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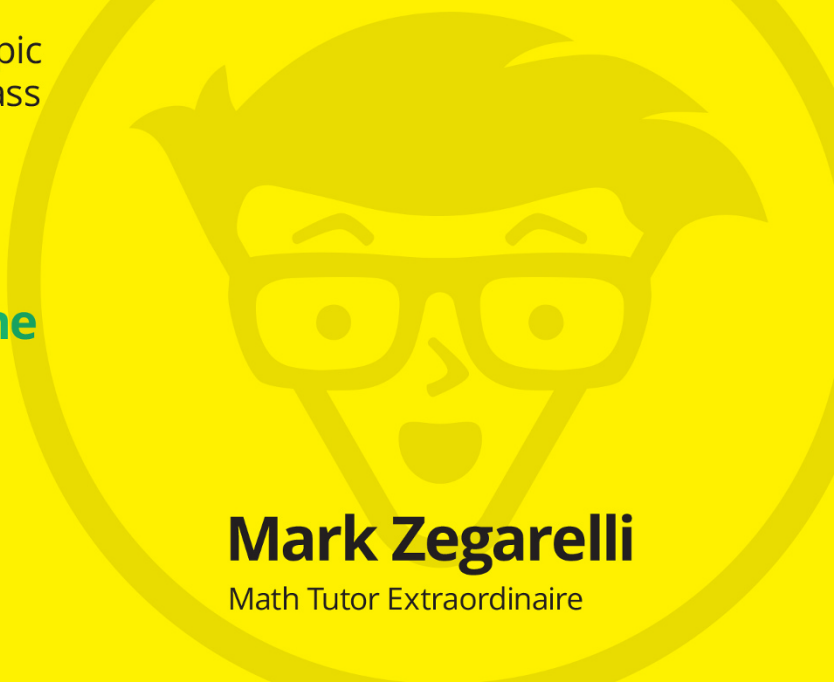

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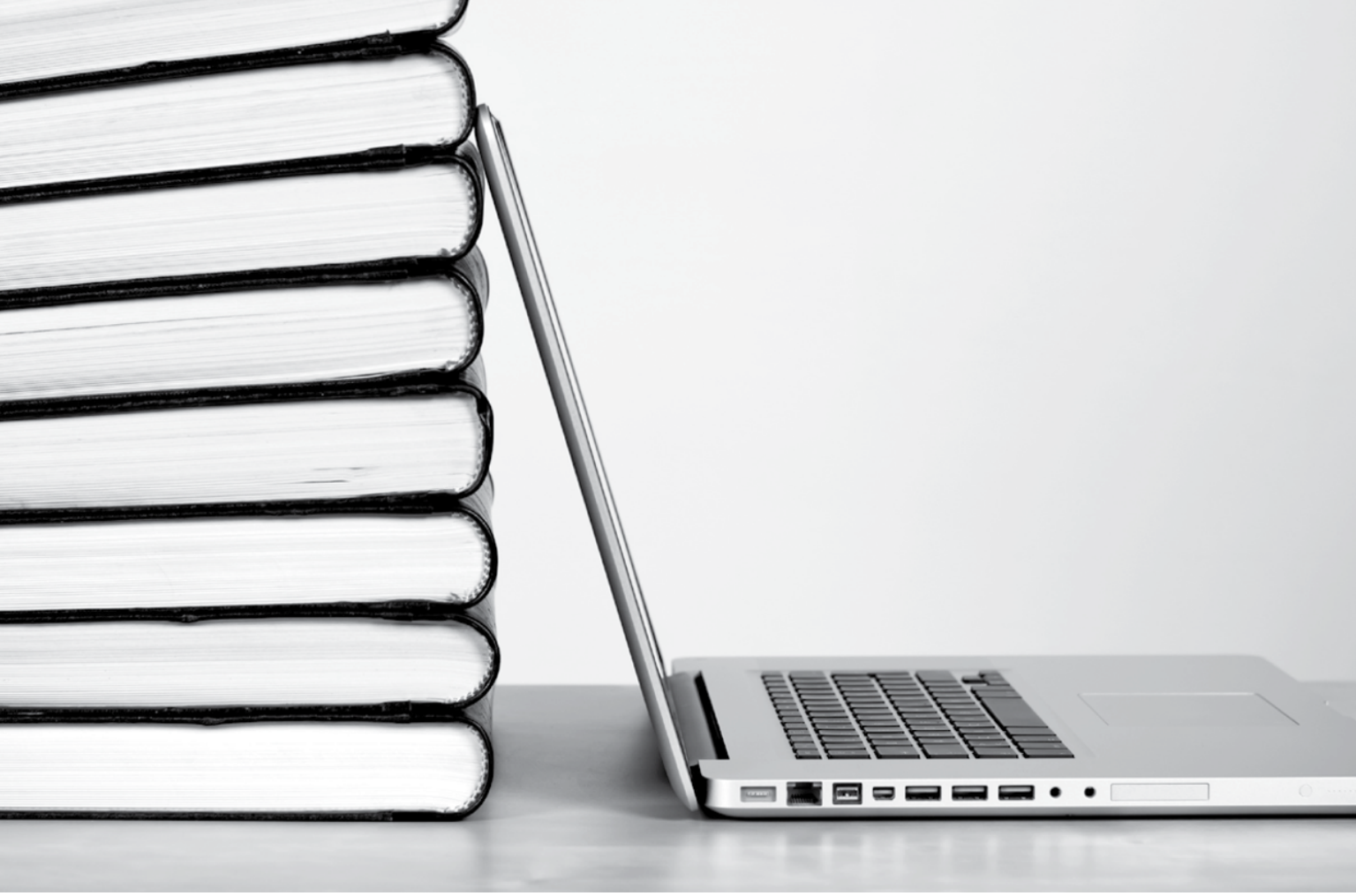
Math Tutor Extraordinaire



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by Mark Zegarelli

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# Contents at a Glance

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# Introduction

Are you kidding . . . 1,001 math problems, really?

That's right, a thousand questions plus one to grow on, here in your hot little hands. I've arranged them in order, starting with beginning arithmetic and ending with basic algebra. Topics include everything from the Big Four operations (adding, subtracting, multiplying, and dividing), through negative numbers and fractions, on to geometry and probability, and finally algebra — plus lots more!

Every chapter provides tips for solving the problems in that chapter. And, of course, the back of the book includes detailed explanations of the answers to every question. It's all here, so get to work!

## What You'll Find

This book includes 1,001 basic math and pre-algebra problems, divided into 22 chapters. Each chapter contains problems focusing on a single math topic, such as negative numbers, fractions, or geometry. Within each chapter, topics are broken into subtopics so that you can work on a specific type of math skill until you feel confident with it. Generally speaking, each section starts with easy problems, moves on to medium ones, and then finishes with hard problems.

You can jump right in anywhere you like and solve these problems in any order. You can also take on one chapter or section at a time, working from easy to medium to hard problems. Or, if you like, you can begin with Question 1 and move right through to Question 1,001.

Additionally, each chapter begins with a list of tips for answering the questions in that chapter. Every question in Part 1 is answered in Part 2, with a full explanation that walks you through how to understand, set up, and solve the problem.

## How This Workbook Is Organized

This workbook includes 1,001 questions in Part 1, and answers to all of these questions in Part 2.

# Part 1: Questions

Here are the topics covered by the 1,001 questions in this book:

- **Basic arithmetic:** In Chapters 1 through 5, you find dozens of basic arithmetic problems. Chapter 1 begins with rounding numbers and then moves on to basic calculating with addition, subtraction, multiplication, and division. Then, in Chapter 2, you tackle negative numbers, and in Chapter 3, you move on to working with powers and square roots. Chapter 4 gives you plenty of practice in solving arithmetic problems using the order of operations. You may remember this using the mnemonic PEMDAS — **P**arentheses, **E**xponents, **M**ultiplication and **D**ivision, **A**ddition and **S**ubtraction. Finally, in Chapter 5, you put all of this information together to answer arithmetic word problems, from easy to challenging.
- **Divisibility, factors, and multiples:** Chapters 6, 7, and 8 cover a set of topics related to divisibility. In Chapter 6, you discover a variety of divisibility tricks, which allow you to find out whether a number is divisible by another number without actually doing the division. You also work on division with remainders and discover the distinction between prime and composite numbers. Chapter 7 focuses on factors and multiples. You discover how to generate all the factors and prime factors of a number and calculate the greatest common factor (GCF) for a set of two or more numbers. Chapter 8 wraps up the section with word problems that sharpen and extend your skills at working with factors, multiples, remainders, and prime numbers.
- **Fractions, decimals, percents, and ratios:** Chapters 9 through 13 focus on four distinct ways to represent parts of a whole — fractions, decimals, percents, and ratios. In Chapter 9, you work with fractions, including increasing the terms of fractions and reducing them to lowest terms. You change improper fractions to mixed numbers, and vice versa. You add, subtract, multiply, and divide fractions, including mixed numbers. You also simplify complex fractions.

  In Chapter 10, you convert fractions to decimals, and vice versa. You add, subtract, multiply, and divide decimals, and you also find out how to work with repeating decimals. Chapter 11 focuses on percents. You convert fractions and multiples to percents, and vice versa. You discover a few tricks for calculating simple percents. You also work on more difficult percent problems by creating word equations, which can then be translated into equations and solved.

  Chapter 12 presents a variety of problems, including word problems, that use ratios and proportions. And in Chapter 13, you tackle even more word problems where you apply your skills working with fractions, decimals, and percents.
- **Scientific notation, weights and measures, geometry, graphs, statistics and probability, and sets:** In Chapters 14 through 19, you take a great stride forward as you begin working with a wide variety of intermediate math skills. In Chapter 14, the topic is scientific notation, which is used to represent very large and very small numbers. Chapter 15 introduces you to weights and measures, focusing on the English and metric systems, and conversions between the two systems. Chapter 16 gives you a huge number of geometry problems of every description, including both plane and solid geometry. In Chapter 17, you work with a variety of graphs, including bar graphs, pie charts, line graphs, pictographs, and the *xy*-graph that is used so much in algebra and later math. Chapter 18 gives you an introduction to basic statistics, including the mean, median, and mode. It also provides problems in probability and gives you an introduction to counting both independent and dependent events. Chapter 19 gives you some problems in basic set theory, including finding the union, intersection, relative complement, and complement. You also use Venn diagrams to solve word problems.

- **Algebraic expressions and equations:** To finish up, Chapters 20, 21, and 22 give you a taste of the work you'll be doing in your first algebra class. Chapter 20 shows you the basics of working with algebraic expressions, including evaluating, simplifying, and factoring. In Chapter 21, you solve basic algebraic equations. And in Chapter 22, you put these skills to use, solving a set of word problems with basic algebra.

## Part 2: Answers

In this part, you find answers to all 1,001 questions that appear in Part 1. Each answer contains a complete step-by-step explanation of how to solve the problem from beginning to end.

# Beyond the Book

In addition to what you're reading right now, this book comes with a free, access-anywhere Cheat Sheet that includes tips and other goodies you may want to have at your fingertips. To get this Cheat Sheet, simply go to `www.dummies.com` and type **Basic Math & Pre-Algebra 1001 Dummies Cheat Sheet** into the Search box.

The online practice that comes free with this book offers you the same 1,001 questions and answers that are available here, presented in a multiple-choice format. The beauty of the online problems is that you can customize your online practice to focus on the topic areas that give you trouble. If you're short on time and want to maximize your study, you can specify the quantity of problems you want to practice, pick your topics, and go. You can practice a few hundred problems in one sitting or just a couple dozen, and you can focus on a few types of problems or a mix of several types. Regardless of the combination you create, the online program keeps track of the questions you get right and wrong so you can monitor your progress and spend time studying exactly what you need to.

To gain access to the online practice, you simply have to register. Just follow these steps:

1. **Register your book or ebook at Dummies.com to get your PIN. Go to** `www.dummies.com/go/getaccess`
2. **Select your product from the drop-down list on that page.**
3. **Follow the prompts to validate your product, and then check your email for a confirmation message that includes your PIN and instructions for logging in.**

If you don't receive this email within two hours, please check your spam folder before contacting us through our Technical Support website at `http://support.wiley.com` or by phone at 877-762-2974.

Now you're ready to go! You can come back to the practice material as often as you want — simply log in with the username and password you created during your initial login. No need to enter the access code a second time.

Your registration is good for one year from the day you activate your PIN.

# Where to Go from Here

Every chapter in this book opens with tips for solving the problems in that chapter. And, of course, if you get stuck on any question, you can flip to the answer section and try to work through the solution provided. However, if you feel that you need a bit more basic math information than this book provides, I highly recommend my earlier book *Basic Math & Pre-Algebra For Dummies*. This book gives you a ton of useful information for solving every type of problem included here.

Additionally, you can also check out my *Basic Math & Pre-Algebra Workbook For Dummies*. It contains a nice mix of short explanations for how to do various types of problems, followed by practice. And, for a quick take on the most important basic math concepts, have a look at *Basic Math & Pre-Algebra Essentials For Dummies*. Yep, I wrote that one, too — how's that for shameless plugs?

# 1 The Questions

**IN THIS PART . . .**

One thousand and one math problems. That's one problem for every night in the *Arabian Nights* stories. That's almost ten problems for every floor in the Empire State Building. In short, that's a *lot* of problems — plenty of practice to help you attain the math skills you need to do well in your current math class. Here's an overview of the types of questions provided:

Basic arithmetic, including absolute value, negative numbers, powers, and square roots (Chapters 1–5)

Divisibility, factors, and multiples (Chapters 6–8)

Fractions, decimals, percents, and ratios (Chapters 9–13)

Scientific notation, measures, geometry, graphs, statistics, probability, and sets (Chapters 14–19)

Algebraic expressions and equations (Chapters 20–22)

Chapter 1

# The Big Four Operations

The Big Four operations (adding, subtracting, multiplying, and dividing) are the basis for all of arithmetic. In this chapter, you get plenty of practice working with these important operations.

## The Problems You'll Work On

Here are the types of problems you find in this chapter:

- Rounding numbers to the nearest ten, hundred, thousand, or million
- Adding columns of figures, including addition with carrying
- Subtracting one number from another, including subtraction with borrowing
- Multiplying one number by another
- Division, including division with a remainder

## What to Watch Out For

Here's a quick tip for rounding numbers to help you in this chapter: When rounding a number, check the number to the right of the place you're rounding to. If that number is from 0 to 4, round down by changing that number to 0. If that number is from 5 to 9, round up by changing that number to 0 and adding 1 to the number to its left.

For example, to round 7,654 to the nearest hundred, check the number to the right of the hundreds place. That number is 5, so change it to 0 and add 1 to the 6 that's to the left of it. Thus, 7,654 becomes 7,700.

## Rounding

**1–6**

**1.** Round the number 136 to the nearest ten.

**2.** Round the number 224 to the nearest ten.

**3.** Round the number 2,492 to the nearest hundred.

**4.** Round the number 909,090 to the nearest hundred.

**5.** Round the number 9,099 to the nearest thousand.

**6.** Round the number 234,567,890 to the nearest million.

## Adding, Subtracting, Multiplying, and Dividing

**7–30**

**7.** Add $47 + 21 = ?$

**8.** Add $136 + 53 + 77 = ?$

**9.** Add $735 + 246 + 1{,}329 = ?$

**10.** Add $904 + 1{,}024 + 6{,}532 + 883 = ?$

**11.** Add $56{,}702 + 821 + 5{,}332 + 89 + 343{,}111 = ?$

**12.** Add $1{,}609{,}432 + 657{,}936 + 82{,}844 + 2{,}579 + 459 = ?$

**13.** Subtract $89 - 54 = ?$

**14.** Subtract $373 - 52 = ?$

**15.** Subtract $539 - 367 = ?$

**16.** Subtract $2{,}468 - 291 = ?$

**17.** Subtract $34{,}825 - 26{,}492 = ?$

**18.** Subtract $71{,}002 - 56{,}234 = ?$

**19.** Multiply $458 \times 4 = ?$

**20.** Multiply $74 \times 35 = ?$

**21.** Multiply $129 \times 86 = ?$

**22.** Multiply $382 \times 67 = ?$

**23.** Multiply $9{,}876 \times 34 = ?$

**24.** Multiply $23{,}834 \times 1{,}597 = ?$

**25.** Divide $861 \div 3 = ?$

**26.** Divide $1{,}876 \div 7 = ?$

**27.** Divide $6{,}184 \div 15 = ?$

**28.** Divide $25{,}246 \div 22 = ?$

**29.** Divide $60{,}000 \div 53 = ?$

**30.** Divide $262{,}145 \div 256 = ?$

Chapter 2

# Less than Zero: Working with Negative Numbers

Negative numbers can be a cause of negativity for some students. The rules for working with negative numbers can be a little tricky. In this chapter, you practice applying the Big Four operations to negative numbers. You also strengthen your skills evaluating absolute value.

## The Problems You'll Work On

This chapter shows you how to work with the following types of problems:

- Subtracting a smaller number minus a larger number
- Adding and subtracting with negative numbers
- Multiplying and dividing with negative numbers
- Evaluating absolute value

## What to Watch Out For

Here are a few things to keep an eye out for when you're working with negative numbers:

- To subtract a smaller number minus a larger number, reverse and negate: *Reverse* by subtracting the larger number minus the smaller one, and then *negate* by attaching a minus sign (−) in front of the result. For example, $4 - 7 = -3$.
- To subtract a negative number minus a positive number, add and negate: *Add* the two numbers as if they were positive, then *negate* by attaching a minus sign in front of the result. For example, $-5 - 4 = -9$.
- To add a positive number and a negative number (in either order), subtract the larger number minus the smaller number; then attach the same sign to the result as the number that is farther from 0. For example, $-3 + 5 = 2$ and $4 + (-6) = -2$

# Adding and Subtracting Negative Numbers

**31–41**

**31.** Evaluate each of the following.

i. $3-6=$

ii. $7-12=$

iii. $14-15=$

iv. $2-16=$

v. $20-31=$

**32.** Evaluate each of the following.

i. $-7-4=$

ii. $-1-9=$

iii. $-9-6=$

iv. $-11-6=$

v. $-1-13=$

**33.** Evaluate each of the following.

i. $-5+8=$

ii. $-8+5=$

iii. $-14+1=$

iv. $-1+14=$

v. $-20+6=$

**34.** Evaluate each of the following.

i. $-2+(-8)=$

ii. $6+(-3)=$

iii. $-9+(-3)=$

iv. $15 + (-5) =$

v. $-19 + (-1) =$

**35.** Evaluate each of the following.

i. $4 - (-2) =$

ii. $-9 - (-1) =$

iii. $-10 - (-3) =$

iv. $8 - (-11) =$

v. $-3 - (-16) =$

**36.** $-29 + (-35) =$

**37.** $46 - (-89) =$

**38.** $81 + (-137) =$

**39.** $-212 - 942 =$

**40.** $1{,}024 - 2{,}543 =$

**41.** $-10{,}654 - (-289) =$

## Multiplying and Dividing Negative Numbers

**42–53**

**42.** Evaluate each of the following.

i. $-6 \times 9 =$

ii. $-8 \times (-7) =$

iii. $-9 \times (-7) =$

iv. $7 \times (-8) =$

v. $-9 \times (-6) =$

**43.** $-15 \times 9 =$

**44.** $-32 \times (-11) =$

**45.** $91 \times (-18) =$

**46.** $-7 \times (-6) \times 5 =$

**47.** $2 \times (-4) \times (-10) \times (-5) =$

**48.** $-1 \times (-2) \times 3 \times (-4) \times (-5) \times (-1) =$

**49.** Evaluate each of the following.

i. $35 \div (-5) =$

ii. $-28 \div (-4) =$

iii. $32 \div (-4) =$

iv. $-48 \div -6 =$

v. $-36 \div 6 =$

**50.** $176 \div (-8) =$

**51.** $-403 \div 13 =$

**52.** $-275 \div (-11) =$

**53.** $-1{,}054 \div (-17) =$

## Working with Absolute Value

**54–57**

**54.** Evaluate each of the following.

i. $|4 - 4| =$

ii. $|6-2|=$

iii. $|7-9|=$

iv. $|9-1|=$

v. $|1-8|=$

**55.** $|38-99|=$

**56.** $|206-88|=$

**57.** $|543-629|=$