reasonable, measured, and careful descriptions of what the standards actually are.

If you're a parent or guardian, you can find suggestions for helping your children learn the math appropriate to their grade level. This information may take the form of written tips for working example problems or video explanations of important ideas. Furthermore, this book shows you how ideas you learned in school are likely to appear in your children's math class. Despite what you may have heard, the standards don't have any New Math in them. Children are being asked to think, and this thinking can look unfamiliar to their parents on the surface. But underneath, many of these ways of thinking are old and familiar. Many times people who identify themselves as "not a math person" will say something such as, "That's how I always thought about it, but I didn't know it was okay to do it that way!" This book can help you connect your child's ways of thinking with your own.

If you're a teacher, you can find a most welcome big picture. You can see connections between the math that you teach at your grade level (which you probably know quite well) and the math that is taught at adjacent and distant grade levels (which you probably haven't had time to study).

This book is organized as a reference that you can spend as little or as much time with as you want. You can read the grade level that matters to you without worrying about what came before and what comes after. All in all, I wrote this book with a busy person in mind. I have organized things so you can find what you need and move on.

Foolish Assumptions

As I wrote this book, I made some assumptions about you. I'm sure I didn't get them all right, but at least one of these categories describes you:

- ✔ **You have a K–12th grade student in your life.** You may be a parent, guardian, grandparent, neighbor, or tutor to a child you care about very much, and you want to help him (or her) be successful in math in school.
- ✔ **You don't really know what Common Core Math means.** You have probably heard of the Common Core State Standards, but you probably haven't read them.
- ✔ **You have seen something unfamiliar in your child's homework.** Seeing something that you thought you knew well (for example, multiplication) but realizing that you have no idea what the questions are asking for can be frustrating.
- ✔ **You are a teacher looking to know the standards better.** Understanding the standards beyond the grade level you teach is extremely helpful for day-to-day classroom teaching. (How did they learn this last year? How will this get used in high school?) It's also helpful in supporting parents when they have questions. Either way, you need information quickly.

I understand that your life is busy. I wrote this book in a way that makes the phrase Common Core Math concrete. The goal is to bring you up to speed quickly on what Common Core means for your child's math class.

Icons Used in This Book

Throughout this book, I include icons in the margins. You can use these icons to navigate this book.



A tip is intended to make your life easier. A tip can give you suggestions of what to look for in the standards or in your child's work.



This icon helps you find summaries of the most important ideas in a section. This icon points to something that you won't want to forget.



This icon lets you know when you can do something with your child in order to understand the content and help your child. You can do some of them on your own as you read; others suggest things to do together with your child.



Technical stuff gives you the real deal, mathematically speaking. Most of the time, you and your child don't really *need* to know the things that go with this icon, but sometimes you want to know the full story.

Beyond the Book

In addition to the content of this book, you can access some related material online. A series of videos that cover some techniques and big ideas from the book is available at www.dummies.com/go/commoncoremathvids.

Check out the related videos for additional help:

- ✓ Chapter 5: Making tens
- ✓ Chapter 6: Decomposing numbers
- ✓ Chapter 7: Eyeing adding and subtracting strategies
- ✓ Chapter 8: Using addition algorithms
- ✓ Chapter 9: Comparing fractions
- ✓ Chapter 10: Tackling multiplication algorithms

You can access a free Cheat Sheet at www.dummies.com/cheatsheet/commoncoremathforparents that contains additional information about the standards. You can also access some additional helpful bits of information at www.dummies.com/extras/commoncoremathforparents.

Where to Go from Here

Feel free to start reading from Chapter 1 to get an overview of what the book has to offer. You also can turn to the grade that interests you most, which may be the grade one of your children is in right now or (if you're a teacher) it may be the grade you teach. That grade most likely refers to another grade for more information. You can follow the references that interest you and skip the ones that don't. If you've been frustrated by a strange-looking homework assignment, get yourself to Chapter 4 to get an overview of the nature and purpose of homework in Common Core classrooms. Or you can flip through the table of contents or index to search for any topic that interests you.

Part I

Getting Started with Common Core Math Standards



Go to www.dummies.com/cheatsheet/commoncoremathforparents for a Cheat Sheet that gives you some easy-to-refer-to tips that can help you when trying to familiarize yourself with the Common Core State Standards for math.

In this part ...

- ✓ Understand how the Common Core State Standards fit in the history of math teaching in the United States and how math education has evolved during the last century.
- ✓ Look at the different ways that students are doing math in Common Core classrooms so that you know what to expect when your child enters a certain grade.
- ✓ Get tips about your child's homework so that you're better prepared to help and can reduce any related stress.
- ✓ Comprehend the purpose of some nontraditional homework assignments that you may have seen on social media (or in your own child's backpack!) to avoid frustration on your part or your child's.

Chapter 1

The Lowdown on Common Core Math, Just the Basics

.....

In This Chapter

- ▶ Knowing what Common Core Math means
 - ▶ Getting tips on helping with homework
 - ▶ Developing math from kindergarten through high school
-

In recent years, news outlets have regularly covered stories on the math that students are learning in school. Whether the story is about international comparisons of student learning (“You must panic! The United States is falling behind!”) or the homework students bring home (“You must panic! Second graders are using number lines!”), these news stories have an element of urgency to them.

This urgency is understandable. Parents want their children to have the best possible opportunities in life and career. In a modern, technology-dependent society, a solid math background is an important part of creating those opportunities. People who struggle to work with numbers, spatial relationships, and algebra can’t find employment in sectors that rely on technology and science, and more industries than ever do rely on technology and science.

You can think beyond the employment picture and still be concerned with how your child learns math. Everyday life requires more thinking about quantities than in the past. Is this week’s cold weather evidence against global warming? Should I have my child vaccinated? What does it mean for my state’s budget if everyone buys more stuff online? To answer these questions confidently requires more comfort with numbers than you need to count change correctly — which

may have been a primary concern for citizens 100 years ago. You still need to count change correctly (or risk getting swindled on a daily basis!), but you need so much more than that to participate fully in the modern-day United States.

As of this writing, in 44 states and the District of Columbia — together totaling about 84 percent of the US population — have enacted the Common Core State Standards. Just like your child will need more math for career and citizenship than your grandparents needed, you need a bit more math than your grandparents did to understand what your child is doing in school. This chapter serves as your jumping-off point into the world of Common Core Math.

Understanding What Common Core Math Is

There really is no such thing as Common Core Math. Okay, you're scratching your head, so allow me to explain what I mean and why this book is so important.

In a Common Core classroom, students' ideas are center stage with the focus not on Common Core Math, but on student thinking. Teachers work every day to help students improve their thinking and to provide students with new ideas when they need them and when they're ready for them.

The Common Core Standards still require students to memorize addition and multiplication facts. They still require students to learn the standard algorithms and the Pythagorean theorem. None of those things have disappeared from the math curriculum. Instead, the role of student thinking has changed. Students' ideas are an important beginning place for math learning rather than being seen as an irrelevant distraction.

Many people in this country have experiences with school math that can be summarized as *rules without reasons*. They were told to *do this* in situation A, but *do that* in situation B. They never understood why and they struggled to remember whether to do *this* or *that* in situation A. And they struggled to tell situation A from situation B so they just applied what they hoped was the right rule in the right situation and prayed that they could earn enough partial credit to pass the test.

A quick story helps to illustrate. My mother-in-law, Lucie, is a fabulous woman. She wouldn't describe herself as a math person. While talking to her about math teaching (no one escapes that fate in my personal life), I asked her to calculate $1,001 - 2$. She thought for a moment and said 999. I asked her how she knew, and she said that she had learned it in school. I didn't believe that for a moment — there is no way this particular fact was one that she had to memorize in second grade, plus I could see that she thought for a moment before responding. When I pressed, she finally was able to say that she knew 1,000 was one less than 1,001, and so 999 was two less than 1,001.

We talked about her solution, and she noticed that she had done something different in her head than she would have done on paper. The way she solved $1,001 - 2$ was different from the way she was taught in school. For Lucie — and for far too many students — the methods taught in school are disconnected from the ways she thinks about numbers.

Lucie's way of finding $1,001 - 2$ wasn't Common Core Math. It was just good mathematical thinking. The standard algorithm (see Chapter 10) is a correct but seriously inefficient way of finding $1,001 - 2$. Similarly, it would be inefficient to use Lucie's strategy to find $1,001 - 999$ (you would have to count backwards from 1,001 until you got to 2).

Examining the Standards for Mathematical Practice

One unique aspect of the Common Core State Standards is that their focus goes beyond the familiar content of numbers, geometry, algebra, and statistics. They also include a set of Standards for Mathematical Practice that describe how people work when they're doing math. These standards apply across all grade levels, with kindergarteners operating at a level of sophistication appropriate to them and high school students working at a much more sophisticated level.

The list of Standards for Mathematical Practice is fairly long — there are eight of them — and they overlap in ways that make it challenging for the average non-math teacher to tell them apart. But they're important aspects of the work that children do in Common Core classrooms, so in this book,

I have boiled the Standards for Mathematical Practice down to four simple statements about what students at all grade levels should be doing in math class. In Chapter 3, I describe these four statements in detail and relate them to the eight standards from the Common Core.

Ask questions

Students should ask questions such as, “What if . . . ?”, “Why?” and “How do we know that?” They should also seek to answer these questions. These may not be the questions that you picture students asking in math class, but they’re really useful questions for learning more math.

Play

When children play, they make things up and try out things. They don’t worry about getting everything perfect. They repeat the same scenario many times, changing it a little bit each time to see what happens. They challenge themselves. They laugh.

All of this can happen in the math classroom, too. Math is challenging, but so are handstands, video games, and soccer. All of these activities involve risk-taking and exploration. Math should too. Often, the line between play and work is drawn with consequences. If an activity has high stakes, it isn’t so much fun and turns into work. A Common Core classroom has many opportunities for students to play with math: to try something new, to create challenges for themselves and others, and to get things wrong and try again.



Math has right answers, just as football has touchdowns. But not every game is for the championship, and not every math activity needs to be high stakes.

Argue

Arguing is a highly mathematical activity. A good argument has some agreed-upon starting point, has some rules for moving forward, and seeks to uncover the truth. In a Common Core classroom, students have to figure some things out for