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Basic Math & Pre-Algebra Workbook

3rd Edition with Online Practice

by Mark Zegarelli

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dummies[®]
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Basic Math & Pre-Algebra Workbook For Dummies®, 3rd Edition with Online Practice

Published by: **John Wiley & Sons, Inc.**, 111 River Street, Hoboken, NJ 07030-5774, www.wiley.com

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Published simultaneously in Canada

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Library of Congress Control Number: 2017932049

ISBN 978-1-119-35751-3 (pbk); ISBN 978-1-119-35752-0 (ebk); ISBN 978-1-119-35753-7 (ebk)

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

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Introduction

When you approach math correctly, it's almost always easier than you think. And a lot of the stuff that hangs you up when you first see it probably isn't all that scary after all. Lots of students feel they got lost somewhere along the way on the road between learning to count to ten and their first day in an algebra class — and this may be true whether you're 14 or 104. If this is you, don't worry. You're not alone, and help is right here!

Basic Math & Pre-Algebra Workbook For Dummies with Online Practice can give you the confidence and math skills you need to succeed in any math course you encounter on the way to algebra. One of the easiest ways to build confidence is to get experience working problems, allowing you to build those skills quickly. Everything in this book is designed to help clear the path on your math journey. Every section of every chapter contains a clear explanation of what you need to know, with plenty of practice problems and step-by-step solutions to every problem. Just grab a pencil, open this book to any page, and begin strengthening your math muscles!

About This Book

This book is for anyone who wants to improve his or her math skills. You may already be enrolled in a math class or preparing to register for one or simply studying on your own. In any case, practice makes perfect, and in this book you get plenty of practice solving a wide variety of math problems.

Each chapter covers a different topic in math: negative numbers, fractions, decimals, geometry, graphing, basic algebra — it's all here. In every section within a chapter, you find problems that allow you to practice a different skill. Each section features the following:

- » A brief introduction to that section's topic
- » An explanation of how to solve the problems in that section
- » Sample questions with answers that show you all the steps to solving the problem
- » Practice problems with space to work out your answer

Go ahead and write in this book — that's what it's for! When you've completed a problem or group of problems, flip to the end of the chapter. You'll find the correct answer followed by a detailed, step-by-step explanation of how to get there.

Although you can certainly work all the exercises in this book from beginning to end, you don't have to. Feel free to jump directly to whatever chapter has the type of problems you want to

practice. When you've worked through enough problems in a section to your satisfaction, feel free to jump to a different section. If you find the problems in a section too difficult, flip back to an earlier section or chapter to practice the skills you need — just follow the cross-references.

Foolish Assumptions

You probably realize that the best way to figure out math is by doing it. You only want enough explanation to get down to business so you can put your math skills to work right away. If so, you've come to the right place. If you're looking for a more in-depth discussion, including tips on how all these math concepts fit into word problems, you may want to pick up the companion book, *Basic Math & Pre-Algebra For Dummies*.

I'm willing to bet my last dollar on earth that you're ready for this book. I assume only that you have some familiarity with the basics of the number system and the Big Four operations (adding, subtracting, multiplying, and dividing). To make sure that you're ready, take a look at these four arithmetic problems and see whether you can answer them:

$$3 + 4 =$$

$$10 - 8 =$$

$$5 \times 5 =$$

$$20 \div 2 =$$

If you can do these problems, you're good to go!

Icons Used in This Book

Throughout this book, I highlight some of the most important information with a variety of icons. Here's what they all mean:



REMEMBER

This icon points out some of the most important pieces of information. Pay special attention to these details — you need to know them!



TIP

Tips show you a quick and easy way to do a problem. Try these tricks as you're solving the problems in that section.



WARNING

Warnings are math booby traps that unwary students often fall into. Reading these bits carefully can help you avoid unnecessary heartache.



EXAMPLE

This icon highlights the example problems that show you techniques before you dive into the exercises.

Beyond the Book

In addition to the book you're reading right now, be sure to check out the free Cheat Sheet for a set of quick reference notes including the order of operations, mathematical inequalities, basic algebra conventions, and more. To get this Cheat Sheet, simply go to www.dummies.com and search for "Basic Math & Pre-Algebra Workbook" in the Search box.

The online practice that comes free with this book contains extra practice questions that correspond with each chapter in the book. To gain access to the online practice, all you have to do is register. Just follow these simple 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 dropdown 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 do not 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 on 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

You can turn to virtually any page in this book and begin improving your math skills. Chapters 3 through 6 cover topics that tend to hang up math students: negative numbers, order of operations, factors and multiples, and fractions. A lot of what follows later in the book builds on these important early topics, so check them out. When you feel comfortable doing these types of problems, you have a real advantage in any math class.

Of course, if you already have a good handle on these topics, you can go anywhere you want (though you may still want to skim these chapters for some tips and tricks). My only advice is that you do the problems *before* reading the answer key!

And by all means, while you're at it, pick up *Basic Math & Pre-Algebra For Dummies*, which contains more-detailed explanations and a few extra topics not covered in this workbook. Used in conjunction, these two books provide a powerful one-two punch to take just about any math problem to the mat.

1

**Getting Started
with Basic Math
and Pre-Algebra**

IN THIS PART . . .

Understand place value.

Use the Big Four operations: addition, subtraction, multiplication, and division.

Calculate with negative numbers.

Simplify expressions using the order of operations (PEMDAS).

Work with factors and multiples.

IN THIS CHAPTER

- » Understanding how place value turns digits into numbers
- » Rounding numbers to the nearest ten, hundred, or thousand
- » Calculating with the Big Four operations: Adding, subtracting, multiplying, and dividing
- » Getting comfortable with long division

Chapter 1

We've Got Your Numbers

In this chapter, I give you a review of basic math, and I do mean basic. I bet you know a lot of this stuff already. So, consider this a trip down memory lane, a mini-vacation from whatever math you may be working on right now. With a really strong foundation in these areas, you'll find the chapters that follow a lot easier.

First, I discuss how the number system you're familiar with — called the *Hindu-Arabic number system* (or decimal numbers) — uses digits and place value to express numbers. Next, I show you how to round numbers to the nearest ten, hundred, or thousand.

After that, I discuss the Big Four operations: adding, subtracting, multiplying, and dividing. You see how to use the number line to make sense of all four operations. Then I give you practice doing calculations with larger numbers. To finish up, I make sure you know how to do long division both with and without a remainder.



REMEMBER

Some math books use a dot (\cdot) to indicate multiplication. In this book, I use the more familiar times sign (\times).

Getting in Place with Numbers and Digits

The number system used most commonly throughout the world is the Hindu-Arabic number system. This system contains ten *digits* (also called *numerals*), which are symbols like the letters A through Z. I'm sure you're quite familiar with them:

1 2 3 4 5 6 7 8 9 0

Like letters of the alphabet, individual digits aren't very useful. When used in combination, however, these ten symbols can build numbers as large as you like using *place value*. Place value assigns each digit a greater or lesser value depending upon where it appears in a number. Each place in a number is ten times greater than the place to its immediate right.



REMEMBER

Although the digit 0 adds no value to a number, it can act as a placeholder. When a 0 appears to the right of *at least one* nonzero digit, it's a placeholder. Placeholders are important for giving digits their proper place value. In contrast, when a 0 isn't to the right of any nonzero digit, it's a *leading zero*. Leading zeros are unnecessary and can be removed from a number.



EXAMPLE

Q. In the number 284, identify the ones digit, the tens digit, and the hundreds digit.

A. The ones digit is 4, the tens digit is 8, and the hundreds digit is 2.

Q. Place the number 5,672 in a table that shows the value of each digit. Then use this table and an addition problem to show how this number breaks down digit by digit.

A.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
			5	6	7	2

The numeral 5 is in the thousands place, 6 is in the hundreds place, 7 is in the tens place, and 2 is in the ones place, so here's how the number breaks down:

$$5,000 + 600 + 70 + 2 = 5,672$$

Q. Place the number 040,120 in a table that shows the value of each digit. Then use this table to show how this number breaks down digit by digit. Which 0s are placeholders, and which are leading zeros?

A.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
	0	4	0	1	2	0

The first 0 is in the hundred-thousands place, 4 is in the ten-thousands place, the next 0 is in the thousands place, 1 is in the hundreds place, 2 is in the tens place, and the last 0 is in the ones place, so

$$0 + 40,000 + 0 + 100 + 20 + 0 = 40,120$$

The first 0 is a leading zero, and the remaining 0s are placeholders.

1 In the number 7,359, identify the following digits:

- a. The ones digit
- b. The tens digit
- c. The hundreds digit
- d. The thousands digit

2 Place the number 2,136 in a table that shows the value of each digit. Then use this table to show how this number breaks down digit by digit.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

3 Place the number 03,809 in a table that shows the value of each digit. Then use this table to show how this number breaks down digit by digit. Which 0 is a placeholder and which is a leading zero?

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

4 Place the number 0,450,900 in a table that shows the value of each digit. Then use this table to show how this number breaks down digit by digit. Which 0s are placeholders and which are leading zeros?

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

Rollover: Rounding Numbers Up and Down



REMEMBER

Rounding numbers makes long numbers easier to work with. To round a two-digit number to the nearest ten, simply increase it or decrease it to the nearest number that ends in 0:

- » When a number ends in 1, 2, 3, or 4, bring it down; in other words, keep the tens digit the same and turn the ones digit into a 0.
- » When a number ends in 5, 6, 7, 8, or 9, bring it up; add 1 to the tens digit and turn the ones digit into a 0.

To round a number with more than two digits to the nearest ten, use the same method, focusing only on the ones and tens digits.

After you understand how to round a number to the nearest ten, rounding a number to the nearest hundred, thousand, or beyond is easy. Focus only on two digits: The digit in the place you're rounding to and the digit to its immediate right, which tells you whether to round up or down. All the digits to the right of the number you're rounding to change to 0s.

Occasionally when you're rounding a number up, a small change to the ones and tens digits affects the other digits. This is a lot like when the odometer in your car rolls a bunch of 9s over to 0s, such as when you go from 11,999 miles to 12,000 miles.



EXAMPLE

Q. Round the numbers 31, 58, and 95 to the nearest ten.

A. 30, 60, and 100.

The number 31 ends in 1, so round it down:

$$31 \rightarrow 30$$

The number 58 ends in 8, so round it up:

$$58 \rightarrow 60$$

The number 95 ends in 5, so round it up:

$$95 \rightarrow 100$$

Q. Round the numbers 742, 3,820, and 61,225 to the nearest ten.

A. 740, 3,820, and 61,230.

The number 742 ends in 2, so round it down:

$$7\text{4}2 \rightarrow 7\text{4}0$$

The number 3,820 already ends in 0, so no rounding is needed:

$$3,8\text{2}0 \rightarrow 3,8\text{2}0$$

The number 61,225 ends in 5, so round it up:

$$61,2\text{2}5 \rightarrow 61,2\text{3}0$$

5 Round these two-digit numbers to the nearest ten:

- a.** 29
- b.** 43
- c.** 75
- d.** 97

6 Round these numbers to the nearest ten:

- a.** 164
- b.** 765
- c.** 1,989
- d.** 9,999,995

7 Round these numbers to the nearest hundred:

- a.** 439
- b.** 562
- c.** 2,950
- d.** 109,974

8 Round these numbers to the nearest thousand:

- a.** 5,280
- b.** 77,777
- c.** 1,234,567
- d.** 1,899,999

Using the Number Line with the Big Four

The *number line* is just a line with numbers marked off at regular intervals. You probably saw your first number line when you were learning how to count to ten. In this section, I show you how to use this trusty tool to perform the Big Four operations (adding, subtracting, multiplying, and dividing) on relatively small numbers.

The number line can be a useful tool for adding and subtracting small numbers:

- » When you add, move *up* the number line, to the right.
- » When you subtract, move *down* the number line, to the left.

To multiply on the number line, start at 0 and count by the *first number* in the problem as many times as indicated by the *second number*.

To divide on the number line, first block off a segment of the number line from 0 to the *first number* in the problem. Then divide this segment evenly into the number of pieces indicated by the *second number*. The length of each piece is the answer to the division.

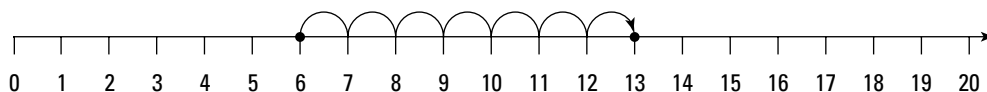


EXAMPLE

Q. Add $6 + 7$ on the number line.

A. **13.** The expression $6 + 7$ means *start at 6, up 7*, which brings you to 13 (see Figure 1-1).

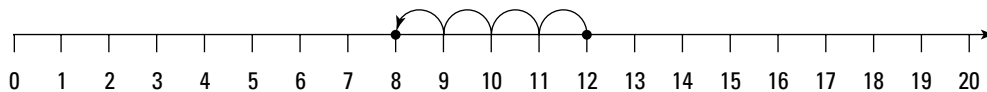
FIGURE 1-1
Adding
 $6 + 7 = 13$ on
the number
line.



Q. Subtract $12 - 4$ on the number line.

A. **8.** The expression $12 - 4$ means *start at 12, down 4*, which brings you to 8 (see Figure 1-2).

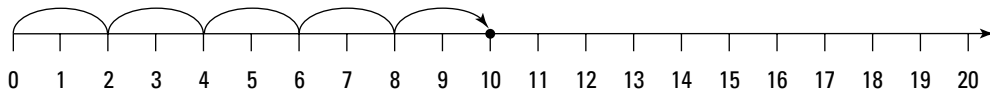
FIGURE 1-2
Subtracting
 $12 - 4 = 8$ on
the number
line.



Q. Multiply 2×5 on the number line.

A. **10.** Starting at 0, count by twos a total of five times, which brings you to 10 (see Figure 1-3).

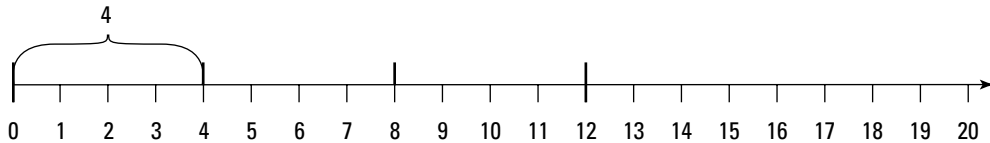
FIGURE 1-3
Multiplying
 $2 \times 5 = 10$
on the
number line.



Q. Divide $12 \div 3$ on the number line.

A. **4.** Block off the segment of the number line from 0 to 12. Now divide this segment evenly into three smaller pieces, as shown in Figure 1-4. Each of these pieces has a length of 4, so this is the answer to the problem.

FIGURE 1-4
Dividing
 $12 \div 3 = 4$
on the
number line.



9 Add the following numbers on the number line:

- a. $4 + 7 = ?$
- b. $9 + 8 = ?$
- c. $12 + 0 = ?$
- d. $4 + 6 + 1 + 5 = ?$

10 Subtract the following numbers on the number line:

- a. $10 - 6 = ?$
- b. $14 - 9 = ?$
- c. $18 - 18 = ?$
- d. $9 - 3 + 7 - 2 + 1 = ?$

11 Multiply the following numbers on the number line:

- a. 2×7
- b. 7×2
- c. 4×3
- d. 6×1
- e. 6×0
- f. 0×10

12 Divide the following numbers on the number line:

- a. $8 \div 2 = ?$
- b. $15 \div 5 = ?$
- c. $18 \div 3 = ?$
- d. $10 \div 10 = ?$
- e. $7 \div 1 = ?$
- f. $0 \div 2 = ?$

The Column Lineup: Adding and Subtracting

To add or subtract large numbers, stack the numbers on top of each other so that all similar digits (ones, tens, hundreds, and so forth) form columns. Then work from right to left. Do the calculations vertically, starting with the ones column, then going to the tens column, and so forth:

- » When you're adding and a column adds up to 10 or more, write down the ones digit of the result and carry the tens digit over to the column on the immediate left.
- » When you're subtracting and the top digit in a column is less than the bottom digit, borrow from the column on the immediate left.



EXAMPLE

Q. Add $35 + 26 + 142$.

A. **203.** Stack the numbers and add the columns from right to left:

$$\begin{array}{r} 11 \\ 35 \\ 26 \\ +142 \\ \hline 203 \end{array}$$

Notice that when I add the ones column ($5 + 6 + 2 = 13$), I write the 3 below this column and carry the 1 over to the tens column. Then, when I add the tens column ($1 + 3 + 2 + 4 = 10$), I write the 0 below this column and carry the 1 over to the hundreds column.

Q. Subtract $843 - 91$.

A. **752.** Stack the numbers and subtract the columns from right to left:

$$\begin{array}{r} 1 \\ 7\cancel{8}43 \\ -91 \\ \hline 752 \end{array}$$

When I try to subtract the tens column, 4 is less than 9, so I borrow 1 from the hundreds column, changing the 8 to 7. Then I place this 1 above the 4, changing it to 14. Now I can subtract $14 - 9 = 5$.

13 Add $129 + 88 + 35$.

14 Find the following sum: $1,734 + 620 + 803 + 32 = ?$

Multiplying Multiple Digits

To multiply large numbers, stack the first number on top of the second. Then multiply each digit of the bottom number, from right to left, by the top number. In other words, first multiply the top number by the ones digit of the bottom number. Then write down a 0 as a placeholder and multiply the top number by the tens digit of the bottom number. Continue the process, adding placeholders and multiplying the top number by the next digit in the bottom number.

When the result is a two-digit number, write down the ones digit and carry the tens digit to the next column. After multiplying the next two digits, add the number you carried over.

Add the results to obtain the final answer.



EXAMPLE

Q. Multiply 742×136 .

A. **100,912.** Stack the first number on top of the second:

$$\begin{array}{r} 742 \\ \times 136 \\ \hline \end{array}$$

Now multiply 6 by every number in 742, starting from the right. Because $2 \times 6 = 12$, a two-digit number, you write down the 2 and carry the 1 to the tens column. In the next column, you multiply $4 \times 6 = 24$, and add the 1 you carried over, giving you a total of 25. Write down the 5, and carry the 2 to the hundreds column. Multiply $7 \times 6 = 42$, and add the 2 you carried over, giving you 44:

$$\begin{array}{r} 1 \\ 742 \\ \times 136 \\ \hline 4452 \end{array}$$

Next, write down a 0 all the way to the right in the row below the one that you just wrote. Multiply 3 by every number in 742, starting from the right and carrying when necessary:

$$\begin{array}{r} 1 \\ 742 \\ \times 136 \\ \hline 4452 \\ 22260 \end{array}$$

Write down two 0s all the way to the right of the row below the one that you just wrote. Repeat the process with 1:

$$\begin{array}{r} 1 \\ 742 \\ \times 136 \\ \hline 4452 \\ 22260 \\ 74200 \end{array}$$

To finish, add up the results:

$$\begin{array}{r} 742 \\ \times 136 \\ \hline 4452 \\ 22260 \\ 74200 \\ \hline 100912 \end{array}$$

So $742 \times 136 = 100,912$.

17 Multiply 75×42 .

18 What's 136×84 ?

19 Solve $1,728 \times 405$.

20 Multiply $8,912 \times 767$.

Cycling through Long Division

To divide larger numbers, use *long division*. Unlike the other Big Four operations, long division moves from left to right. For each digit in the *divisor* (the number you're dividing), you complete a cycle of division, multiplication, and subtraction.

In some problems, the number at the very bottom of the problem isn't a 0. In these cases, the answer has a *remainder*, which is a leftover piece that needs to be accounted for. In those cases, you write r followed by whatever number is left over.



Q. Divide $956 \div 4$.

A. **239.** Start off by writing the problem like this:

$$4 \overline{)956}$$

To begin, ask how many times 4 goes into 9 — that is, what's $9 \div 4$? The answer is 2 (with a little left over), so write 2 directly above the 9. Now multiply 2×4 to get 8, place the answer directly below the 9, and draw a line beneath it:

$$\begin{array}{r} 2 \\ 4 \overline{)956} \\ \underline{8} \end{array}$$

Subtract $9 - 8$ to get 1. (*Note:* After you subtract, the result should be less than the divisor (in this problem, the divisor is 4). Then bring down the next number (5) to make the new number 15.

$$\begin{array}{r} 2 \\ 4 \overline{)956} \\ \underline{-8} \\ 15 \end{array}$$

These steps are one complete cycle. To complete the problem, you just need to repeat them. Now ask how many times 4 goes into 15 — that is, what's $15 \div 4$? The answer is 3 (with a little left over). So write the 3 above the 5, and then multiply 3×4 to get 12. Write the answer under 15.

$$\begin{array}{r} 23 \\ 4 \overline{)956} \\ \underline{-8} \\ 15 \\ \underline{-12} \end{array}$$

Subtract $15 - 12$ to get 3. Then bring down the next number (6) to make the new number 36.

$$\begin{array}{r} 23 \\ 4 \overline{)956} \\ \underline{-8} \\ 15 \\ \underline{-12} \\ 36 \end{array}$$

Another cycle is complete, so begin the next cycle by asking how many times 4 goes into 36 — that is, what's $36 \div 4$? The answer this time is 9. Write down 9 above the 6, multiply 9×4 , and place this below the 36.

$$\begin{array}{r} 239 \\ 4 \overline{)956} \\ \underline{-8} \\ 15 \\ \underline{-12} \\ 36 \\ \underline{-36} \end{array}$$

Now subtract $36 - 36 = 0$. Because you have no more numbers to bring down, you're finished, and the answer (that is, the *quotient*) is the very top number of the problem:

$$\begin{array}{r} 239 \\ 4 \overline{)956} \\ \underline{-8} \\ 15 \\ \underline{-12} \\ 36 \\ \underline{-36} \\ 0 \end{array}$$



EXAMPLE

Q. Divide $3,042 \div 5$.**A.** **608 r 2.** Start off by writing the problem like this:

$$5 \overline{)3042}$$

To begin, ask how many times 5 goes into 3. The answer is 0 — because 5 doesn't go into 3 — so write a 0 above the 3. Now you need to ask the same question using the first *two* digits of the divisor: How many times does 5 go into 30 — that is, what's $30 \div 5$? The answer is 6, so place the 6 over the 0. Here's how to complete the first cycle:

$$\begin{array}{r} 06 \\ 5 \overline{)3042} \\ \underline{-30} \\ 04 \end{array}$$

Next, ask how many times 5 goes into 4. The answer is 0 — because 5 doesn't go into 4 — so write a 0 above the 4. Now bring down the next number (2), to make the number 42:

$$\begin{array}{r} 060 \\ 5 \overline{)3042} \\ \underline{-30} \\ 042 \end{array}$$

Ask how many times 5 goes into 42 — that is, what's $42 \div 5$? The answer is 8 (with a little bit left over), so complete the cycle as follows:

$$\begin{array}{r} 0608 \\ 5 \overline{)3042} \\ \underline{-30} \\ 042 \\ \underline{-40} \\ 2 \end{array} \quad \begin{array}{l} \leftarrow \text{quotient} \\ \leftarrow \text{remainder} \end{array}$$

Because you have no more numbers to bring down, you're finished. The answer (quotient) is at the top of the problem (you can drop the leading 0), and the remainder is at the bottom of the problem. So $3,042 \div 5 = 608$ with a remainder of 2. To save space, write this answer as 608 r 2.

21 Divide $741 \div 3$.22 Evaluate $3,245 \div 5$.23 Figure out $91,390 \div 8$.24 Find $792,541 \div 9$.

Solutions to We've Got Your Numbers

The following are the answers to the practice questions presented in this chapter.

- 1 Identify the ones, tens, hundreds, and thousands digit in the number 7,359.

- a. **9** is the ones digit.
- b. **5** is the tens digit.
- c. **3** is the hundreds digit.
- d. **7** is the thousands digit.

- 2 $2,000 + 100 + 30 + 6 = 2,136$

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
			2	1	3	6

- 3 $0 + 3,000 + 800 + 0 + 9 = 3,809$. The first 0 is the leading zero, and the second 0 is the placeholder.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
		0	3	8	0	9

- 4 $0 + 400,000 + 50,000 + 0 + 900 + 0 + 0 = 450,900$. The first 0 is a leading zero, and the remaining three 0s are placeholders.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
0	4	5	0	9	0	0

- 5 Round to the nearest ten:

- a. $29 \rightarrow 30$. The ones digit is 9, so round up.
- b. $43 \rightarrow 40$. The ones digit is 3, so round down.
- c. $75 \rightarrow 80$. The ones digit is 5, so round up.
- d. $97 \rightarrow 100$. The ones digit is 7, so round up, rolling 9 over.

- 6 Round to the nearest ten:

- a. $164 \rightarrow 160$. The ones digit is 4, so round down.
- b. $765 \rightarrow 770$. The ones digit is 5, so round up.
- c. $1,989 \rightarrow 1,990$. The ones digit is 9, so round up.
- d. $9,999,995 \rightarrow 10,000,000$. The ones digit is 5, so round up, rolling all of the 9s over.

- 7 Focus on the hundreds and tens digits to round to the nearest hundred.
- a. $\underline{4}39 \rightarrow \underline{400}$. The tens digit is 3, so round down.
 - b. $\underline{5}62 \rightarrow \underline{600}$. The tens digit is 6, so round up.
 - c. $2,\underline{9}50 \rightarrow \underline{3,000}$. The tens digit is 5, so round up.
 - d. $109,\underline{9}74 \rightarrow \underline{110,000}$. The tens digit is 7, so round up, rolling over all the 9s.
- 8 Focus on the thousands and hundreds digits to round to the nearest thousand.
- a. $5,\underline{2}80 \rightarrow \underline{5,000}$. The hundreds digit is 2, so round down.
 - b. $77,\underline{7}77 \rightarrow \underline{78,000}$. The hundreds digit is 7, so round up.
 - c. $1,\underline{234},\underline{5}67 \rightarrow \underline{1,235,000}$. The hundreds digit is 5, so round up.
 - d. $1,\underline{899},\underline{9}99 \rightarrow \underline{1,900,000}$. The hundreds digit is 9, so round up, rolling over all the 9s to the left.
- 9 Add on the number line.
- a. $4 + 7 = 11$. The expression $4 + 7$ means *start at 4, up 7*, which brings you to 11.
 - b. $9 + 8 = 17$. The expression $9 + 8$ means *start at 9, up 8*, which brings you to 17.
 - c. $12 + 0 = 12$. The expression $12 + 0$ means *start at 12, up 0*, which brings you to 12.
 - d. $4 + 6 + 1 + 5 = 16$. The expression $4 + 6 + 1 + 5$ means *start at 4, up 6, up 1, up 5*, which brings you to 16.
- 10 Subtract on the number line.
- a. $10 - 6 = 4$. The expression $10 - 6$ means *start at 10, down 6*, which brings you to 4.
 - b. $14 - 9 = 5$. The expression $14 - 9$ means *start at 14, down 9*, which brings you to 5.
 - c. $18 - 18 = 0$. The expression $18 - 18$ means *start at 18, down 18*, which brings you to 0.
 - d. $9 - 3 + 7 - 2 + 1 = 12$. The expression $9 - 3 + 7 - 2 + 1$ means *start at 9, down 3, up 7, down 2, up 1*, which brings you to 12.
- 11 Multiply on the number line.
- a. $2 \times 7 = 14$. Starting at 0, count by twos a total of seven times, which brings you to 14.
 - b. $7 \times 2 = 14$. Starting at 0, count by sevens a total of two times, which brings you to 14.
 - c. $4 \times 3 = 12$. Starting at 0, count by fours a total of three times, which brings you to 12.
 - d. $6 \times 1 = 6$. Starting at 0, count by sixes one time, which brings you to 6.
 - e. $6 \times 0 = 0$. Starting at 0, count by sixes zero times, which brings you to 0.
 - f. $0 \times 10 = 0$. Starting at 0, count by zeros a total of ten times, which brings you to 0.