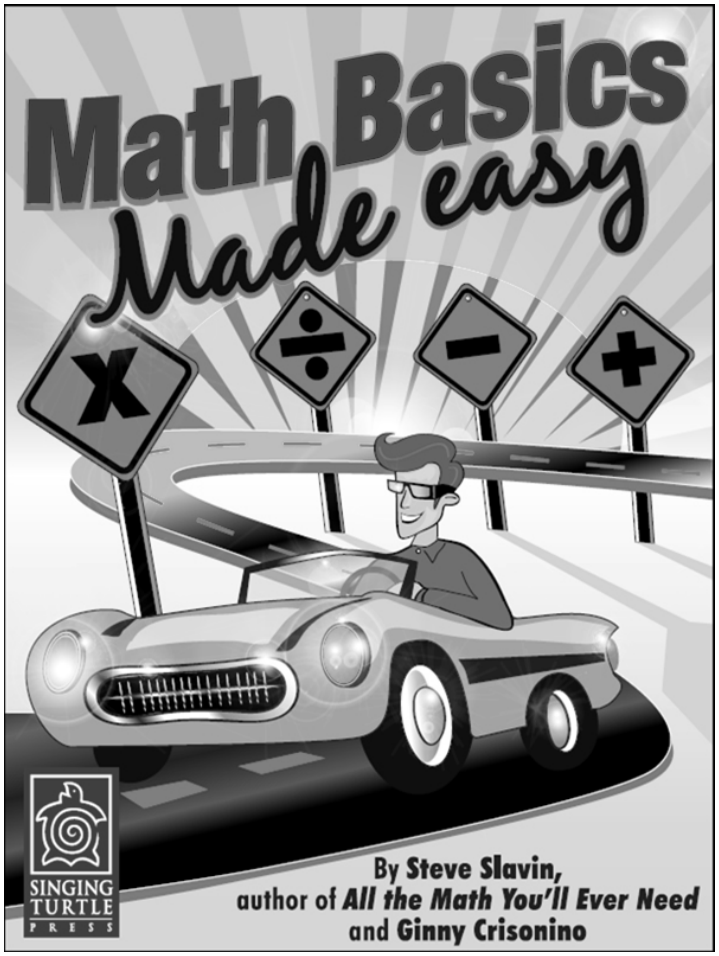
Math Basics
Made easy
By Steve Slavin,
author of All the Math You'll Ever Need
and Ginny Crisonino
SINGING
TURTLE
PRESS

Math Basics Made Easy

Teach Yourself How to Add, Subtract, Multiply and Divide

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SINGING TURTLE PRESS
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Slavin and Crisonino are the coauthors of:

Precalculus: A Self-Teaching Guide (John Wiley and Sons)

Geometry: A Self-Teaching Guide (John Wiley and Sons)

Basic Mathematics (Pi r Squared Publishers)

Basic Algebra (Pi r Squared Publishers)

Preface

We've got some good news and some bad news. The bad news is that about half of all American adults cannot do simple arithmetic. It's not that they're incapable of adding, subtracting, multiplying, and dividing. The problem is that they never learned how to perform these simple arithmetic operations. After all, isn't that what calculators are for?

And the good news? We can teach you how to add, subtract, multiply, and divide in just a few months. That's right! You can learn four years of math just by working your way through this book.

With ***Back to Basics*** you get four books for the price of one, beginning with *The Book of Addition*. Once you've mastered addition, you'll go on to *The Book of Subtraction*, then to *The Book of Multiplication*, and finally, to *The Book of Division*.

So what are we waiting for? Let's get started!

The Book of Addition

Introduction

Learning mathematics is a lot like building a house. Without a good foundation, the house falls down. Addition, subtraction, multiplication, and division are the basic building blocks of mathematics. When you have completed this book, you will be very good at addition. And after working your way through our next three books, you will have a very solid mathematical foundation. After that, there'll be no stopping you.

Back in the good old days when the authors went to elementary school, nearly everyone learned arithmetic. Regretfully, that's no longer the case. Today one out of two children falls so far behind by the end of the second grade that they can never catch up.

Because we really do go back to basics, you'll soon have a solid mathematical foundation. And who knows? Maybe someday, when asked to rate your mathematical skills, you'll give them a perfect 10.

There's just one thing you'll need before we get started – a pack of 3" by 5" index cards. You'll need these to make flash cards, with a math question on the front and the answer on the back. But if you want to get started right now, you can just cut up a file folder, or even a piece of paper.

There are only two rules we'll ask you to follow:

Rule number one: You may not use a calculator. Using a calculator interferes with your learning math. So just give it away, because you're not going to need it any more.

Rule number two: Since you're going to be working your way through this book, you'll need to be confident that you understand what you're doing. If something isn't clear, then go over it until it is.

For example, in Chapter 1, you MUST learn to add two single-digit numbers. No ifs, ands or buts. You'll need to know how to add these numbers WITHOUT a calculator. In fact, by the time you get to the end of ***Back to Basics***, you'll have made a great discovery: Your brain actually IS a calculator. Once you've got it up and running, there's no telling how far your brain will take you. You may even discover that you are a mathematical genius.

Chapter 1

Adding Two Single-Digit Numbers

This is, by far, the most important chapter in ***The Book of Addition.*** You're going to find out just how well you can add. But before we start, you MUST put away your pocket calculator. We promise that you will not need it even once while you work your way through the entire book.

Back in the good old days, by which we mean the 1940's and 1950's, in the first grade nearly every child in America was forced to learn the addition table all the way up to 10 + 10. That happened to be an excellent idea. You'll find this table on the next page. Take a fast look at it. Then we're going to find out if you know the entire table.

Addition Table: Single-Digit Numbers

+	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
2	3	4	5	6	7	8	9	10	11	12
3	4	5	6	7	8	9	10	11	12	13
4	5	6	7	8	9	10	11	12	13	14
5	6	7	8	9	10	11	12	13	14	15
6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18	19
10	11	12	13	14	15	16	17	18	19	20

It’s extremely important for you to know the answers to all 100 problems in this table. Chances are you already know nearly all of them, but we need to make sure. If you can’t add properly, you can’t do math. It’s that simple. So please turn to the next page and take Self-Test 1. After you’ve done all the problems, you’ll be able to check your work by looking at the answers on the facing page. Circle any problems you get wrong. But remember: no peeking at the answers until you’ve finished the entire test. This is very important, because if you peek, you won’t find out what you know and what you don’t know.

Self-Test 1

(1) 6 + 4 = _____	(2) 7 + 8 = _____	(3) 3 + 9 = _____
(4) 10 + 10 = _____	(5) 8 + 3 = _____	(6) 4 + 3 = _____
(7) 6 + 10 = _____	(8) 9 + 2 = _____	(9) 8 + 9 = _____
(10) 9 + 6 = _____	(11) 7 + 7 = _____	(12) 4 + 8 = _____
(13) 1 + 10 = _____	(14) 4 + 7 = _____	(15) 3 + 5 = _____
(16) 6 + 6 = _____	(17) 5 + 4 = _____	(18) 9 + 9 = _____
(19) 6 + 7 = _____	(20) 5 + 9 = _____	(21) 4 + 4 = _____
(22) 9 + 7 = _____	(23) 10 + 3 = ____	(24) 8 + 6 = _____
(25) 5 + 5 = _____	(26) 3 + 7 = ____	(27) 4 + 9 = _____
(28) 3 + 3 = _____	(29) 1 + 10 = _____	(30) 8 + 2 = _____
(31) 1 + 7 = _____	(32) 4 + 5 = _____	(33) 10 + 7 = _____
(34) 2 + 6 = _____	(35) 6 + 5 = _____	(36) 4 + 10 = _____
(37) 9 + 3 = _____	(38) 5 + 7 = _____	(39) 7 + 9 = _____
(40) 9 + 5 = _____	(41) 7 + 6 = _____	(42) 10 + 8 = _____
(43) 6 + 9 = _____	(44) 8 + 8 = _____	(45) 7 + 5 = _____
(46) 5 + 8 = _____	(47) 10 + 9 = _____	(48) 2 + 5 = _____
(49) 6 + 4 = _____	(50) 9 + 8 = _____	(51) 5 + 6 = _____
(52) 3 + 6 = _____	(53) 8 + 7 = _____	(54) 7 + 4 = _____

Answers to Self-Test 1

(1) 10	(2) 15	(3) 12	(4) 20	(5) 11	(6) 7
(7) 16	(8) 11	(9) 17	(10) 15	(11) 14	(12) 12
(13) 11	(14) 11	(15) 8	(16) 12	(17) 9	(18) 18
(19) 13	(20) 14	(21) 8	(22) 16	(23) 13	(24) 14
(25) 10	(26) 10	(27) 13	(28) 6	(29) 11	(30) 10
(31) 8	(32) 9	(33) 17	(34) 8	(35) 11	(36) 14
(37) 12	(38) 12	(39) 16	(40) 14	(41) 13	(42) 18
(43) 15	(44) 16	(45) 12	(46) 13	(47) 19	(48) 7
(49) 10	(50) 17	(51) 11	(52) 9	(53) 15	(54) 11

How did you do? If you got everything right, you can skip the rest of the chapter and go directly to Chapter 2.

If you got no more than five problems wrong, you're just a little rusty. All you need to do is memorize the answers to the problems you got wrong.

Write each of these problems on separate index cards – or even on scraps of paper – and then, on the back, write down the correct answer. Use these flash cards to test yourself until you're confident that you have learned the correct answer to each of these problems.

If you got more than five problems wrong, we'd like you to retake Self-Test 1. There's a fresh copy of the test on the next page. Then, once again, check your answers, circling any problems with incorrect answers.

Retest: Self-Test 1

(1)	6 + 4 = _____	(2)	7 + 8 = _____	(3)	3 + 9 = _____
(4)	10 + 10 = _____	(5)	8 + 3 = _____	(6)	4 + 3 = _____
(7)	6 + 10 = _____	(8)	9 + 2 = _____	(9)	8 + 9 = _____
(10)	9 + 6 = _____	(11)	7 + 7 = _____	(12)	4 + 8 = _____
(13)	1 + 10 = _____	(14)	4 + 7 = _____	(15)	3 + 5 = _____
(16)	6 + 6 = _____	(17)	5 + 4 = _____	(18)	9 + 9 = _____
(19)	6 + 7 = _____	(20)	5 + 9 = _____	(21)	4 + 4 = _____
(22)	9 + 7 = _____	(23)	10 + 3 = ____	(24)	8 + 6 = _____
(25)	5 + 5 = _____	(26)	3 + 7 = ____	(27)	4 + 9 = _____
(28)	3 + 3 = _____	(29)	1 + 10 = _____	(30)	8 + 2 = _____
(31)	1 + 7 = _____	(32)	4 + 5 = _____	(33)	10 + 7 = _____
(34)	2 + 6 = _____	(35)	6 + 5 = _____	(36)	4 + 10 = _____
(37)	9 + 3 = _____	(38)	5 + 7 = _____	(39)	7 + 9 = _____
(40)	9 + 5 = _____	(41)	7 + 6 = _____	(42)	10 + 8 = _____
(43)	6 + 9 = _____	(44)	8 + 8 = _____	(45)	7 + 5 = _____
(46)	5 + 8 = _____	(47)	10 + 9 = _____	(48)	2 + 5 = _____
(49)	6 + 4 = _____	(50)	9 + 8 = _____	(51)	5 + 6 = _____
(52)	3 + 6 = _____	(53)	8 + 7 = _____	(54)	7 + 4 = _____

Retest: Answers to Self-Test 1

(1) 10	(2) 15	(3) 12	(4) 20	(5) 11	(6) 7
(7) 16	(8) 11	(9) 17	(10) 15	(11) 14	(12) 12
(13) 11	(14) 11	(15) 8	(16) 12	(17) 9	(18) 18
(19) 13	(20) 14	(21) 8	(22) 16	(23) 13	(24) 14
(25) 10	(26) 10	(27) 13	(28) 6	(29) 11	(30) 10
(31) 8	(32) 9	(33) 17	(34) 8	(35) 11	(36) 14
(37) 12	(38) 12	(39) 16	(40) 14	(41) 13	(42) 18
(43) 15	(44) 16	(45) 12	(46) 13	(47) 19	(48) 7
(49) 10	(50) 17	(51) 11	(52) 9	(53) 15	(54) 11

How did you do this time? Hopefully you got at least a few more right answers.

What we'd like you to do now is compare your results that you got the first time you took Self-Test 1 with those when you took it again. Were there some problems you got wrong both times? Those are the ones you'll need to go over several times.

Use an index card for each problem you got wrong on the first test as well as for each problem you got wrong the second time you took the test. On the back of each card, please write the correct answer to the problem.

You now have a set of flash cards for all the problems that gave you trouble. But look at the bright side: The problems you got right both times you took the test are the ones you've got down cold. You won't have to look at them again.

If you've been doing all this without a break, please take some time off. As we shall repeat from time to time, "Rome wasn't built in a day." When you have completed ***Back to Basics***, you will have mastered a few years of math in a very short time. So let's not rush things.

Once you return to your flash cards, just keep testing yourself. Very soon you'll find that you have learned the answers to all the problems. You'll then be ready to move on to Chapter 2.

Chapter 2

Adding Double- and Triple-Digit Numbers

This chapter is so easy, we're embarrassed to include it. But it's the next logical step in addition.

Self-Test 2

Add these numbers:

(1) 22 56	(2) 41 27	(3) 80 19	(4) 53 44	(5) 75 23
(6) 36 50	(7) 71 26	(8) 42 45	(9) 55 24	(10) 87 12

Answers to Self-Test 2

(1) 78	(2) 68	(3) 99	(4) 97	(5) 98
(6) 86	(7) 97	(8) 87	(9) 79	(10) 99

Before we go any further, let's look at adding 0 to a number. We actually did that in problems 3 and 6 of Self-Test 2.

- How much is 0 + 4?

  We're sure you know that the answer is 4.

- Next question: How much is 10 + 0?

  The answer is 10.

  In fact, *any* number plus 0 is that number. Therefore:

1 + 0 = 1
3 + 0 = 3
0 + 5 = 0

Now let's try adding a couple of three-digit numbers:

```
 106
+473
```

Solution:

```
 106
+473
 579
```

Are you ready for another ridiculously easy set of problems?

Self-Test 3

(1) 175 + 824	(2) 307 + 481	(3) 215 + 683	(4) 414 + 170	(5) 600 + 287
(6) 550 + 249	(7) 208 + 791	(8) 315 + 410	(9) 510 + 274	(10) 723 + 265

Answers to Self-Test 3

(1) 999	(2) 788	(3) 898	(4) 584	(5) 887
(6) 799	(7) 999	(8) 725	(9) 784	(10) 988

We know you got every one of these right. So let’s go on to Chapter 3.

Chapter 3

Adding Three Single-Digit Numbers

This is known as adding in your head – or mental math. It sometimes helps to talk to yourself as you're doing the math. Let's say you need to add 4 + 5 + 6. You would say, 4 + 5 = 9; 9 + 6 = 15. Or, you could say, 4 and 5 is 9; 9 and 6 are 15. Get it? Got it. Good! Then go ahead and do the next self-test.

Self-Test 4

Do these addition problems:

(1) 2 6 4	(2) 5 4 5	(3) 3 2 7	(4) 6 3 9	(5) 1 6 7
(6) 9 3 1	(7) 1 8 9	(8) 5 5 5	(9) 4 6 8	(10) 2 5 4
(11) 5 7 1	(12) 8 5 7	(13) 2 9 5	(14) 7 6 6	(15) 9 2 3

Answers to Self-Test 4

(1) 12	(2) 14	(3) 12	(4) 18	(5) 14
(6) 13	(7) 18	(8) 15	(9) 18	(10) 11
(11) 13	(12) 20	(13) 16	(14) 19	(15) 14

Did you get everything right? If you did, then go directly to Chapter 4. If not, then please copy over any problems you missed and do them again.

OK, did you get everything right this time? If you did, then go on to Chapter 4. If not, you definitely need to go back to Chapter 1 and make sure you learn the entire addition table. Keep testing yourself with flash cards until you do.

Once you've done this, try retaking Self-Test 4. We are confident that you'll ace it.

Chapter 4

Writing Numbers in Expanded Form

A three-digit number, like 384, can be written in an expanded form, which breaks it down into hundreds, tens, and ones, or units. So 384 can be written as 3 hundreds + 8 tens + 4 ones.

Can you write the number 79 in expanded form?

It would be 7 tens and 9 ones. Now you're ready for another self-test.

Self-Test 5

Write each of these numbers in expanded form.

(1) 46

(2) 175

(3) 496

(4) 80

(5) 214

(6) 591

(7) 600

(8) 837

(9) 703

(10) 530

Answers to Self-Test 5

(1) 4 tens + 6 ones

(2) 1 hundred + 7 tens + 5 ones

(3) 4 hundreds + 9 tens + 6 ones

(4) 8 tens + 0 ones

(5) 2 hundreds + 1 ten + 4 ones

(6) 5 hundreds + 9 tens + 1 one

(7) 6 hundreds + 0 tens + 0 ones

(8) 8 hundreds + 3 tens + 7 ones

(9) 7 hundreds + 0 tens + 3 ones

(10) 5 hundreds + 3 tens + 0 ones

Chapter 5

Adding with Carrying

If you had two quarters, how much money would you have?

That was an easy one: You'd have 50 cents. Let's write it out:

$$\begin{array}{r} 25 \\ +\ 25 \\ \hline 50 \end{array}$$

You just did addition with carrying. Let's do this problem step-by-step:

$$\begin{array}{r} {\scriptstyle 1} \\ 25 \\ +\ 25 \\ \hline 0 \end{array}$$

Step 1: 5 + 5 = 10
Step 2: Write the 0 in the ones' column and place the 1 over the tens' column.

$$\begin{array}{r} {\scriptstyle 1} \\ 25 \\ +\ 25 \\ \hline 50 \end{array}$$

Step 3: Add the tens' column: 1 + 2 + 2 = 5

That was so much fun, let's work out another problem:

$$\begin{array}{r} 37 \\ +\ 59 \\ \hline \end{array}$$

Solution:

1 37 + 59 6	Step 1: 7 + 9 = 16	Write down the 6 in the ones' column and carry the 1 to the tens' column.
1 37 + 59 96	Step 2: 1 + 3 + 5 = 9	Add the tens' column.

Let's do one more:

42 + 29		
1 42 + 29 1	Step 1: 2 + 9 = 11	Write the first 1 in the ones' column and carry the other 1 to the tens' column.
1 42 + 29 71	Step 2: 1 + 4 + 2 = 7	Add the tens' column.

Are you getting the hang of it? As you do more of these problems, carrying will become second nature to you.

Self-Test 6

Please do each of these addition problems:

(1) 49 34	(2) 18 26	(3) 55 37	(4) 24 16	(5) 61 29
(6) 53 28	(7) 29 17	(8) 75 15	(9) 47 36	(10) 16 59
(11) 77 14	(12) 15 67	(13) 46 39	(14) 38 47	(15) 27 19

Answers to Self-Test 6

(1) 83	(2) 44	(3) 92	(4) 40	(5) 90
(6) 81	(7) 46	(8) 90	(9) 83	(10) 75
(11) 91	(12) 82	(13) 85	(14) 85	(15) 46

Did you get everything right? If you did, then you may skip the rest of this chapter and go directly to Chapter 6. If you got any problems wrong, you'll get some more practice by doing Self-Test 7.

Self-Test 7

Please do these addition problems:

(1) 16 39	(2) 43 47	(3) 56 35	(4) 75 18	(5) 27 48
(6) 37 48	(7) 46 26	(8) 22 39	(9) 57 27	(10) 19 63
(11) 34 57	(12) 28 43	(13) 48 35	(14) 65 28	(15) 17 77

Answers to Self-Test 7

(1) 55	(2) 90	(3) 91	(4) 93	(5) 75
(6) 85	(7) 72	(8) 61	(9) 84	(10) 82
(11) 91	(12) 71	(13) 83	(14) 93	(15) 94

Did you get all the problems right this time? If you did, go on to Chapter 6. If you got any wrong, please copy them over on a blank sheet of paper. Also copy over any problems you got wrong in Self-

Test 6. Chances are, you’ll do much better. Then you’ll be ready to tackle Chapter 6.

Chapter 6

Adding Three-Digit Numbers

We hope you're ready to add into the hundreds, because that's what we'll be doing. See what you can do with *this* problem, and then use our solution to check your work.

```
  349
+ 265
```

Solution:

```
  1
 349
+ 265
   4
```

Step 1: 9 + 5 = 14

Write down the 4 and carry the 1 to the tens' column.

```
 11
 349
+ 265
  14
```

Step 2: 1 + 4 + 6 = 11

Write down the 1 and carry the other 1 to the hundreds' column.

```
 11
 349
+ 265
 614
```

Step 3: 1 + 3 + 2 = 6

Write down the 6 in the hundreds' column.

Once you get a few of these under you belt, you'll be able to carry in your sleep. Here's another one. Work it out and then check your answer.

$$\begin{array}{r} 168 \\ +\ 495 \\ \hline \end{array}$$

Solution:

$\begin{array}{r} 1 \\ 168 \\ +\ 495 \\ \hline 3 \end{array}$	Step 1: 8 + 5 = 13	Write down the 3 and carry the 1 to the tens' column.
$\begin{array}{r} 11 \\ 168 \\ +\ 495 \\ \hline 63 \end{array}$	Step 2: 1 + 6 + 9 = 16	Write down the 6 and carry the 1 to the hundreds' column.
$\begin{array}{r} 11 \\ 168 \\ +\ 495 \\ \hline 663 \end{array}$	Step 3: 1 + 1 + 4 = 6	Write down the 6.

Self-Test 8

Please do these addition problems.

(1) $\begin{array}{r} 147 \\ +\ 753 \\ \hline \end{array}$	(2) $\begin{array}{r} 438 \\ +\ 275 \\ \hline \end{array}$	(3) $\begin{array}{r} 572 \\ +\ 389 \\ \hline \end{array}$	(4) $\begin{array}{r} 295 \\ +\ 395 \\ \hline \end{array}$
(5) $\begin{array}{r} 737 \\ +\ 198 \\ \hline \end{array}$	(6) $\begin{array}{r} 195 \\ +\ 455 \\ \hline \end{array}$	(7) $\begin{array}{r} 538 \\ +\ 379 \\ \hline \end{array}$	(8) $\begin{array}{r} 386 \\ +\ 487 \\ \hline \end{array}$
(9) $\begin{array}{r} 798 \\ +\ 125 \\ \hline \end{array}$	(10) $\begin{array}{r} 533 \\ +\ 287 \\ \hline \end{array}$	(11) $\begin{array}{r} 618 \\ +\ 297 \\ \hline \end{array}$	(12) $\begin{array}{r} 493 \\ +\ 387 \\ \hline \end{array}$

Answers to Self-Test 8

(1) 900	(2) 713	(3) 961	(4) 690
(5) 935	(6) 650	(7) 917	(8) 873
(9) 923	(10) 820	(11) 915	(12) 880

Did you get every problem right? If you did, then you're doing extremely well and may go directly to Chapter 7. If you got any of these wrong, we're going to give you another chance. See if you can get all the right answers in Self-Test 9.

Self-Test 9

Please do these addition problems.

(1) 257 + 658	(2) 639 + 292	(3) 759 + 184	(4) 399 + 473
(5) 675 + 195	(6) 729 + 197	(7) 556 + 384	(8) 427 + 179
(9) 296 + 568	(10) 792 + 198	(11) 646 + 259	(12) 758 + 175

Answers to Self-Test 9

(1) 915	(2) 931	(3) 943	(4) 872
(5) 870	(6) 926	(7) 940	(8) 606
(9) 864	(10) 990	(11) 905	(12) 933

If you got everything right, go directly to Chapter 7. But if you got one or more wrong answers, please copy over that problem or

problems on a blank sheet of paper. Also copy over any problems you got wrong in Self-Test 8. Write the correct answers at the bottom of the page and then retest yourself. We're not sure if practice makes perfect, but it can come pretty close. Once you've gotten these problems right, you'll be ready for Chapter 7.

Chapter 7

Adding a Column of Single-Digit Numbers

How about a little change of pace? Let's go back to single-digit numbers. Please work out this problem:

```
  8
  3
  4
  5
+ 3
```

Solution:

```
  8          Step 1: 8 + 3 = 11
  3
  4          Step 2: 11 + 4 = 15
  5          Step 3: 15 + 5 = 20
+ 3          Step 4: 20 + 3 = 23
 23
```

Here's another problem. See what you come up with.

```
  2
  7
  9
  1
  8
  5
  5
  6
  3
+ 4
```

Solution:

```
  2
  7          Step 1: 2 + 7 = 9
  9          Step 2: 9 + 9 = 18
  1          Step 3: 18 + 1 = 19
  8          Step 4: 19 + 8 = 27
  5          Step 5: 27 + 5 = 32
  5          Step 6: 32 + 5 = 37
  6          Step 7: 37 + 6 = 43
  3          Step 8: 43 + 3 = 46
+ 4          Step 9: 46 + 4 = 50
 50
```

Hey, that's a lot of steps. So here's a shortcut: Look for pairs of numbers adding to 10. We've done that in the accompanying box.

Box: Adding by Tens

We'll start with the same problem we just solved. This time we'll look for pairs of numbers that add up to 10:

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

We found 5 pairs of 10, which, of course, adds to 50. Use pairs of 10s in the next problem to help you get the answer.

5
9
4
1
5
7
+ 6

Solution:

There are three pairs of 10s – 5 and 5; 9 and 1; and 4 and 6. That gives us 30. There's a 7 left over, so when we add it to 30, our answer comes to 37.

Finding pairs of 10s is a short-cut that will save you time. As you get used to working with numbers, you'll do this almost automatically when you're adding a column of figures.

(end of box)

Self-Test 10

Add these columns of numbers.

(1)	(2)	(3)	(4)	(5)
7	1	8	1	4
4	5	8	6	8
4	6	9	2	5
1	9	3	8	1
5	5	2	5	5
6	3	6	1	7
3	4	1	4	6

(6)	(7)	(8)	(9)	(10)
7	2	9	6	5
1	3	2	3	4
8	4	7	1	5
2	8	5	5	9
5	1	8	6	2
5	3	3	7	5
1	6	1	9	1
4	9	2	2	8
5	7	5	4	8

(11)	(12)	(13)	(14)	(15)
8	9	8	2	6
9	3	1	2	8
1	4	2	7	1
6	7	5	9	5
5	1	6	5	6
3	3	3	1	3
7	8	4	6	8
6	1	5	8	4
8	7	9	1	4
6	6	9	8	2

Answers to Self-Test 10

(1) 30	(2) 33	(3) 37	(4) 27	(5) 36
(6) 38	(7) 43	(8) 42	(9) 43	(10) 47
(11) 59	(12) 49	(13) 52	(14) 49	(15) 47

You don’t need a calculator to do these sums. As you get more adept at working with numbers, you’ll wonder why you ever used one in the first place.

Moving right along, let’s do Self-Test 11.

Self-Test 11

Please do each of these sums.

(1)	(2)	(3)	(4)	(5)
5	8	4	6	2
7	1	1	2	3
1	9	4	7	8
8	3	9	5	6
4	2	6	1	1
6	5	2	9	8
5	6	1	5	2
3	6	6	6	6
3	7	5	7	1
5	4	3	4	6

(6)	(7)	(8)	(9)	(10)
2	5	3	6	2
7	7	1	5	6
1	4	8	1	3
8	4	9	9	8
8	1	1	8	6
5	3	7	4	5
1	9	4	4	1
2	8	3	1	7
6	6	2	7	9
3	1	5	4	3
4	5	6	5	3

(11)	(12)	(13)	(14)	(15)
1	7	8	6	4
3	8	4	1	9
8	3	6	9	8
6	1	5	4	1
5	4	1	3	2
4	7	6	5	6
7	1	8	6	2
7	3	3	7	2
5	9	3	9	5
1	4	1	2	6
3	3	7	5	7
9	2	9	3	1

Answers to Self-Test 11

(1) 47	(2) 51	(3) 41	(4) 52	(5) 43
(6) 47	(7) 53	(8) 49	(9) 54	(10) 53
(11) 59	(12) 52	(13) 61	(14) 60	(15) 53

Let’s look back over Self-Tests 10 and 11. If you got all the problems right, then you’re in great shape, so go directly to Chapter 8.If not, then you need to take stock. If you got just one or two wrong both self-tests, we’d like you to take them over again.

Retest: Self-Test 10

Add these columns of numbers.

(1)	(2)	(3)	(4)	(5)
7	1	8	1	4
4	5	8	6	8
4	6	9	2	5
1	9	3	8	1
5	5	2	5	5
6	3	6	1	7
3	4	1	4	6

(6)	(7)	(8)	(9)	(10)
7	2	9	6	5
1	3	2	3	4
8	4	7	1	5
2	8	5	5	9
5	1	8	6	2
5	3	3	7	5
1	6	1	9	1
4	9	2	2	8
5	7	5	4	8

(11)	(12)	(13)	(14)	(15)
8	9	8	2	6
9	3	1	2	8
1	4	2	7	1
6	7	5	9	5
5	1	6	5	6
3	3	3	1	3
7	8	4	6	8
6	1	5	8	4
8	7	9	1	4
6	6	9	8	2

Answers to Retest: Self-Test 10

(1) 30	(2) 33	(3) 37	(4) 27	(5) 36
(6) 38	(7) 43	(8) 42	(9) 43	(10) 47
(11) 59	(12) 49	(13) 52	(14) 49	(15) 47

Retest: Self-Test 11

Please do each of these sums.

(1)	(2)	(3)	(4)	(5)
5	8	4	6	2
7	1	1	2	3
1	9	4	7	8
8	3	9	5	6
4	2	6	1	1
6	5	2	9	8
5	6	1	5	2
3	6	6	6	6
3	7	5	7	1
5	4	3	4	6

(6)	(7)	(8)	(9)	(10)
2	5	3	6	2
7	7	1	5	6
1	4	8	1	3
8	4	9	9	8
8	1	1	8	6
5	3	7	4	5
1	9	4	4	1
2	8	3	1	7
6	6	2	7	9
3	1	5	4	3
4	5	6	5	3

(11)	(12)	(13)	(14)	(15)
1	7	8	6	4
3	8	4	1	9
8	3	6	9	8
6	1	5	4	1
5	4	1	3	2
4	7	6	5	6
7	1	8	6	2
7	3	3	7	2
5	9	3	9	5
1	4	1	2	6
3	3	7	5	7
9	2	9	3	1

Answers to Retest: Self-Test 11

(1) 47	(2) 51	(3) 41	(4) 52	(5) 43
(6) 47	(7) 53	(8) 49	(9) 54	(10) 53
(11) 59	(12) 52	(13) 61	(14) 60	(15) 53

If you got more than two wrong answers in either retest, we suggest you redo this chapter. You want to be confident that you can add a column of numbers, because in the next chapter, we're going to be adding up two columns of numbers. It's better to spend a little more time now getting down the basics than a lot more time in later chapters trying to figure out how to do each problem.

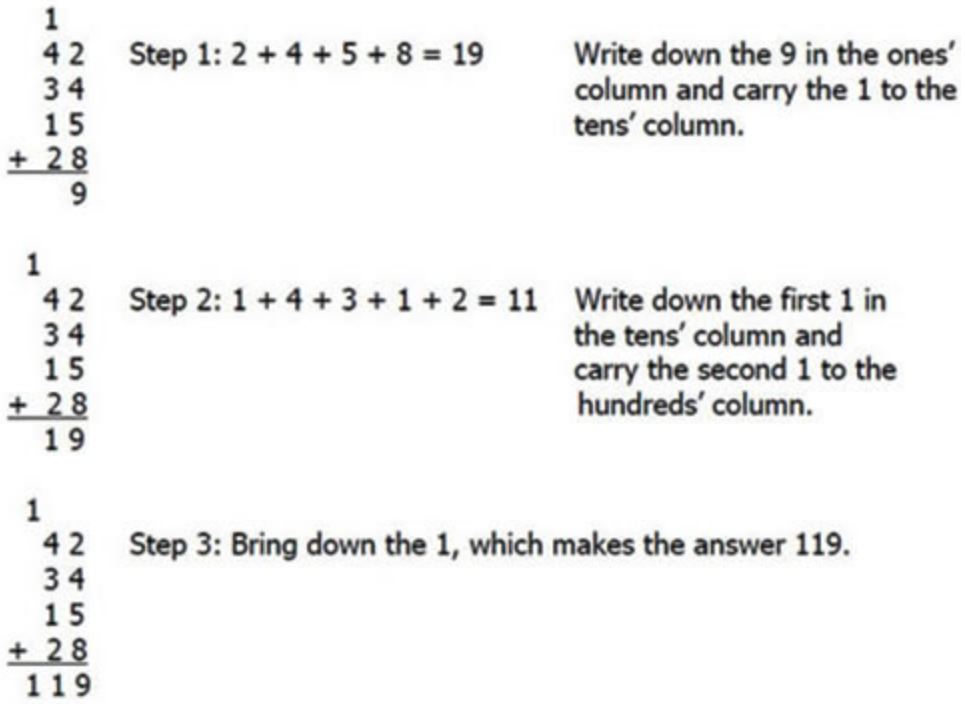
Chapter 8

Adding Columns of Double-Digit Numbers

Now we going to take it up a couple of notches. Please work out this problem:

$$\begin{array}{r} 42 \\ 34 \\ 15 \\ +\ 28 \\ \hline \end{array}$$

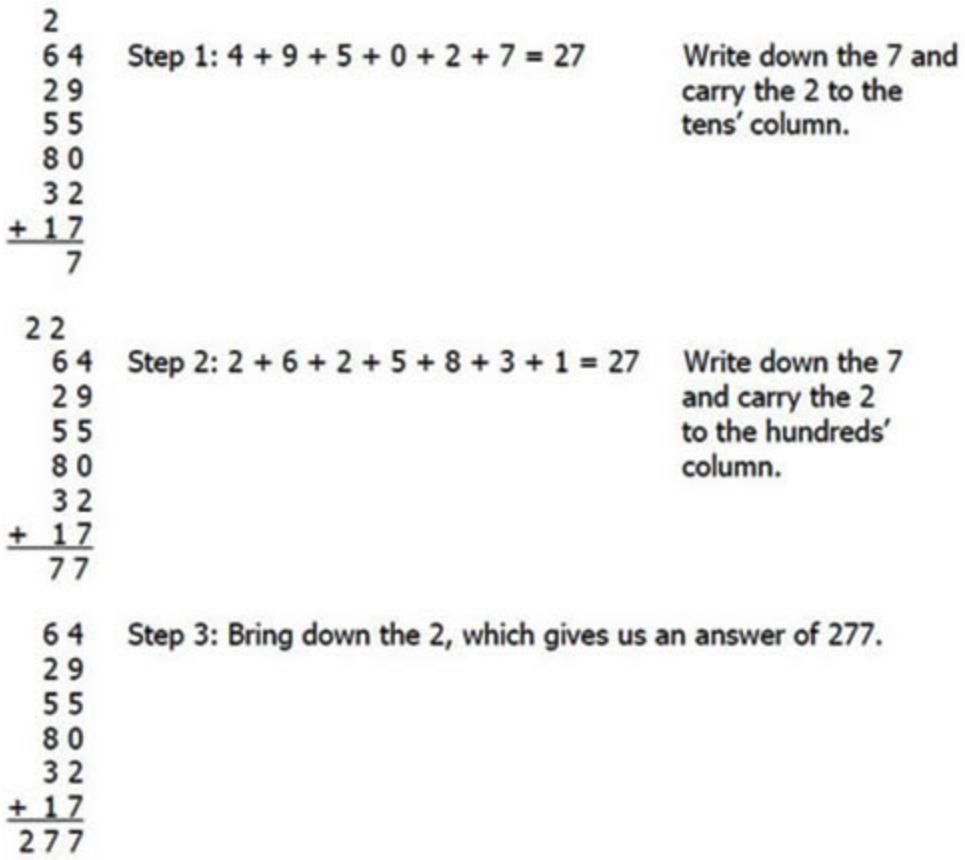
Solution:



Here's another problem:

```
  64
  29
  55
  80
  32
+ 17
```

Solution:



Ready for another self-test?

Self-Test 12

Please do each of these addition problems.

(1) 73 24 57 16 35	(2) 45 61 82 10 96	(3) 59 22 84 77 31	(4) 85 43 22 35 18
(5) 23 46 65 18 37	(6) 72 39 46 25 48	(7) 19 96 53 42 61	(8) 13 46 79 59 91

(9) 54
18
35
28
16
25

(10) 19
47
64
14
81
90

(11) 75
21
57
39
26
15

(12) 62
78
10
83
97
25

(13) 28
19
55
78
29
85
43

(14) 58
14
89
75
96
51
22

(15) 26
32
79
19
44
81
60

(16) 95
48
11
64
59
32
50

Answers to Self-Test 12

(1) 205 (2) 294 (3) 273 (4) 203

(5) 189 (6) 230 (7) 271 (8) 288

(9) 176 (10) 315 (11) 233 (12) 355

(13) 337 (14) 405 (15) 341 (16) 359

Let’s do one more self-test. This one will be just a little more challenging.

Self-Test 13

(1) 59
38
30
83
51
46
22
10

(2) 65
49
13
62
55
96
71
34

(3) 12
36
79
25
63
54
90
85

(4) 53
41
96
27
88
61
19
40

(5)	(6)	(7)	(8)
48	73	31	16
87	44	60	33
17	19	84	81
39	66	14	67
25	13	95	51
76	58	78	28
62	34	35	46
11	29	26	79
83	71	59	10

(9)	(10)	(11)	(12)
50	77	47	19
23	69	26	82
86	31	59	63
17	58	20	43
43	23	45	72
75	46	94	81
12	92	14	38
64	37	66	18
27	60	83	85
51	55	21	57

Answers to Self-Test 13

(1) 339	(2) 445	(3) 444	(4) 425
(5) 448	(6) 407	(7) 482	(8) 411
(9) 448	(10) 548	(11) 475	(12) 558

Before we go any further, let's remember that we're covering a whole lot of math in a very short time. So any time you need to take a breather, please go right ahead. Just as Rome wasn't built in a day, no one learns math overnight.

So, how are you doing? If you got a total of no more than two problems wrong in Self-Tests 12 and 13, then you're ready to go on to Chapter 9. If not, then you know the drill. Copy over the problems you missed and work them out again. Then you should be ready to tackle Chapter 9.

Chapter 9

Adding Two Triple-Digit Numbers

There's very little new in this chapter. Basically, you'll just continue doing what you were doing – adding and carrying.

Find the sum of these two numbers:

$$\begin{array}{r} 358 \\ +\,465 \\ \hline \end{array}$$

Solution:

$$\begin{array}{r} 1 \\ 358 \\ +\,465 \\ \hline 3 \end{array}$$

Step 1: 8 + 5 = 13 Write down the 3 and carry the 1.

$$\begin{array}{r} 11 \\ 358 \\ +\,465 \\ \hline 23 \end{array}$$

Step 2: 1 + 5 + 6 = 12 Write down the 2 and carry the 1.

$$\begin{array}{r} 11 \\ 358 \\ +\,465 \\ \hline 823 \end{array}$$

Step 3: 1 + 3 + 4 = 8 Write down the 8.

Here's another one for you to work out:

```
  686
+ 796
```

```
   1
  686      Step 1: 6 + 6 = 12        Write down the 2 and carry the 1.
+ 796
    2
```

```
  11
  686      Step 2: 1 + 8 + 9 = 18    Write down the 8 and carry the 1.
+ 796
   82
```

```
1
  686      Step 3: 1 + 6 + 7 = 14    Write down the 4 and carry the 1.
+ 796
1,482
```

This is the first time we've added into the thousands. From here on out, as we begin dealing with larger numbers, we'll be adding into the thousands pretty often.

Self-Test 14

Please do the following addition problems.

(1) 497 + 245	(2) 384 + 327	(3) 538 + 164	(4) 617 + 295
(5) 267 + 483	(6) 492 + 189	(7) 948 + 279	(8) 514 + 287
(9) 477 + 456	(10) 826 + 379	(11) 843 + 178	(12) 969 + 875

Answers to Self-Test 14

(1) 742	(2) 711	(3) 702	(4) 912
(5) 750	(6) 681	(7) 1,227	(8) 801
(9) 933	(10) 1,205	(11) 1,021	(12) 1,844

If you got these all right, go directly to Chapter 10. If you got any wrong, please do Self-Test 15.

Self-Test 15

(1) 5 2 2 2 8 9	(2) 4 7 3 4 8 9	(3) 6 4 8 1 9 6	(4) 4 3 7 2 6 3
(5) 3 8 4 5 7 8	(6) 7 3 4 1 4 6	(7) 8 2 6 6 9 5	(8) 6 4 3 2 5 7
(9) 7 2 8 1 7 6	(10) 8 4 9 2 6 4	(11) 7 5 8 5 5 9	(12) 9 8 2 9 7 8

Answers to Self-Test 15

(1) 811	(2) 962	(3) 844	(4) 700
(5) 962	(6) 880	(7) 1,521	(8) 900
(9) 904	(10) 1,113	(11) 1,317	(12) 1,960

Now it’s time to take stock. Did you get all of these right? If you did, go on to Chapter 10. But if you got more than one wrong, please copy over all the problems you got wrong in Self-Tests 14 and 15 and do them over. When you’re confident that you’ve mastered the addition of two three-digit numbers, then you’re ready for Chapter 10.

Chapter 10

Adding Three Triple-Digit Numbers

You're almost out of the woods. Once you get through this chapter, we're not going to throw much more at you. So what are we waiting for? Let's get started!

See what you can do with *this* problem:

```
  251
  584
+ 317
```

Solution:

```
   1
  251      Step 1:  1 + 4 + 7 = 12      Write down the 2 and carry
  584                                   the 1.
+ 317
    2

  11
  251      Step 2:  1 + 5 + 8 + 1 = 15  Write down the 5 and
  584                                   carry the 1.
+ 317
   52

  11
  251      Step 3: 1 + 2 + 5 + 3 = 11   Write down the 11.
  584
+ 317
1,152
```

Are you ready for Self-Test 16? We certainly hope so, because here it comes.

Self-Test 16

Please do each of these addition problems.

(1) 284 173 335	(2) 311 293 346	(3) 608 275 184	(4) 892 537 262
(5) 553 275 406	(6) 472 138 243	(7) 916 124 899	(8) 178 597 543
(9) 703 257 156	(10) 832 615 263	(11) 755 486 274	(12) 439 264 341

Answers to Self-Test 16

(1) 792	(2) 950	(3) 1,067	(4) 1,691
(5) 1,234	(6) 853	(7) 1,939	(8) 1,318
(9) 1,116	(10) 1,710	(11) 1,515	(12) 1,044

Chapter 11

Checking Your Work

You probably remember your teachers telling you to always check your work. That way, you'd have a chance to correct any wrong answers.

The best way to check the answer to an addition problem is to use subtraction – a subject we won't cover until we begin *The Book of Subtraction*. So how else can we check our work?

One way would be to do a problem twice. If we came up with the same answer, chances are that that answer would be correct. For example, go ahead and do this problem, and then check your answer:

$$\begin{array}{r} 795 \\ +468 \\ \hline \end{array}$$

Solution:

$$\begin{array}{r} 795 \\ +\ 468 \\ \hline 1,263 \end{array}$$

Check:

$$\begin{array}{r} 795 \\ +\ 468 \\ \hline 1,263 \end{array}$$

Doing the problem twice will enable you to find most of your mistakes. But what if you make the same mistake twice – when you solved the problem the first time and when you checked your work?

Well, there *is* a better way of checking. We can rewrite the last problem *this way*:

$$\begin{array}{r} 468 \\ +\ 795 \\ \hline \end{array}$$

Do we still get the same answer?

$$\begin{array}{r} 468 \\ +\ 795 \\ \hline 1,263 \end{array}$$

Yes, we certainly *do* get the same answer. Now solve *this* problem and check your work:

$$\begin{array}{r} 28 \\ 76 \\ 19 \\ 53 \\ +\ 45 \\ \hline \end{array}$$

Solution:

$$\begin{array}{r} 28 \\ 76 \\ 19 \\ 53 \\ +\ 45 \\ \hline 221 \end{array}$$

Check:

$$\begin{array}{r} 45 \\ 53 \\ 19 \\ 76 \\ +\ 28 \\ \hline 221 \end{array}$$

Now that you know how to check your work, you're ready for Self-Test 17.

Self-Test 17

Do each of these problems and then check your work.

(1) $\begin{array}{r} 74 \\ 28 \\ \hline \end{array}$ (2) $\begin{array}{r} 36 \\ 75 \\ \hline \end{array}$ (3) $\begin{array}{r} 584 \\ 437 \\ \hline \end{array}$ (4) $\begin{array}{r} 927 \\ 283 \\ \hline \end{array}$

(5) $\begin{array}{r} 406 \\ 394 \\ 515 \\ \hline \end{array}$ (6) $\begin{array}{r} 397 \\ 108 \\ 662 \\ \hline \end{array}$ (7) $\begin{array}{r} 28 \\ 41 \\ 57 \\ 80 \\ 65 \\ \hline \end{array}$ (8) $\begin{array}{r} 65 \\ 24 \\ 38 \\ 17 \\ 40 \\ \hline \end{array}$

Answers to Self-Test 17

(1) $\begin{array}{r} 74 \\ 28 \\ \hline 102 \end{array}$ (2) $\begin{array}{r} 36 \\ 75 \\ \hline 111 \end{array}$ (3) $\begin{array}{r} 584 \\ 437 \\ \hline 1,021 \end{array}$ (4) $\begin{array}{r} 927 \\ 283 \\ \hline 1,210 \end{array}$

Check:

$\begin{array}{r} 28 \\ 74 \\ \hline 102 \end{array}$ $\begin{array}{r} 75 \\ 36 \\ \hline 111 \end{array}$ $\begin{array}{r} 437 \\ 584 \\ \hline 1,021 \end{array}$ $\begin{array}{r} 283 \\ 927 \\ \hline 1,210 \end{array}$

(5)
$$\begin{array}{r} 406 \\ 394 \\ \underline{515} \\ 1,315 \end{array}$$

(6)
$$\begin{array}{r} 397 \\ 108 \\ \underline{662} \\ 1,167 \end{array}$$

(7)
$$\begin{array}{r} 28 \\ 41 \\ 57 \\ 80 \\ \underline{65} \\ 271 \end{array}$$

(8)
$$\begin{array}{r} 65 \\ 24 \\ 38 \\ 17 \\ \underline{40} \\ 184 \end{array}$$

Check:

$$\begin{array}{r} 515 \\ 394 \\ \underline{406} \\ 1,315 \end{array}$$

$$\begin{array}{r} 662 \\ 108 \\ \underline{397} \\ 1,167 \end{array}$$

$$\begin{array}{r} 65 \\ 80 \\ 57 \\ 41 \\ \underline{28} \\ 271 \end{array}$$

$$\begin{array}{r} 40 \\ 17 \\ 38 \\ 24 \\ \underline{65} \\ 184 \end{array}$$

Now that you know how to check you work, you can be pretty certain whether or not you get the right answers. You'll still make mistakes, but now you'll be able to correct most of them.

Chapter 12

Adding One-, Two-, and Three-Digit Numbers

Let’s put it all together now. Please find the sum of these numbers:

```
  126
   19
  271
+   4
```

Solution:

```
   2
  126
   19
  271
+   4
    0
```

Step 1: 6 + 9 + 1 + 4 = 20

Write down the 0 and carry the 2.

```
  12
  126
   19
  271
+   4
   20
```

Step 2: 2 + 2 + 1 + 7 = 12

Write down the 2 and carry the 1.

```
  12
  126
   19
  271
+   4
  420
```

Step 3: 1 + 1 + 2 = 4

Write down the 4.

Here’s one more problem to solve:

```
  284
  316
    7
   34
  276
   49
+  8
```

Solution:

```
   4
  284
  316
    7
   34
  276
   49
+  8
   4
```

Step 1: 4 + 6 + 7 + 4 + 6 + 9 + 8 = 44
Write down one 4 and carry the other 4.

```
  24
  284
  316
    7
   34
  276
   49
+  8
  74
```

Step 2: 4 + 8 + 1 + 3 + 7 + 4 = 27
Write down the 7 and carry the 2.

```
  24
 284
 316
   7
  34
 276
  49
+  8
 974
```

Step 3: 2 + 2 + 3 + 2 = 9 Write down 9.

Self-Test 18

Please find the sum for each problem.

(1)
```
   24
   47
 281
    6
 363
```

(2)
```
 309
    4
   82
 175
   55
```

(3)
```
 403
 214
    9
   35
 291
```

(4)
```
    6
   53
 248
    7
 354
```

(5)
```
 450
 173
    2
   84
 266
 357
```

(6)
```
   76
 542
    8
 439
   50
    4
```

(7)
```
    8
 285
   29
 407
 591
 852
```

(8)
```
   45
   77
    1
 282
 665
 323
```

(9)
```
 750
    3
   87
 262
    9
 415
 180
```

(10)
```
   69
 306
   95
   14
    5
 441
 230
```

(11)
```
 594
   63
    4
 176
 307
    9
   71
```

(12)
```
    5
   44
 738
 196
   61
   95
 414
```

Answers to Self-Test 18

(1) 721	(2) 625	(3) 952	(4) 668
(5) 1,332	(6) 1,119	(7) 2,172	(8) 1,393
(9) 1,706	(10) 1,160	(11) 1,224	(12) 1,553

If you had checked your work, you might not even have needed to look at the answers to Self-Test 18.

You know how things work around here. If you got all of these right, go directly to Chapter 13. If you got just one wrong we'll let you off this time. So if you feel like it, you may skip the rest of this chapter and go on to Chapter 13.

Here's another group of problems. Take your time and check your work. If you do a problem twice and get the same answer, the chances are extremely good that your answer is right.

Self-Test 19

Please do each of these addition problems.

(1) 29 141 283 2 65	(2) 730 192 7 11 3	(3) 8 151 250 32 69	(4) 504 7 299 16 3
(5) 285 9 78 140 22 63	(6) 5 16 7 294 645 221	(7) 760 189 4 37 96 5	(8) 77 146 3 290 28 4

(9)
$$\begin{array}{r} 5\,6\,3 \\ 1\,2\,2 \\ 9\,8 \\ 7 \\ 2\,3\,4 \\ 5\,3 \\ \hline 9 \end{array}$$

(10)
$$\begin{array}{r} 8\,7 \\ 4 \\ 2\,9\,7 \\ 6\,4 \\ 5\,8 \\ 1\,4\,3 \\ \hline 7\,5\,6 \end{array}$$

(11)
$$\begin{array}{r} 9\,0 \\ 4\,3\,8 \\ 2\,0\,9 \\ 8\,2 \\ 7\,5 \\ 4 \\ \hline 5\,2\,5 \end{array}$$

(12)
$$\begin{array}{r} 1 \\ 4\,0 \\ 8 \\ 3\,7\,2 \\ 9\,1 \\ 5\,5 \\ \hline 1\,3\,9 \end{array}$$

Answers to Self-Test 19

(1) 520	(2) 943	(3) 510	(4) 829
(5) 597	(6) 1,188	(7) 1,091	(8) 548
(9) 1,086	(10) 1,409	(11) 1,423	(12) 706

Did you get the right answers to all these problems? Then go directly to Chapter 12. If not, then please copy over any problems you got wrong in Self- Tests 18 and 19 and do them again. Then you'll be all set for Chapter 13.

Chapter 13

Adding Thousands

How much is one thousand plus one thousand? Obviously it's two thousand. Adding thousands won't be quite as easy as adding one and one, but after you've worked your way though this chapter it may be *almost* as easy.

See if you can work out this problem:

$$\begin{array}{r} 2,489 \\ +\ 3,556 \\ \hline \end{array}$$

Solution:

$$\begin{array}{r} 1\ 1\ 1 \\ 2,489 \\ +\ 3,556 \\ \hline 6,045 \end{array}$$

Let's do one more:

$$\begin{array}{r} 8,725 \\ +\ 4,895 \\ \hline \end{array}$$

Solution:

```
  1 1 1
  8,725
+ 4,895
 13,620
```

Self-Test 20

Please do these addition problems.

(1) 1, 7 4 9 4, 8 6 7	(2) 2, 3 9 8 1, 4 2 2	(3) 3, 8 7 5 3, 4 1 9	(4) 4, 6 8 2 2, 3 2 0
(5) 3, 5 9 0 2, 8 1 5	(6) 1, 0 7 8 7, 4 2 3	(7) 5, 2 8 5 4, 9 2 6	(8) 6, 0 8 9 4, 2 7 3
(9) 7, 5 3 9 5, 5 5 7	(10) 7, 9 2 0 1, 0 4 6	(11) 6, 3 9 5 4, 8 5 2	(12) 5, 0 9 9 6, 1 4 2

Answers to Self-Test 20

(1) 6,616	(2) 3,820	(3) 7,294	(4) 7,002
(5) 6,405	(6) 8,501	(7) 10,211	(8) 10,362
(9) 13,096	(10) 8,966	(11) 11,247	(12) 11,241

How did you do? If you got them all right, then go directly to Chapter 14. If not, just redo any problem you got wrong.

Chapter 14

Applications

Would you believe this is the last addition chapter? We're going to use some of the math we've already covered to solve practical problems. Each of these problems calls for addition. Go ahead and solve *this* problem:

The New England Patriots scored three points in the first quarter, seven points in the second quarter, nine points in the third quarter and seven points in the fourth quarter. How many points did they score in the entire game?

Solution:

$$\begin{array}{r} 3 \\ 7 \\ 9 \\ +\ 7 \\ \hline 26 \text{ points} \end{array}$$

Next problem: How many years of experience did these four law partners have if O'Brien had 36 years, Esposito had 29 years, Cohen had 31 years, and Singh had 42 years?

Solution:

```
 1 1
   3 6
   2 9
   3 1
+  4 2
 1 3 8 years
```

If Canaan Banana had $209 in one bank account, $27 in a second account, $135 in a third account, $6 in a fourth account, and $567 in a fifth account, how much money did he have in all five accounts?

Solution:

```
   1 3
 $2 0 9
     2 7
   1 3 5
       6
+  5 6 7
  $9 4 4
```

One more problem: If you were driving cross country and covered 451 miles on Monday, 522 on Tuesday, 480 on Wednesday, 497 on Thursday, and 505 on Friday, how many miles did you cover during these five days?

Solution:

```
 2 2 1
   4 5 1
   5 2 2
   4 8 0
   4 9 7
+  5 0 5
 2, 4 5 5 miles
```

Self-Test 21

1. If you had $294 in your bank account and deposited another $318 into your account, how much money would now be in your bank account?
2. Luther Schwartz worked 7 hours of overtime in January, 12 hours of overtime in February, 8 hours of overtime in March, and 13 hours of overtime in April. How many hours of overtime did he work during these four months?
3. The Chicago Bulls scored 27 points in the first quarter, 22 points in the second quarter, 30 points in the third quarter, and 24 points in the fourth quarter. How many points did the Bulls score in the entire game?
4. Lourdes Hussein ran 6 miles on Monday, 8 miles on Tuesday, 5 miles on Wednesday, 12 miles on Friday, and 9 miles on Saturday. How many miles did she run that week?
5. A train with 132 passengers went from New York to Albany. No one got off in Albany, but 39 people got on. In Utica no one got off, but 17 people got on. In Rochester, no one got off, but 102 people got on. How many people were now on the train?
6. Henry Wong sold office supplies to six stores. His sales at each of these stores, respectively, were $205, $82, $353, $57, $122, and $80. How much were his sales all together?
7. James Madison High School has 785 freshmen, 762 sophomores, 709 juniors, and 641 seniors. How many students attend the school?
8. The Arizona Diamondbacks and the St. Louis Cardinals played the highest scoring game of all time. The Diamondbacks scored 4 runs in the first inning, 2 runs in the third inning, 9 runs in the fourth inning, 3 runs in the fifth inning, 4 runs in the seventh inning, and 2 runs in the eighth inning. The Cardinals scored 4 runs in the third inning, 2 runs in the fourth inning, 5 runs in the sixth inning, 3 runs in the seventh inning, and 2 runs in the ninth inning. How many runs did the two teams score all together?
9. There were 6,724 people at the opening game of the Brooklyn Cyclones. Attendance at the second and third games was 5,944 and

6,038, respectively. How many people attended the Cyclones' first three games?

10. Sam's Sports Superstore had weekly sales for the month of February of $4,027; $5,196; $3,753; and $6,265. How much were the store's sales in February?

Answers to Self-Test 21

(1) $612	(2) 40 hours	(3) 103 points	(4) 40 miles
(5) 290 people	(6) $899	(7) 2,897 students	(8) 40 runs
(9) 18,706 people	(10) $19,241		

Final Exam

Did you think we'd let you out of here without taking a final exam? Don't worry, if you got this far, you'll probably ace it.

Chapter 1:

(1) 6 + 9 = _____ (2) 8 + 7 = _____

(3) 5 + 9 = _____ (4) 9 + 8 = _____

Chapter 2:

(1) 4 3 + 5 1 _____

(2) 7 2 + 2 6 _____

(3) 5 2 + 3 7 _____

(4) 7 4 + 2 5 _____

Chapter 3:

(1) 4 + 6 + 7 _____

(2) 3 + 8 + 4 _____

(3) 9 + 4 + 6 _____

(4) 1 + 8 + 3 _____

Chapter 4:

Write these numbers in expanded form:

(1) 781

(2) 503

(3) 947

(4) 492

Chapter 5:

(1) 67 + 27 = ____

(2) 43 + 18 = ____

(3) 69 + 25 = ____

(4) 14 + 49 = ____

Chapter 6:

(1) 458 + 162 = ____

(2) 396 + 475 = ____

(3) 761 + 249 = ____

(4) 894 + 767 = ____

Chapter 7:

(1) 5 + 8 + 5 + 1 + 7 + 8 + 9 = ____

(2) 9 + 2 + 3 + 9 + 3 + 1 + 5 = ____

(3) 1 + 6 + 9 + 4 + 5 + 5 + 6 = ____

(4) 8 + 7 + 4 + 2 + 6 + 9 + 2 = ____

Chapter 8:

(1) 36 + 17 + 49 + 25 + 33 + 47 + 90 = ____

(2) 48 + 94 + 27 + 83 + 92 + 56 + 78 = ____

(3) 88 + 19 + 11 + 64 + 71 + 44 + 18 = ____

(4) 50 + 23 + 73 + 61 + 32 + 61 + 15 = ____

Chapter 9:

(1) 297 + 144 = ____

(2) 355 + 176 = ____

(3) 752 + 269 = ____

(4) 864 + 366 = ____

Chapter 10:

Do each problem and check your answer.

(1) 3 9 4
+ 2 1 8

(2) 5 8 6
+ 6 2 4

(3) 5 5
8 1
2 0
1 7
+ 3 8

(4) 6 1
7 3
4 5
6 6
+ 7 2

Chapter 11:

(1) 1 7 2
2 4 0
+ 4 8 9

(2) 3 9 7
1 7 5
+ 2 5 6

(3) 4 9 3
2 6 7
+ 4 5 8

(4) 7 4 0
3 5 5
+ 4 7 5

Chapter 12:

(1) 3
2 5
2 6 4
5 0 1
7
8 0
+ 1 0 4

(2) 4 5
2 5 6
8
3 8 1
4
7 6
+ 4 9 8

(3) 1 7 8
6 1
3 4
5
2
3 7 7
+ 1 3 9

(4) 5 5
7 3
1
8
2 7 5
4 0
+ 5 8

Chapter 13:

(1) 1, 4 7 5
+ 4, 6 2 5

(2) 5, 8 1 0
+ 3, 9 9 2

(3) 6, 3 8 4
+ 5, 7 9 4

(4) 6, 2 7 9
+ 7, 9 5 6

Chapter 14:

1. The Detroit Tigers scored 4 runs in the first inning, 2 runs in the second inning, 5 runs in the fourth inning, 1 run in the seventh inning, and 3 runs in the ninth inning. How many runs did the Tigers score all together?
2. The Tracewski family bowled games of 201, 187, 180, 166, and 153. What was the family's total score?
3. If you drove 88 miles on Monday, 70 miles on Tuesday, 104 miles on Wednesday, 49 miles on Thursday, and 112 miles on Friday, how many miles did you drive all together?

4. Carlos Maldonado earned $4,605 in March. In April he earned $5,372. And in May he earned $4,290. How much did he earn during these three months?

Answers to Final Exam

Chapter 1:

(1) 15 (2) 15 (3) 14 (4) 17

Chapter 2:

(1) 94 (2) 98 (3) 89 (4) 99

Chapter 3:

(1) 17 (3) 15 (3) 19 (4) 12

Chapter 4:

(1) 781 = 7 hundreds + 8 tens + 1 one
(2) 503 = 5 hundreds + 0 tens + 3 ones
(3) 947 = 9 hundreds + 4 tens + 7 ones
(4) 492 = 4 hundreds + 9 tens + 2 ones

Chapter 5:

(1) 94 (2) 61 (3) 94 (4) 63

Chapter 6:

(1) 620 (2) 871 (3) 1,010 (4) 1,661

Chapter 7:

(1) 43 (2) 32 (3) 36 (4) 38

Chapter 8:

(1) 297 (2) 478 (3) 315 (4) 315

Chapter 9:

(1) 441 (2) 531 (3) 1,021 (4) 1,230

Chapter 10:

(1)
$$\begin{array}{r} 394 \\ 218 \\ \hline 612 \end{array}$$

(2)
$$\begin{array}{r} 586 \\ 624 \\ \hline 1,210 \end{array}$$

(3)
$$\begin{array}{r} 55 \\ 81 \\ 20 \\ 17 \\ 38 \\ \hline 211 \end{array}$$

(4)
$$\begin{array}{r} 61 \\ 73 \\ 45 \\ 66 \\ 72 \\ \hline 317 \end{array}$$

Check:

$$\begin{array}{r} 218 \\ 394 \\ \hline 612 \end{array}$$

$$\begin{array}{r} 624 \\ 586 \\ \hline 1,210 \end{array}$$

$$\begin{array}{r} 38 \\ 17 \\ 20 \\ 81 \\ 55 \\ \hline 211 \end{array}$$

$$\begin{array}{r} 72 \\ 66 \\ 45 \\ 73 \\ 61 \\ \hline 317 \end{array}$$

Chapter 11:

(1) 901 (2) 828 (3) 1,218 (4) 1,570

Chapter 12:

(1) 984 (2) 1,268 (3) 796 (4) 876

Chapter 13:

(1) 6,100 (2) 9,802 (3) 12,178 (4) 14,235

Chapter 14:

(1) 15 runs (2) 887 points (3) 423 miles (4) $14,267

If you got everything right, you are to be congratulated! You can add better than at least 90 percent of all adults. Please go to the Last Word.

If you got just three or four problems wrong, you're in great shape and can go directly to the Last Word.

If you got more than four problems wrong, you still have some work to do. We'd like you to go back to the chapters in which you missed any problems. Redo all the problems in those chapters, including the self-tests. Once you feel comfortable doing those problems, you may go on to the Last Word.

Last Word

You've completed the first of our four-book set. The next book is on subtraction, which is followed by the books on multiplication and division.

It is said that a journey begins with the first step. You're well on your way to learning math, so keep up the good work. And just to show you what nice guys we are, we'll let you take off a day or two before you tackle subtraction.

The Book of Subtraction

Introduction

Subtraction is the exact opposite of addition. But you need to learn how to add before you can subtract. So before you read any further, ask yourself this question: Self, do I *really* know how to add?

If you've worked your way all the way through ***the Book of Addition***, then you're certainly ready to subtract. But if your addition is kind of rusty, then you really need to go back and redo each of the self-tests until you're confident that you can add. Then you'll be ready for *this* book. We'll wait for you right here.

In all four volumes of ***Back to Basics***, there are only two rules we ask you to follow:

Rule number one: You may not use a calculator. Using a calculator interferes with your learning math. So just give it away, because you're not going to need it any more.

Rule number two: Since you're going to be working your way through this book, you must be confident that you understand what you're doing. If something isn't clear, then go over it until it is. For example, in the next chapter, you will be subtracting single-digit numbers. No ifs, ands or buts. You need to know how to subtract these numbers *without* a calculator. In fact, by the time you get to the end of the book, you'll have made a great discovery: As we're so fond of saying, your brain has a built-in a calculator. And once you've got it up and running, there's no telling how far your brain will take you.

Chapter 1

Subtracting Single-Digit Numbers

Let’s see if you really *do* know your subtraction. First, glance at the table below. Do you know the answer to every problem from 1 - 1 to 12 - 12? We’re going to find out pretty quickly. Please take Self-Test 1.

Subtraction Table: Single-Digit Numbers

-	12	11	10	9	8	7	6	5	4	3	2	1
1	11	10	9	8	7	6	5	4	3	2	1	0
2	10	9	8	7	6	5	4	3	2	1	0	
3	9	8	7	6	5	4	3	2	1	0		
4	8	7	6	5	4	3	2	1	0			
5	7	6	5	4	3	2	1	0				
6	6	5	4	3	2	1	0					
7	5	4	3	2	1	0						
8	4	3	2	1	0							
9	3	2	1	0								
10	2	1	0									
11	1	0										
12	0											

Self-Test 1

(1) 9 - 5 = _____	(2) 4 - 2 = _____	(3) 10 - 5 = _____
(4) 11 - 5 = _____	(5) 12 - 8 = _____	(6) 9 - 7 = _____
(7) 8 - 4 = _____	(8) 10 - 6 = _____	(9) 9 - 2 = _____
(10) 6 - 1 = _____	(11) 5 - 2 = _____	(12) 8 - 2 = _____
(13) 10 - 2 = _____	(14) 12 - 3 = _____	(15) 4 - 1 = _____
(16) 11 - 8 = _____	(17) 3 - 1 = _____	(18) 12 - 1 = _____
(19) 4 - 3 = _____	(20) 8 - 3 = _____	(21) 10 - 8 = _____
(22) 6 - 4 = _____	(23) 9 - 6 = _____	(24) 3 - 2 = _____
(25) 12 - 4 = _____	(26) 9 - 1 = _____	(27) 7 - 5 = _____
(28) 11 - 7 = _____	(29) 6 - 3 = _____	(30) 10 - 3 = _____
(31) 9 - 4 = _____	(32) 8 - 1 = _____	(33) 5 - 3 = _____
(34) 9 - 6 = _____	(35) 11 - 2 = _____	(36) 12 - 7 = _____
(37) 7 - 3 = _____	(38) 10 - 4 = _____	(39) 10 - 7 = _____
(40) 6 - 2 = _____	(41) 7 - 1 = _____	(42) 8 - 5 = _____
(43) 7 - 2 = _____	(44) 12 - 6 = _____	(45) 9 - 3 = _____
(46) 12 - 9 = _____	(47) 8 - 6 = _____	(48) 11 - 1 = _____
(49) 11 - 4 = _____	(50) 12 - 10 = _____	(51) 5 - 1 = _____
(52) 12 - 7 = _____	(53) 8 - 7 = _____	(54) 11 - 2 = _____

Retest: Answers to Self-Test 1

(1) 4	(2) 2	(3) 5
(4) 6	(5) 4	(6) 2
(7) 4	(8) 4	(9) 7
(10) 5	(11) 3	(12) 6
(13) 8	(14) 9	(15) 3
(16) 3	(17) 2	(18) 11
(19) 1	(20) 5	(21) 2
(22) 2	(23) 3	(24) 1
(25) 8	(26) 8	(27) 2
(28) 4	(29) 3	(30) 7
(31) 5	(32) 7	(33) 2
(34) 3	(35) 9	(36) 5
(37) 4	(38) 6	(39) 3
(40) 4	(41) 6	(42) 3
(43) 5	(44) 6	(45) 6
(46) 3	(47) 2	(48) 10
(49) 7	(50) 2	(51) 4
(52) 5	(53) 1	(54) 9

Not that anyone's looking over your shoulder, but if you got anything wrong in Self-Test, then you need to make some flash cards, with the problem on one side and the answer on the other side. Then keep testing yourself until you get everything right.

If you needed more than five flash cards, please retake Self-Test 1 on the next page. Hopefully, this time you'll get a perfect score.

Retest: Self-Test 1

(1) 9 - 5 = _____	(2) 4 - 2 = _____	(3) 10 - 5 = _____
(4) 11 - 5 = _____	(5) 12 - 8 = _____	(6) 9 - 7 = _____
(7) 8 - 4 = _____	(8) 10 - 6 = _____	(9) 9 - 2 = _____
(10) 6 - 1 = _____	(11) 5 - 2 = _____	(12) 8 - 2 = _____
(13) 10 - 2 = _____	(14) 12 - 3 = _____	(15) 4 - 1 = _____
(16) 11 - 8 = _____	(17) 3 - 1 = _____	(18) 12 - 1 = _____
(19) 4 - 3 = _____	(20) 8 - 3 = _____	(21) 10 - 8 = _____
(22) 6 - 4 = _____	(23) 9 - 6 = _____	(24) 3 - 2 = _____
(25) 12 - 4 = _____	(26) 9 - 1 = _____	(27) 7 - 5 = _____
(28) 11 - 7 = _____	(29) 6 - 3 = _____	(30) 10 - 3 = _____
(31) 9 - 4 = _____	(32) 8 - 1 = _____	(33) 5 - 3 = _____
(34) 9 - 6 = _____	(35) 11 - 2 = _____	(36) 12 - 7 = _____
(37) 7 - 3 = _____	(38) 10 - 4 = _____	(39) 10 - 7 = _____
(40) 6 - 2 = _____	(41) 7 - 1 = _____	(42) 8 - 5 = _____
(43) 7 - 2 = _____	(44) 12 - 6 = _____	(45) 9 - 3 = _____
(46) 12 - 9 = _____	(47) 8 - 6 = _____	(48) 11 - 1 = _____
(49) 11 - 4 = _____	(50) 12 - 10 = _____	(51) 5 - 1 = _____
(52) 12 - 7 = _____	(53) 8 - 7 = _____	(54) 11 - 2 = _____

Retest: Self-Test 1

(1) 4	(2) 2	(3) 5
(4) 6	(5) 4	(6) 2
(7) 4	(8) 4	(9) 7
(10) 5	(11) 3	(12) 6
(13) 8	(14) 9	(15) 3
(16) 3	(17) 2	(18) 11
(19) 1	(20) 5	(21) 2
(22) 2	(23) 3	(24) 1
(25) 8	(26) 8	(27) 2
(28) 4	(29) 3	(30) 7
(31) 5	(32) 7	(33) 2
(34) 3	(35) 9	(36) 5
(37) 4	(38) 6	(39) 3
(40) 4	(41) 6	(42) 3
(43) 5	(44) 1	(45) 6
(46) 3	(47) 2	(48) 10
(49) 7	(50) 2	(51) 4
(52) 5	(53) 1	(54) 9

Chapter 2

Subtracting Double-Digit and Triple-Digit Numbers

This chapter is so easy, we're embarrassed to include it. But it does cover some math you'll need to know.

Self-Test 2

(1) 36 -14	(2) 54 -40	(3) 85 -24	(4) 69 -36	(5) 77 -42
(6) 94 -32	(7) 83 -80	(8) 61 -51	(9) 50 -20	(10) 48 -11
(11) 68 -12	(12) 56 -35	(13) 99 -49	(14) 73 -22	(15) 37 -15
(16) 394 -282	(17) 820 -720	(18) 675 -524	(19) 448 -145	(20) 500 -200
(21) 961 -431	(22) 538 -132	(23) 864 -552	(24) 396 -134	(25) 653 -140

Answers to Self-Test 2

(1) 22	(2) 14	(3) 61	(4) 33	(5) 35
(6) 62	(7) 3	(8) 10	(9) 30	(10) 37
(11) 56	(12) 21	(13) 50	(14) 51	(15) 22
(16) 112	(17) 100	(18) 151	(19) 303	(20) 300
(21) 530	(22) 406	(23) 312	(24) 262	(25) 513

Chapter 3

Subtracting Two-Digit Numbers with Borrowing

Subtraction with borrowing is the flip side of addition with carrying. Let's very briefly go over the concept of expanded numbers, which helps us to understand borrowing.

Can you write the number 275 in expanded form?

Solution: 275 = 2 hundreds + 7 tens + 5 ones

Write the number 342 in expanded form.

Solution: 342 = 3 hundreds + 4 tens + 2 ones

Now we're ready to do subtraction with borrowing. Find the answer to this problem:

```
  5 3
- 2 7
-----
```

Solution:

Since 7 is larger than 3, we'll need to borrow 1 ten from the tens' column:

```
   4
 /5 13
- 2 7
-----
```

We cross out the 5 in the tens' column and make it 4.
We put the 1 we borrowed in front of the 3 to make it 13.

Now we're ready to subtract:

```
  4
 5 13
-2 7
 2 6
```

In the ones' column: 13 - 7 = 6
In the tens' column: 4 - 2 = 2

That was so much fun, let's do another problem:

```
  8 2
- 4 8
```

Solution:

Since 8 is larger than 2, we'll need to borrow 1 ten from the tens' column.

```
  7
 8 12
-4 8
```

We cross out the 8 in the tens' column and make it 7.
We put the 1 we borrowed in front of the 2 to make it 12.

```
  7
 8 12
-4 8
 3 4
```

In the ones' column: 12 - 8 = 4
In the tens' column: 7 - 4 = 3

Here's one more problem:

```
  9 4
- 3 7
```

Solution:

Since 7 is larger than 4, we borrow 1 ten from the tens' column:

```
  8
 9 14
-3 7
```

Cross out the 9 in the tens' column and make it 8.
We put the 1 we borrowed in front of the 4 to make it 14.

$$\begin{array}{r} 8 \\ \not{9}\,{}^{1}4 \\ -\,3\ 7 \\ \hline 5\ 7 \end{array}$$

In the ones' column: 14 - 7 = 7
In the tens' column: 8 - 3 = 5

Self-Test 3

(1) 61 − 24	(2) 54 − 35	(3) 86 − 18	(4) 32 − 26	(5) 75 − 37
(6) 56 − 49	(7) 81 − 17	(8) 74 − 55	(9) 44 − 28	(10) 63 − 36
(11) 95 − 78	(12) 86 − 49	(13) 43 − 18	(14) 70 − 56	(15) 61 − 53

Answers to Self-Test 3

(1) 37	(2) 19	(3) 68	(4) 6	(5) 38
(6) 7	(7) 64	(8) 19	(9) 16	(10) 27
(11) 17	(12) 37	(13) 25	(14) 14	(15) 8

We're on a roll, so let's keep going. Please take Self-Test 4.

Self-Test 4

(1) 51 − 39	(2) 36 − 18	(3) 14 − 9	(4) 62 − 48	(5) 80 − 11
(6) 73 − 29	(7) 43 − 18	(8) 85 − 36	(9) 64 − 48	(10) 97 − 39
(11) 41 − 33	(12) 72 − 45	(13) 57 − 39	(14) 52 − 23	(15) 90 − 17

Answers to Self-Test 4

(1) 12	(2) 18	(3) 5	(4) 14	(5) 69
(6) 44	(7) 25	(8) 49	(9) 16	(10) 58
(11) 8	(12) 27	(13) 18	(14) 29	(15) 73

If you got all of these right, go directly to Chapter 4. But if you got even one wrong answer, then please take Self-Test 5. As they say, Rome wasn't built in a day.

Self-Test 5

(1) 62 -15	(2) 25 - 9	(3) 44 -28	4) 73 -36	(5) 81 -52
(6) 84 -38	(7) 55 -18	(8) 72 -49	(9) 91 -16	(10) 66 -58
(11) 92 -34	(12) 31 -24	(13) 56 -29	(14) 64 -27	(15) 43 -17

Answers to Self-Test 5

(1) 47	(2) 16	(3) 16	(4) 37	(5) 29
(6) 46	(7) 37	(8) 23	(9) 75	(10) 8
(11) 58	(12) 7	(13) 27	(14) 37	(15) 26

You know how things work around here. If you got a perfect score, go on to Chapter 4. If not, then do Self-Test 6.

Self-Test 6

(1) 32 -17	(2) 85 -29	(3) 24 -9	(4) 57 -28	(5) 61 -38
(6) 74 -36	(7) 91 -48	(8) 66 -27	(9) 52 -39	(10) 75 -27
(11) 36 -19	(12) 46 -17	(13) 76 -38	(14) 82 -56	(15) 32 -14

Answers to Self-Test 6

(1) 15	(2) 56	(3) 15	(4) 29	(5) 23
(6) 38	(7) 43	(8) 39	(9) 13	(10) 48
(11) 17	(12) 29	(13) 38	(14) 26	(15) 18

Did you get everything right? Then go ahead to Chapter 4. But if you got any wrong answers, please redo those problems.

Chapter 4

Checking Your Answers

How do your know when you've gotten the right answer? You know when you can prove it's right. You can check the answer to a subtraction problem by doing addition. After all, addition is the reverse of subtraction.

Find the answer to the following problem, and then see if you can prove your answer.

```
  8 2
- 4 7
-----
```

Solution:

```
  8 2
- 4 7
-----
  3 5
```

Check:

```
  4 7
+ 3 5
-----
  8 2
```

That's all there is to it. Let's try another:

```
  7 1
- 3 4
-----
```

Solution:

$$\begin{array}{r} 71 \\ -\ 34 \\ \hline 37 \end{array}$$

Check:

$$\begin{array}{r} 34 \\ +\ 37 \\ \hline 71 \end{array}$$

Self-Test 7

Do each of these problems, and then check your answers.

(1) $\begin{array}{r} 47 \\ -\ 28 \\ \hline \end{array}$	(2) $\begin{array}{r} 52 \\ -\ 38 \\ \hline \end{array}$	(3) $\begin{array}{r} 43 \\ -\ 17 \\ \hline \end{array}$	(4) $\begin{array}{r} 32 \\ -\ 9 \\ \hline \end{array}$	(5) $\begin{array}{r} 65 \\ -\ 19 \\ \hline \end{array}$
(6) $\begin{array}{r} 32 \\ -\ 16 \\ \hline \end{array}$	(7) $\begin{array}{r} 91 \\ -\ 43 \\ \hline \end{array}$	(8) $\begin{array}{r} 44 \\ -\ 17 \\ \hline \end{array}$	(9) $\begin{array}{r} 37 \\ -\ 19 \\ \hline \end{array}$	(10) $\begin{array}{r} 61 \\ -\ 22 \\ \hline \end{array}$
(11) $\begin{array}{r} 85 \\ -\ 46 \\ \hline \end{array}$	(12) $\begin{array}{r} 74 \\ -\ 58 \\ \hline \end{array}$	(13) $\begin{array}{r} 52 \\ -\ 29 \\ \hline \end{array}$	(14) $\begin{array}{r} 96 \\ -\ 37 \\ \hline \end{array}$	(15) $\begin{array}{r} 68 \\ -\ 58 \\ \hline \end{array}$

Answers to Self-Test 7

(1) $\begin{array}{r} 47 \\ -\ 28 \\ \hline 19 \end{array}$	(2) $\begin{array}{r} 52 \\ -\ 38 \\ \hline 14 \end{array}$	(3) $\begin{array}{r} 43 \\ -\ 17 \\ \hline 26 \end{array}$	(4) $\begin{array}{r} 32 \\ -\ 9 \\ \hline 23 \end{array}$	(5) $\begin{array}{r} 65 \\ -\ 19 \\ \hline 46 \end{array}$

Check:

$$\begin{array}{r} 19 \\ +28 \\ \hline 47 \end{array} \qquad \begin{array}{r} 14 \\ +38 \\ \hline 52 \end{array} \qquad \begin{array}{r} 26 \\ +17 \\ \hline 43 \end{array} \qquad \begin{array}{r} 23 \\ +\ 9 \\ \hline 32 \end{array} \qquad \begin{array}{r} 46 \\ +19 \\ \hline 65 \end{array}$$

$$\begin{array}{r} (6)\ 32 \\ -16 \\ \hline 16 \end{array} \qquad \begin{array}{r} (7)\ 91 \\ -43 \\ \hline 48 \end{array} \qquad \begin{array}{r} (8)\ 44 \\ -17 \\ \hline 27 \end{array} \qquad \begin{array}{r} (9)\ 37 \\ -19 \\ \hline 18 \end{array} \qquad \begin{array}{r} (10)\ 61 \\ -22 \\ \hline 39 \end{array}$$

Check:

$$\begin{array}{r} 16 \\ +16 \\ \hline 32 \end{array} \qquad \begin{array}{r} 48 \\ +43 \\ \hline 91 \end{array} \qquad \begin{array}{r} 27 \\ +17 \\ \hline 44 \end{array} \qquad \begin{array}{r} 18 \\ +19 \\ \hline 37 \end{array} \qquad \begin{array}{r} 39 \\ +22 \\ \hline 61 \end{array}$$

$$\begin{array}{r} (11)\ 85 \\ -46 \\ \hline 39 \end{array} \qquad \begin{array}{r} (12)\ 74 \\ -58 \\ \hline 16 \end{array} \qquad \begin{array}{r} (13)\ 52 \\ -29 \\ \hline 23 \end{array} \qquad \begin{array}{r} (14)\ 96 \\ -37 \\ \hline 59 \end{array} \qquad \begin{array}{r} (15)\ 75 \\ -58 \\ \hline 17 \end{array}$$

Check:

$$\begin{array}{r} 39 \\ +46 \\ \hline 85 \end{array} \qquad \begin{array}{r} 16 \\ +58 \\ \hline 74 \end{array} \qquad \begin{array}{r} 23 \\ +29 \\ \hline 52 \end{array} \qquad \begin{array}{r} 59 \\ +37 \\ \hline 96 \end{array} \qquad \begin{array}{r} 17 \\ +58 \\ \hline 75 \end{array}$$

One of the great things about mathematics is that your answers are either right or wrong. OK, suppose you're taking an exam and you have time to check all your answers. It's a great feeling to be able to walk out of the exam knowing for sure that you got everything right.

If you got this far, then you must have checked your work and gotten everything right. If not, then you know the drill. You'll need to redo any problems you got wrong.

Chapter 5

Subtracting Two-Digit Numbers with Zeros

There are just nine two-digit numbers ending in zero - 10, 20, 30, 40, 50, 60, 70, 80, and 90.

Please solve this problem:

$$\begin{array}{r} 40 \\ -\ 17 \\ \hline \end{array}$$

Solution:

We can't subtract 7 from 0, so we borrow 1 ten from the tens' column and add 10 ones to the ones' column:

$$\begin{array}{r} 3 \\ \not{4}\ {}^{1}0 \\ -\ 1\ 7 \\ \hline \end{array}$$

Cross out the 4 in the tens' column and make it 3.
Add 1 to the 0 in the ones' column to make it 10.

$$\begin{array}{r} 3 \\ \not{4}\ {}^{1}0 \\ -\ 1\ 7 \\ \hline 2\ 3 \end{array}$$

Ones' column: 10 - 7 = 3
Tens' column: 3 - 1 = 2

One more problem:

$$\begin{array}{r} 6\ 0 \\ -\ 1\ 2 \\ \hline \end{array}$$

Solution:

We can't subtract 2 from 0, so we borrow 1 ten from the tens' column and add 10 ones to the ones' column:

$$\begin{array}{r} 5 \\ \not{6}\ {}^{1}0 \\ -\ 1\ 2 \\ \hline 4\ 8 \end{array}$$

Cross out the 6 in the tens' column and make it 5.
Add 1 to the 0 in the ones' column to make it 10.

$$\begin{array}{r} 5 \\ \not{6}\ {}^{1}0 \\ -\ 1\ 2 \\ \hline 4\ 8 \end{array}$$

Ones' column: 10 - 2 = 8
Tens' column: 5 - 1 = 4

Self-Test 8

Do each of these problems and then check your answers.

(1) $\begin{array}{r} 4\ 0 \\ -\ 1\ 1 \\ \hline \end{array}$ (2) $\begin{array}{r} 8\ 0 \\ -\ 1\ 0 \\ \hline \end{array}$ (3) $\begin{array}{r} 4\ 5 \\ -\ 2\ 0 \\ \hline \end{array}$ (4) $\begin{array}{r} 6\ 0 \\ -\ 3\ 2 \\ \hline \end{array}$

(5) $\begin{array}{r} 9\ 0 \\ -\ 5\ 3 \\ \hline \end{array}$ (6) $\begin{array}{r} 7\ 0 \\ -\ 2\ 2 \\ \hline \end{array}$ (7) $\begin{array}{r} 2\ 0 \\ -\ 1\ 3 \\ \hline \end{array}$ (8) $\begin{array}{r} 7\ 6 \\ -\ 2\ 0 \\ \hline \end{array}$

Answers to Self-Test 8

(1) 29 (2) 70 (3) 25 (4) 28

(5) 37 (6) 48 (7) 7 (8) 56

Chapter 6

Subtracting Three-Digit Numbers with Borrowing

We're going to keep doing the same type of problems, but this time we'll be working with three-digit numbers.

Let's work out the following problem:

$$\begin{array}{r} 472 \\ -\,284 \\ \hline \end{array}$$

Solution:

First we need to borrow 1 ten from the tens' column.

$$\begin{array}{r} 6 \\ 4\,\not{7}\,{}^{1}2 \\ -\,2\;8\;4 \\ \hline \end{array}$$

Cross out the 7 and make it a 6.
Put the 1 we borrowed in front of the 2 to make it 12.

$$\begin{array}{r} 6 \\ 4\,\not{7}\,{}^{1}2 \\ -\,2\;8\;4 \\ \hline \end{array}$$

12 - 4 = 8. Write down the 8.

Now we're going to need to borrow 1 hundred from the hundreds' column:

```
 3 16
 4 7 12
-2 8 4
```

The 4 in the hundreds' column becomes a 3.
Put the 1 we borrowed in front of the 6 to make it 16.

```
 3 16
 4 7 12
-2 8 4
 1 8 8
```

16 - 8 = 8. Write down the 8; then subtract 2 from 3 and write down 1.

Check:

```
  2 8 4
+ 1 8 8
  4 7 2
```

Next problem:

```
  7 1 3
- 5 4 9
```

Solution:

```
   0
 7 1 13
-5 4 9
     4
```

Borrow 1 ten; add it to 3 ones to make 13 ones.
13 ones - 9 ones = 4 ones.

```
  6 10
 7 1 13
-5 4 9
   6 4
```

Borrow 1 hundred; add it to 0 tens to make 10 tens.
10 tens - 4 tens = 6 tens.

```
 6 10
 7 1 13
-5 4 9
 1 6 4
```

6 hundreds - 5 hundreds = 1 hundred.

Check:

$$\begin{array}{r} 164 \\ +\,549 \\ \hline 713 \end{array}$$

Ready for one last problem?

$$\begin{array}{r} 653 \\ -\,384 \\ \hline \end{array}$$

Solution:

$$\begin{array}{r} 4 \\ 6\,\not{5}\,{}^{1}3 \\ -\,384 \\ \hline \end{array}$$

First we borrow 1 ten from the tens' column.

$$\begin{array}{r} 4 \\ 6\,\not{5}\,{}^{1}3 \\ -\,384 \\ \hline 9 \end{array}$$

13 - 4 = 9

$$\begin{array}{r} 514 \\ \not{6}\,\not{5}\,{}^{1}3 \\ -\,384 \\ \hline 9 \end{array}$$

Now we borrow 1 hundred from the hundreds' column.

$$\begin{array}{r} 514 \\ \not{6}\,\not{5}\,{}^{1}3 \\ -\,384 \\ \hline 269 \end{array}$$

14 - 8 = 6; 5 - 3 = 2

Check:

$$\begin{array}{r} 269 \\ +\,384 \\ \hline 653 \end{array}$$

Self-Test 9

Do each of these problems and then check your answers.

(1) 814 − 125

(2) 625 − 577

(3) 538 − 369

(4) 764 − 287

(5) 937 − 459

(6) 422 − 358

(7) 625 − 481

(8) 265 − 189

(9) 856 − 157

(10) 718 − 379

(11) 642 − 458

(12) 435 − 266

(13) 873 − 195

(14) 512 − 469

(15) 334 − 198

Answers to Self-Test 9

(1) 689 (2) 48 (3) 169 (4) 477

Check:

689 + 125 = 814

48 + 577 = 625

169 + 369 = 538

477 + 287 = 764

(5) 478 (6) 64 (7) 144 (8) 76

Check:

478 + 459 = 937

64 + 358 = 422

144 + 481 = 625

76 + 189 = 265

(9) 699 (10) 339 (11) 184 (12) 169

Check:

699 + 157 = 856

339 + 379 = 718

184 + 458 = 642

169 + 266 = 435

(13) 678 (14) 43 (15) 136

Check:

```
  678      43      136
+ 195    + 469    + 198
  873      512      334
```

Self-Test 9 was so much fun, let's go straight to Self-Test 10.

Self-Test 10

Do each of these problems and then check your answers.

```
(1) 731    (2) 591    (3) 335    (4) 624
    -195       -292       -148       -235

(5) 916    (6) 845    (7) 721    (8) 423
    -828       -659       -196       -285

(9) 723    (10) 241   (11) 922   (12) 547
    -175       -164       -278       -468

(13) 822   (14) 533   (15) 916
     -245       -384       -738
```

Answers to Self-Test 10

(1) 536 (2) 299 (3) 187 (4) 389

Check:

536 +195 731	299 +292 591	187 +148 335	389 +235 624
(5) 88	(6) 186	(7) 525	(8) 138

Check:

88 +828 916	186 +659 845	525 +196 721	138 +285 423
(9) 548	(10) 77	(11) 644	(12) 79

Check:

548 +175 723	77 +164 241	644 +278 922	79 +468 547
(13) 577	(14) 149	(15) 178	

Check:

577 +245 822	149 +384 533	178 +738 916

Did you get everything right? Even if you caught a few mistakes when you checked your answers, the bottom line is that you ultimately got the right answers. So please proceed to Chapter 7. But if you can still use a little more practice, please take Self-Test 11.

Self-Test 11

Do each of these problems and then check your answers.

(1) 766 -167	(2) 341 -198	(3) 512 -245	(4) 635 -177
(5) 831 -654	(6) 732 -483	(7) 596 -398	(8) 661 -472
(9) 824 -466	(10) 538 -299	(11) 273 -185	(12) 175 -166
(13) 847 -659	(14) 445 -286	(15) 928 -749	

Answers to Self-Test 11

(1) 599	(2) 143	(3) 267	(4) 458

Check:

599 +167 766	143 +198 341	267 +245 512	458 +177 635

(5) 177	(6) 249	(7) 198	(8) 189

Check:

177 +654 831	249 +483 732	198 +398 596	189 +472 661

(9) 358	(10) 239	(11) 88	(12) 9

Check:

358 +466 824	239 +299 538	88 +185 273	9 +166 175
(13) 188	(14) 159	(15) 179	

Check:

188 +659 847	159 +286 445	179 +749 928

Did you check your work? If you did, then you caught any mistakes you made and corrected them. So you know that all your answers are right.

Is checking your work kind of like cheating? Not at all! Haven't teachers always said that if you finish a test early, always go back and check your work? Besides, nobody's perfect: we all make mistakes. But if we check our answers, we can get a lot closer to perfection.

Chapter 7

Subtracting Three-Digit Numbers Containing Zeros

Here's another problem for you to work out:

$$\begin{array}{r} 805 \\ -279 \\ \hline \end{array}$$

Solution:

We need to borrow 1 ten, but we have 0 tens. So what do we do? We borrow 1 hundred. That gives us 10 tens. Then we can borrow 1 ten from those 10 tens.

$$\begin{array}{r} {\scriptstyle 7\ 9} \\ 8\ \cancel{0}\ {}^{1}5 \\ -2\ 7\ 9 \\ \hline 6 \end{array}$$

Borrow 1 ten; add it to 5 ones to make 15.
15 ones - 9 ones = 6 ones.

$$\begin{array}{r} {\scriptstyle 7\ 9} \\ 8\ \cancel{10}\ {}^{1}5 \\ -2\ 7\ 9 \\ \hline 2\ 6 \end{array}$$

9 tens - 7 tens = 2 tens.

$$\begin{array}{r} {\scriptstyle 7\ 9} \\ 8\ \cancel{10}\ {}^{1}5 \\ -2\ 7\ 9 \\ \hline 5\ 2\ 6 \end{array}$$

7 hundreds - 2 hundreds = 5 hundreds.

Let's try a shortcut solution of this problem:

```
  8 0 5
- 2 7 9
-------
```

Solution:

Think of the first two numbers in 805 as 80. If we borrow 1 from 80, we cross out 80 and write 79. Then put the 1 we borrowed in front of 5 to make 15. Now we can subtract.

```
  8 0 5
- 2 7 9
-------
```

```
  7 9
  8 0 15      Ones' column: 15 - 9 = 6
- 2 7 9       Tens' column: 9 - 7 = 2
-------       Hundreds' column: 7 - 2 = 5
  5 2 6
```

Here's another problem:

```
  7 0 3
- 4 7 5
-------
```

Solution:

Can we borrow a ten from the tens' column? No, since there *are* no tens in that column. So what *can* we do?

Using the shortcut method, we'll treat the first two numbers of 703 as 70. We borrow 1 from 70, making it 69. Then we put the 1 we borrowed in front of the 3 to make 13. Now we can subtract.

```
  6 9
  7 0 13
- 4 7 5
-------

  6 9
  7 0 13      Ones' column: 13 - 5 = 8
- 4 7 5       Tens' column: 9 - 7 = 2
-------       Hundreds' column: 6 - 4 = 2
  2 2 8
```

One last problem:

```
  5  0  0
- 2  9  3
---------
```

Solution:

Once again we'll use the shortcut solution. Borrow 1 from 50, making it 49. Place the 1 we borrowed in front of the 0 in the ones' column giving us 10.

```
  4 9
  5 0 10
- 2 9 3
-------

  4 9
  5 0 10      Ones' column: 10 - 3 = 7
- 2 9 3       Tens' column: 9 - 9 = 0
-------       Hundreds' column: 4 - 2 = 2
  2 0 7
```

Self-Test 12

(1) 590 − 291

(2) 400 − 237

(3) 740 − 199

(4) 901 − 283

(5) 906 − 828

(6) 560 − 280

(7) 800 − 476

(8) 608 − 440

(9) 703 − 175

(10) 790 − 202

(11) 900 − 207

(12) 660 − 401

(13) 820 − 243

(14) 900 − 330

(15) 701 − 504

Answers to Self-Test 12

(1) 299

(2) 163

(3) 541

(4) 618

Check:

299 + 291 = 590

163 + 237 = 400

541 + 199 = 740

618 + 283 = 901

(5) 78

(6) 280

(7) 324

(8) 168

Check:

78 + 828 = 906

280 + 280 = 560

324 + 476 = 800

168 + 440 = 608

(9) 528

(10) 588

(11) 693

(12) 259

Check:

528 +175 703	588 +202 790	693 +207 900	259 +401 660
(13) 577	(14) 570	(15) 197	

Check:

577 +243 820	570 +330 900	197 +504 701

You'll notice that we're still checking our answers. This is really important, so please keeping doing it. Now let's do another self-test.

Self-Test 13

(1) 500 -241	(2) 901 -616	(3) 640 -495	(4) 700 -314
(5) 801 -654	(6) 500 -143	(7) 901 -604	(8) 660 -472
(9) 804 -416	(10) 400 -301	(11) 810 -167	(12) 740 -190
(13) 300 -254	(14) 710 -512	(15) 604 -306	

Answers to Self-Test 13

(1) 259	(2) 285	(3) 145	(4) 386

Check:

259 +241 500	285 +616 901	145 +495 640	386 +314 700
(5) 147	(6) 357	(7) 297	(8) 188

Check:

147 +654 801	357 +143 500	297 +604 901	188 +472 660
(9) 388	(10) 99	(11) 643	(12) 550

Check:

388 +416 804	99 +301 400	643 +167 810	550 +190 740
(13) 46	(14) 198	(15) 298	

Check:

46 +254 300	198 +512 710	298 +306 604

Are you ready to go on to Chapter 8? You certainly are if you got all the problems right in this chapter. If not, then you'll need to redo any that you got wrong.

Chapter 8

Subtracting into the Thousands

Please solve this problem:

$$\begin{array}{r} 4,384 \\ -\,2,579 \\ \hline \end{array}$$

Solution:

$$\begin{array}{r} {\scriptstyle 3}\quad {\scriptstyle 7} \\ \not{4},{}^{1}3\ \not{8}\ {}^{1}4 \\ -\,2,5\ 7\ 9 \\ \hline 1,8\ 0\ 5 \end{array}$$

Here's another problem to do:

$$\begin{array}{r} 10,016 \\ -\ 7,418 \\ \hline \end{array}$$

Solution:

$$\begin{array}{r} {\scriptstyle 9}\ {\scriptstyle 9}{\scriptstyle 10} \\ \not{1}\ \not{0},0\ \not{1}\ {}^{1}6 \\ -\ \ 7,4\ 1\ 8 \\ \hline 2,5\ 9\ 8 \end{array}$$

To save space we've stopped checking our work. But we very strongly recommend that you continue to do so. We believe that if you catch a mistake and correct it, that mistake never happened. Regardless of what anyone might tell you, getting the right answer is what math is all about. So only fools don't check their work.

Self-Test 14

(1) 7, 2 3 5 - 5, 3 4 8	(2) 4, 0 9 6 - 1, 2 8 7	(3) 8, 1 5 3 - 3, 9 8 5	(4) 5, 8 4 1 - 2, 8 4 8
(5) 9, 0 5 5 - 8, 1 9 6	(6) 6, 1 4 3 - 4, 3 4 5	(7) 2, 4 8 5 - 1, 3 9 7	(8) 8, 0 1 7 - 5, 1 9 7
(9) 1 1, 2 7 3 - 9, 2 7 5	(10) 9, 3 7 8 - 6 2 8	(11) 1 2, 3 8 4 - 1 0, 5 8 8	(12) 7, 3 9 2 - 6, 6 8 5
(13) 1 5, 0 2 9 1 2, 1 6 9	(14) 1 3, 2 7 1 - 1 0, 7 7 2	(15) 1 6, 5 8 3 - 1 2, 5 9 5	

Answers to Self-Test 14

(1) 1,887	(2) 2,809	(3) 4,168	(4) 2,993
(5) 859	(6) 1,798	(7) 1,088	(8) 2,820
(9) 1,998	(10) 3,089	(11) 1,796	(12) 707
(13) 2,860	(14) 2,499	(15) 3,988	

That was so much fun, let's do another set of problems.

Self-Test 15

(1) 4,017 - 2,178	(2) 7,195 - 5,296	(3) 3,252 - 1,249	(4) 5,184 - 3,196
(5) 10,361 - 6,463	(6) 9,536 - 7,548	(7) 12,728 - 9,659	(8) 14,627 - 12,529
(9) 15,639 - 11,649	(10) 8,402 - 7,414	(11) 6,177 - 4,268	(12) 15,362 - 12,699
(13) 16,003 - 9,146	(14) 15,175 - 13,976	(15) 18,427 - 12,389	

Answers to Self-Test 15

(1) 1,839	(2) 1,899	(3) 2,003	(4) 1,988
(5) 3,898	(6) 1,988	(7) 3,069	(8) 2,098
(9) 3,990	(10) 988	(11) 1,909	(12) 2,663
(13) 6,857	(14) 1,199	(15) 6,038	

Again, if you got everything right, then you're ready for Chapter 9. If not, please redo any problems that you missed.

Chapter 9

Subtracting Two-, Three-, Four-, and Five-Digit Numbers

Now for something a little bit different. Until now, we've been subtracting one two-digit number from another (for example, 56 - 39), or one three-digit number from another (for example, 351 - 286), or one four-digit number from another (for example, 4,625 - 2,398). Now let's subtract relatively small numbers from relatively large numbers. Please perform this subtraction:

```
  6, 1 8 4
- 2 8 8
```

Solution:

```
  5  10 17
  6, 1  8  14
-    2  8  8
  5, 8  9  6
```

Here's another one: If you begin with 10,100 and subtract 1,299 and 546, how much do you have left?

Solution:

$$\begin{array}{r} 1,299 \\ +\ 546 \\ \hline 1,845 \end{array}$$

Add 1,299 + 546 to get 1,845.

$$\begin{array}{r} 9\ 10\ 9 \\ \cancel{1}\cancel{0},1\ 0\ {}^{1}0 \\ -\ 1,845 \\ \hline 8,255 \end{array}$$

Subtract: 10,100 - 1,845 = 8,255.

Sometimes we'll find numbers expressed in words. For example, if George Washington was born in seventeen hundred thirty-two and died in seventeen hundred ninety-nine, how old was he when he died?

Solution:

$$\begin{array}{r} 1799 \\ -1732 \\ \hline 67 \end{array}$$

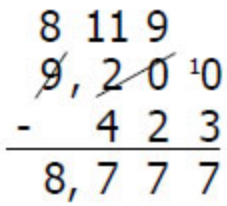
See if you can subtract three hundred seventy-five from two thousand one hundred.

Solution:

$$\begin{array}{r} 1\ 10\ 9 \\ \cancel{2},\cancel{1}\ 0\ {}^{1}0 \\ -\ \ 3\ 7\ 5 \\ \hline 1,725 \end{array}$$

How much is nine thousand two hundred minus four hundred twenty-three?

Solution:



If you'd like a little more practice translating words into numbers, please look at the box on the next page.

Box: Translating Words into Numbers

Here are some basic translations:

one = 1

ten = 10

one hundred = 100

one thousand = 1,000

ten thousand = 10,000

Now translate two hundred sixty-four into a number.

Solution:

264

Convert one thousand nine hundred thirty-five into a number.

Solution:

1,935

Translate each of these terms into numbers:

a) eight thousand six hundred nine

b) four hundred twenty-one

c) seventeen thousand forty

d) three thousand one hundred eighty-three

Solution:

a) 8,609

b) 421

c) 17,040

d) 3,183

The word “and” is reserved for a decimal point. For example, $10.75 would be read as ten dollars and seventy-five cents. How would you express the number, 264, in words?

It would be expressed as two hundred sixty-four. But not as two hundred *and* sixty-four. That’s a common mistake.

(end of box)

In *The Book of Addition* we asked you to find the sum of two numbers. For example – how much is the sum of 20 and 35?

20 + 35 = 55. In subtraction we may ask you to find the *difference* of two numbers. Go ahead and find the difference of 435 and 169.

Solution:

$$\begin{array}{r} {}^{3}\not{4}\,{}^{1}\not{3}\,{}^{1}5 \\ -\,1\;6\;9 \\ \hline 2\;6\;6 \end{array}$$

And one last problem: You begin with 8,000. From that subtract the numbers 29, 284, and 1,395.

Solution:

```
   2 9
 2 8 4
1,3 9 5
1,7 0 8
```

Add 29 + 284 + 1,395 to get 1,708.

```
  7 9 9
  8,0 0 10
- 1,7 0 8
  6,2 9 2
```

Subtract: 8,000 - 1,708 = 6,292.

Self-Test 16

(1) How much is 12,500 - 985?

(2) Subtract 78 from 1,510.

(3) 3,140 − 98

(4) 10,225 − 858

(5) 12,004 − 145

(6) How much is 17,200 - 1,073?

(7) Subtract 988 from 12,700.

(8) You begin with 15,233. From that you take away 243 and 73. How much do you have left?

(9) How much is fourteen thousand minus one hundred fifty-five?

(10) 18,225 − 58

(11) 13,023 − 774

(12) 9,300 − 81

(13) How much is ten thousand two hundred forty-three minus nine hundred seventy-five?

(14) You begin with 11,100. From that you subtract 259 and 73. How much do you have left?

(15) How much is eight thousand four hundred minus six hundred one?

(16) Find the difference of 423 and 79.

(17) Find the difference of five hundred three and forty-eight.

Answers to Self-Test 16

(1) 12,500 − 985 = 11,515

(2) 1,510 − 78 = 1,432

(3) 3,140 − 98 = 3,042

(4) 10,225 − 858 = 9,367

(5) 12,004 − 145 = 11,859

(6) 17,200 − 1,073 = 16,127

(7) 12,700 − 988 = 11,712

(8) 243 + 73 = 316; 15,233 − 316 = 14,917

(9) 14,000 − 155 = 13,845

(10) 18,225 − 58 = 18,167

(11) 13,023 − 774 = 12,249

(12) 9,300 − 81 = 9,219

(13) 10,243 − 975 = 9,268

(14) 259 + 73 = 332

11,100 − 332 = 10,768

(15) 8,400 − 601 = 7,799

(16) 423 − 79 = 344

(17) 503 − 48 = 455

Are you still checking all your answers? If you are, then you're catching any mistakes you've made.

Chapter 10

Applications

Saleh Nikbakht sells his house for $200,000. He pays his real estate broker $12,000, and then he pays closing fees of $3,178. How much money does he actually get for his house?

Solution:

$$\begin{array}{r} \$12,000 \\ +\ 3,178 \\ \hline 15,178 \end{array}$$

$$\begin{array}{r} 19999 \\ \$200,000 \\ -\ 15,178 \\ \hline \$184,822 \end{array}$$

When the first pitch is thrown at the Ballpark at Arlington, there are 38,111 people in the stands. Before the game ends 9,374 people arrive and 20,926 people leave. At the end of the game, how many people are still in the ball park?

Solution:

$$\begin{array}{r} 38,111 \\ +\ 9,374 \\ \hline 47,485 \end{array}$$

$$\begin{array}{r} 6147 \\ 47,\cancel{4}\,\cancel{8}^{15} \\ -\ 20,926 \\ \hline 26,559 \end{array}$$

The Battle of Hastings took place in one thousand sixty-six. King John signed the Magna Carta in twelve fifteen. How many years passed between the Battle of Hastings and the signing of the Magna Carta?

Solution:

$$\begin{array}{r} 110 \\ 1,\cancel{2}\,\cancel{1}^{15} \\ -\ 1,066 \\ \hline 149 \text{ years} \end{array}$$

How much larger is twelve thousand seven hundred eighty-two than four thousand eight hundred seventy-nine?

Solution:

$$\begin{array}{r} 11177 \\ \cancel{1}2,\cancel{7}\,\cancel{8}^{12} \\ -\ 4,879 \\ \hline 7,903 \end{array}$$

Samuel J. Tilden High School has 2,017 seniors, 2,246 juniors, 2,401 sophomores, and 2,578 freshmen.

A) How many more freshmen are there than juniors?

B) How many more sophomores are there than seniors?

C) How many fewer seniors are there than freshmen?

Solution:

A) $2,578 - 2,246 = 332$

B) $2,401 - 2,017 = 384$

C) $2,578 - 2,017 = 561$

Self-Test 17

1. When the first pitch was thrown at Yankee Stadium, there were 48,125 fans in the stands. During the rest of the game 7,264 more fans arrived and 10,679 left. How many fans were still there when the game ended?
2. In Essex County, President Bush received eighteen thousand one hundred fifty votes. Senator Kerry received sixteen thousand eight hundred sixtytwo votes. By how many votes did President Bush win in Essex County?
3. Babak Dehghanpisheh left home with $104. He spent $8 on lunch, $23 on groceries, and $12 for flowers. How much money did he have left?
4. The T-Bar-T Ranch was 17,255 acres. If the owners sold off 1,223 acres to one buyer and 4,065 acres to another buyer, how many acres does the ranch still own?
5. Ingrid Vilhjalmsson left an inheritance of nineteen thousand dollars to her three children. If the first child received five thousand three hundred forty dollars and the second child received six thousand five hundred nine dollars, how much did the third child receive?
6. Shyam Selvadurai drove 2,871 miles from New York to California. On the first day of his return trip he drove 674 miles. At that point, how far from New York was he?
7. There were 2,382 students in the freshmen class at the University of Tulsa. If 895 dropped out, how many students graduated?

8. Mercedes Padilla had a checking account with a balance of $16,036 of June 1st. On June 5th she wrote a check for $745 and on June 19th she wrote another check for $233. She deposited $1,427 in her checking account on June 25th. How much money was now in her account?
9. Luigi's score on the exam was 92. Sophia's score was 28 points lower. What was Sophia's score on the exam?
10. When you started climbing a mountain you were 5,824 feet above sea level. When you got to the top, you were 11,909 feet above sea level. How far did you climb?
11. Li Yu earned $17,243 in commissions during the first quarter and $12,485 in the second quarter. By how much did his commissions decline?
12. The boss brought four hundred fifty dollars to work on Friday. She paid one of her workers $225 and she paid her other worker $190. How much money did the boss have left?
13. When you were leaving on a trip, your car's odometer read 14,199. When you arrived at your destination, your odometer read 16,056. How far did you travel?
14. Yuri earns $11,043 less than Natasha. If Natasha earns $60,730, how much does Yuri earn?
15. A store had eight hundred forty-one snow shovels. By noon one hundred seventy-two had been sold. Between noon and closing time an additional forty-seven shovels were sold. How many shovels did the store have left in stock at closing time?

Answers to Self-Test 17

(1) 48,125 + 7,264 = 55,389

55,389 - 10,679 = 44,710 fans

(2) 18,150 - 16,862 = 1,288 votes

(3) $ 8 + 23 + 12 = $43

104 - 43 = 61

(4) 1,223 + 4,065 = 5,288

17,255 - 5,288 = 11,967 acres

(5) $ 5,340 + 6,509 = $11,849

$19,000 - 11,849 = $ 7,151

(6) 2,871 - 674 = 2,197

(7) 2,382 - 895 = 1,487

(8) $16,036 + 1,427 = $17,463

$745 + 233 = $978

$17,463 - 978 = $16,485

(9) 92 - 28 = 64 points

(10) 11,909 - 5,824 = 6,085 feet

(11) $17,243 - 12,485 = $ 4,758

(12) $225 + 190 = $415

$450 - 415 = $ 35

(13) 16,056 - 14,199 = 1,857 miles

(14) $60,730 - 11,043 = $49,687

(15) 172 + 47 = 219

841 - 219 = 622 shovels

Did you get each of these problems right? Then you're done. with this chapter. And you're ready for the Final Exam.

If you're still here, then the big question is: How many did you get wrong? We're feeling pretty good right now, so if you got just one problem wrong, you may go on to the Final Exam.

Still with us? All right, then, let's tackle Self-Test 18.

Self-Test 18

1. Kyra left for work with $283. She spent $9 on lunch, $54 on shoes, and $15 on a watch. How much money did she have left?
2. The difference between two numbers is 382. If the larger number is 701, how much is the smaller number?

3. Sean O'Boyle had a checking account balance of $5,071. If he made a deposit of $1,350, and then wrote a check for $725, how much money would now be in his account?
4. If I owe you eleven thousand four hundred dollars and repay three thousand eight hundred dollars, how much do I still owe you?
5. On Monday Gang Zhao left on a five thousand one hundred sixty-four mile trip. He drove five hundred twenty-two miles on Monday, four hundred seventy-eight miles on Tuesday, and five hundred six miles on Wednesday. How many more miles did he have to go?
6. Zahra Behnoodi owns a store that did sales of $12,146 during the first week in February and $15,073 during the second week. How much larger were her second-week sales than her first-week sales?
7. If Hans is 34 years older than Lucia, how old is Lucia if Hans is 71?
8. During the 1990s the population of Los Alamos rose by 4,199. If the population of the city was 17,394 in the year 2000, how much was its population in 1990?
9. Manmohan Singh earned $19,024 in 2005. In 2006 he earned $17,478. How much less did he earn in 2006 than in 2005?
10. At the start of the game at Fenway Park, there were 22,062 fans in the stands. During the game 9,155 arrived and 12,492 left. How many fans were still in the ballpark at the end of the game?
11. Takisha Nguyen was born on the third of February, nineteen hundred nine. She died on the twenty-fourth of March, two thousand one. How many years old was she when she died?
12. If you had sixteen thousand eight hundred fifty-three dollars and spent two thousand nine hundred ninety-six dollars, how much money would you have left?
13. An oil delivery truck left the depot with four thousand seven hundred thirty-one gallons of heating oil. It delivered two hundred fifty-four gallons to the first house, four hundred nine gallons to the second house, and three thousand one hundred sixty-five gallons to a large apartment house. How many gallons of oil did the truck have left?

14. Caanan Banana started with 497 bricks and found 374 more bricks. If 1500 bricks is a full load, how many bricks short of a full load was Mr. Banana.
15. Ms. Koshiama had a checking account balance of $5,167. If she wrote checks for $325, $578, and $290, how much money was left in her account?

Answers to Self-Test 18

(1) $\begin{array}{r} \$\ 9 \\ 54 \\ +15 \\ \hline \$78 \end{array}$ $\begin{array}{r} \$283 \\ -\ 78 \\ \hline \$205 \end{array}$ (2) $\begin{array}{r} 701 \\ -382 \\ \hline 319 \end{array}$ (3) $\begin{array}{r} \$5,071 \\ +1,350 \\ \hline \$6,421 \end{array}$ $\begin{array}{r} \$6,421 \\ -\ 725 \\ \hline \$5,696 \end{array}$

(4) $\begin{array}{r} \$11,400 \\ -\ 3,800 \\ \hline \$\ 7,600 \end{array}$ (5) $\begin{array}{r} 522 \\ 478 \\ +506 \\ \hline 1,506 \end{array}$ $\begin{array}{r} 5,164 \\ -1,506 \\ \hline 3,658 \text{ miles} \end{array}$ (6) $\begin{array}{r} \$15,073 \\ -12,146 \\ \hline \$\ 2,927 \end{array}$

(7) $\begin{array}{r} 71 \\ -34 \\ \hline 37 \end{array}$ (8) $\begin{array}{r} 17,394 \\ -\ 4,199 \\ \hline 13,195 \end{array}$ (9) $\begin{array}{r} \$19,024 \\ -17,478 \\ \hline \$\ 1,546 \end{array}$

(10) $\begin{array}{r} 22,062 \\ +\ \ 9,155 \\ \hline 31,217 \end{array}$ $\begin{array}{r} 31,217 \\ -12,492 \\ \hline 18,725 \end{array}$ (11) $\begin{array}{r} 2001 \\ -1909 \\ \hline 92 \end{array}$ (12) $\begin{array}{r} \$16,853 \\ -\ 2,996 \\ \hline \$13,857 \end{array}$

(13) $\begin{array}{r} 254 \\ 409 \\ +3,165 \\ \hline 3,828 \end{array}$ $\begin{array}{r} 4,731 \\ -3,828 \\ \hline 903 \text{ gallons} \end{array}$ (14) $\begin{array}{r} 497 \\ +374 \\ \hline 871 \end{array}$ $\begin{array}{r} 1,500 \\ -\ 871 \\ \hline 629 \text{ bricks} \end{array}$

(15) $\begin{array}{r} \$\ 325 \\ 578 \\ +\ 290 \\ \hline \$1,193 \end{array}$ $\begin{array}{r} \$5,167 \\ -1,193 \\ \hline \$3,974 \end{array}$

If you got all of these right, then go directly to the final exam. If not, then please go back to the start of this chapter and work your way through it again. Once you have, you should be ready for the final exam. And remember: Check your work!

Final Exam

Let’s see how much you remember from all the way back to the first chapter. You should be able to complete this in about 40 minutes. But there’s no hurry. And remember to check all your work!

Chapter 1:

(1) 7 - 4 = _____ (2) 13 - 7 = _____ (3) 16 - 8 = _____

(4) 12 - 8 = _____

Chapter 2:

(1)	(2)	(3)	(4)
35	68	76	97
- 22	- 35	- 41	- 62

Chapter 3:

(1)	(2)	(3)	(4)
53	80	92	75
- 28	- 43	- 76	- 39

Chapter 4:

(1)	(2)	(3)	(4)
64	81	70	46
- 36	- 73	- 57	- 19

Chapter 5:

Do each of these subtraction problems and then check your answers.

(1) 67 − 38 (2) 82 − 26 (3) 56 − 17 (4) 70 − 11

Chapter 6:

Do each of these subtraction problems and prove your answers.

(1) 514 − 146 (2) 905 − 618 (3) 732 − 539 (4) 600 − 412

Chapter 7:

(1) 436 − 157 (2) 625 − 589 (3) 840 − 542 (4) 602 − 395

Chapter 8:

(1) 5,615 − 3,636 (2) 8,046 − 6,548 (3) 3,817 − 1,818 (4) 7,004 − 4,017

Chapter 9:

(1) 18,200 − 396

(2) Subtract 88 from 1,027.

(3) You begin with 17,133. From that you take away 378 and 2,097. How much do you have left?

(4) The United States is said to have begun on July fourth, seventeen seventy-six. How many years passed until July fourth, two thousand six?

Chapter 10:

1. Arlene Cohen won a raffle prize of $13,500. She paid $2,117 in taxes and gave $2,500 to her daughter. How much money did she have left?
2. Francine Esposito earned $49,574 in 2005. In 2006 she earned $60,113. How much more did she earn in 2006 than in 2005?
3. Peter Anastasakos had a checking account with a balance of $14,015 on August 1st. On August 4th he wrote a check for $590 and on August 15th he wrote another check for $988. He deposited $1,875 in his checking account on August 23rd. How much money was now in his account?
4. Midhat al-Mahoudi was born on the sixth of January in the year nineteen four. He died on the eighth of October in the year nineteen ninety-one. How many years old was he when he died?

Answers to Final Exam

Chapter 1:

(1) 3 (2) 6 (3) 8 (4) 4

Chapter 2:

(1) 13 (2) 33 (3) 35 (4) 35

Chapter 3:

(1)	(2)	(3)	(4)
53	80	92	75
- 28	- 43	- 76	- 39
25	37	16	36

Chapter 4:

(1)	(2)	(3)	(4)
64	81	70	46
- 36	- 73	- 57	- 19
28	8	13	27

Chapter 5:

(1)	(2)	(3)	(4)
67	82	56	70
- 38	- 26	- 17	- 11
29	56	39	59

Check:

29	56	39	59
+38	+26	+17	+11
67	82	56	70

Chapter 6:

(1)	(2)	(3)	(4)
514	905	732	600
- 146	- 618	- 539	- 412
368	287	193	188

Check:

368	287	193	188
+ 146	+ 618	+ 539	+ 412
514	905	732	600

Chapter 7:

(1) 279 (2) 36 (3) 298 (4) 207

Chapter 8:

(1) 1,979 (2) 1,498 (3) 1,999 (4) 2,987

Chapter 9:

(1) 17,804 (2) 939 (3) 14,658 (4) 230 years

Chapter 10:

(1) 8,883 (2) $10,539 (3) $14,312 (4) 87

If you aced this exam, we'd like to congratulate you. You can subtract better than 90 percent of all adults. Please go to the Last Word.

If you got just one or two problems wrong, you're in great shape and can go directly to the Last Word.

If you got more than two problems wrong, then you still have some work to do. Please go back to the chapters in which you missed any problems. Rework your way through those chapters. Once you feel

comfortable doing all those problems, you may go on to the Last Word.

Last Word

You've completed the second of our four-book set. The next book is on multiplication, which is followed by the book on division.

You're well on your way to learning math, so keep up the good work. And just to show you what nice guys we are, we'll let you take the rest of the week off before you go on to multiplication.

The Book of Multiplication

Introduction

We're assuming that you know how to add and subtract. You *do*, right? If not,then you definitely need to work your way through the first two parts – *The Book of Addition and The Book of Subtraction.*

Did you know that multiplication is really speeded up addition? That's right: multiplication provides us with a shortcut to addition. For example, go ahead and add these numbers:

```
  7
  7
  7
  7
  7
  7
  7
  7
+ 7
```

What did you get? Did you get 63? How long did it take you to come up with this answer? 30 seconds? 45 seconds? Maybe even a minute? You can do the same problem in about a second using multiplication:

9 x 7 = 63

There's only one trick: You need to know the multiplication table, which you'll find on the next page.

Multiplication Table

x	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Most Americans get by without ever learning how to multiply. They may be very nice people, but none of them have gone very far in mathematics. If you can't multiply, then you won't be able to divide. You won't be able to do even simple algebra. But once you've got multiplication down, there's no telling how far you'll go. You've certainly heard all that talk about going back to basics. Well, as it so happens, multiplication is about as basic as it gets.

We're not real big on vocabulary, but you do need to learn one word. When two or more numbers are multiplied, the answer is called the *product* of those numbers. So, how much is the product of 5 and 9?

The product of 5 and 9 is 45.

Before we go any further, here are the only two rules you need to follow:

Rule number one: You may not use a calculator. Using a calculator interferes with your learning math. So just give it away because you're not going to need it any more.

Rule number two: Since you're going to be working your way through this book, you need to be confident that you understand what you're doing. If something isn't clear, then go over it until it is. For example, in Chapter 1, you MUST learn to multiply two single-digit numbers. No ifs, ands or buts. You need to know how to multiply these numbers WITHOUT a calculator.

Chapter 1

Multiplying Single-Digit Numbers

This is probably the most important chapter in the entire book. If you can't do single-digit multiplication in your head, then you won't be able to multiply. And if you can't multiply, then you can't go very far in mathematics.

So before we go any further, we want to see if you really *do* know your multiplication. Please go ahead and take Self-Test 1 on the next page.

Self-Test 1

(1) 4 x 4 = _____	(2) 8 x 5 = _____	(3) 7 x 6 = _____
(4) 5 x 10 = _____	(5) 9 x 3 = _____	(6) 6 x 4 = _____
(7) 9 x 8 = _____	(8) 5 x 7 = _____	(9) 2 x 9 = _____
(10) 10 x 8 = _____	(11) 3 x 8 = _____	(12) 4 x 9 = _____
(13) 6 x 5 = _____	(14) 8 x 7 = _____	(15) 6 x 9 = _____
(16) 9 x 9 = _____	(17) 6 x 6 = _____	(18) 10 x 7 = _____
(19) 3 x 7 = _____	(20) 5 x 4 = _____	(21) 5 x 3 = _____
(22) 6 x 10 = _____	(23) 8 x 8 = _____	(24) 2 x 7 = _____
(25) 3 x 6 = _____	(26) 5 x 5 = _____	(27) 3 x 3 = _____
(28) 2 x 6 = _____	(29) 3 x 10 = _____	(30) 3 x 4 = _____
(31) 7 x 4 = _____	(32) 10 x 5 = _____	(33) 4 x 6 = _____
(34) 8 x 6 = _____	(35) 4 x 10 = _____	(36) 5 x 6 = _____

Answers to Self-Test 1

(1) 16	(2) 40	(3) 42
(4) 50	(5) 27	(6) 24
(7) 72	(8) 35	(9) 18
(10) 80	(11) 24	(12) 36
(13) 30	(14) 56	(15) 54
(16) 81	(17) 36	(18) 70
(19) 21	(20) 20	(21) 15
(22) 60	(23) 64	(24) 14
(25) 18	(26) 25	(27) 9
(28) 12	(29) 30	(30) 12
(31) 28	(32) 50	(33) 24
(34) 48	(35) 40	(36) 30

So how did you do? If you got everything right, then you're ready for Self-Test 2.

If not, then please make a flash card for each problem you got wrong. On one side, write out the problem, and on the other side, write the correct answer.

Once you've mastered all the flash cards, we'd like you to redo Self-Test 1. When you do, we expect you to get a perfect score. Then you'll be ready to take Self-Test 2.

Self-Test 2

(1)	7 x 9 = _____	(2)	9 x 6 = _____	(3)	10 x 10 = _____
(4)	4 x 8 = _____	(5)	10 x 4 = _____	(6)	9 x 10 = _____
(7)	8 x 9 = _____	(8)	7 x 8 = _____	(9)	6 x 7 = _____
(10)	10 x 9 = _____	(11)	6 x 3 = _____	(12)	5 x 9 = _____
(13)	8 x 4 = _____	(14)	5 x 8 = _____	(15)	4 x 5 = _____
(16)	9 x 7 = _____	(17)	2 x 5 = _____	(18)	10 x 3 = _____
(19)	2 x 2 = _____	(20)	7 x 7 = _____	(21)	9 x 5 = _____
(22)	4 x 3 = _____	(23)	6 x 2 = _____	(24)	10 x 6 = _____
(25)	4 x 2 = _____	(26)	8 x 3 = _____	(27)	9 x 4 = _____
(28)	3 x 2 = _____	(29)	7 x 3 = _____	(30)	8 x 2 = _____
(31)	8 x 10 = _____	(32)	7 x 2 = _____	(33)	6 x 8 = _____
(34)	9 x 2 = _____	(35)	3 x 5 = _____	(36)	5 x 2 = _____
(37)	3 x 9 = _____	(38)	10 x 2 = _____	(39)	7 x 5 = _____
(40)	2 x 4 = _____	(41)	4 x 7 = _____	(42)	2 x 8 = _____
(43)	2 x 3 = _____	(44)	7 x 10 = _____	(45)	2 x 10 = _____

Answers to Self-Test 2

(1)	63	(2)	54	(3)	100
(4)	32	(5)	40	(6)	90
(7)	72	(8)	56	(9)	42
(10)	90	(11)	18	(12)	45
(13)	32	(14)	40	(15)	20
(16)	63	(17)	10	(18)	30
(19)	4	(20)	49	(21)	45
(22)	12	(23)	12	(24)	60
(25)	8	(26)	24	(27)	36
(28)	6	(29)	21	(30)	16
(31)	80	(32)	14	(33)	48
(34)	18	(35)	15	(36)	10
(37)	27	(38)	20	(39)	35
(40)	8	(41)	28	(42)	16
(43)	6	(44)	70	(45)	20

Chapter 2

Multiplying a Double-Digit Number by a Single-Digit Number

Let’s get right into it. See if you can solve this problem:

```
 2 3
x 8
```

Did you get 184? Let’s go over the solution step-by-step:

```
 2 3
x 8
  4
```

3 x 8 = 24. Write down the 4 and carry the 2.

```
   2 3
x    8
1 8 4
```

2 x 8 = 16. 16 + 2 = 18. Write down the 18 to get the answer, 184.

Here’s another problem for you to solve:

```
 7 6
x 9
```

Solution:

```
7 6
x 9
  4
```

6 x 9 = 54. Write down the 4 and carry the 5.

```
   7 6
x    9
6 8 4
```

7 x 9 = 63. 63 + 5 = 68. Write down the 68 to get the answer, 684.

Are you having a good time? We certainly hope so, because we'd like you to do one more problem:

```
8 7
x 6
```

Solution:

```
8 7
x 6
  2
```

7 x 6 = 42. Write down the 2 and carry the 4.

8 x 6 = 48. 48 + 4 = 52. Write down the 52 to get the answer, 522.

$$\begin{array}{r} 87 \\ \times\ \ 6 \\ \hline 522 \end{array}$$

Self-Test 3

(1) $\begin{array}{r} 32 \\ \times\ 7 \end{array}$	(2) $\begin{array}{r} 25 \\ \times\ 6 \end{array}$	(3) $\begin{array}{r} 53 \\ \times\ 4 \end{array}$	(4) $\begin{array}{r} 48 \\ \times\ 6 \end{array}$
(5) $\begin{array}{r} 66 \\ \times\ 6 \end{array}$	(6) $\begin{array}{r} 58 \\ \times\ 5 \end{array}$	(7) $\begin{array}{r} 82 \\ \times\ 4 \end{array}$	(8) $\begin{array}{r} 67 \\ \times\ 9 \end{array}$
(9) $\begin{array}{r} 84 \\ \times\ 7 \end{array}$	(10) $\begin{array}{r} 73 \\ \times\ 3 \end{array}$	(11) $\begin{array}{r} 57 \\ \times\ 8 \end{array}$	(12) $\begin{array}{r} 96 \\ \times\ 9 \end{array}$
(13) $\begin{array}{r} 62 \\ \times\ 4 \end{array}$	(14) $\begin{array}{r} 79 \\ \times\ 8 \end{array}$	(15) $\begin{array}{r} 26 \\ \times\ 5 \end{array}$	(16) $\begin{array}{r} 34 \\ \times\ 6 \end{array}$

Answers to Self-Test 3

(1) 224	(2) 150	(3) 212	(4) 288
(5) 396	(6) 290	(7) 328	(8) 603
(9) 588	(10) 219	(11) 456	(12) 864
(13) 248	(14) 632	(15) 130	(16) 204

If you aced this self-test, then proceed to Chapter 3. If you got any wrong, then please do Self-Test 4.

Self-Test 4.

(1) 37 × 7	(2) 83 × 6	(3) 69 × 8	(4) 55 × 4
(5) 29 × 2	(6) 18 × 9	(7) 46 × 5	(8) 38 × 3
(9) 75 × 2	(10) 46 × 8	(11) 53 × 7	(12) 84 × 3
(13) 72 × 4	(14) 28 × 7	(15) 32 × 5	(16) 38 × 9

Answers to Self-Test 4

(1) 259	(2) 498	(3) 552	(4) 220
(5) 58	(6) 162	(7) 230	(8) 114
(9) 150	(10) 368	(11) 371	(12) 252
(13) 288	(14) 196	(15) 160	(16) 342

OK, it's time to take stock. If you got even one problem wrong, we want you to go back to the beginning of this chapter and rework each problem. It's great if you can get everything the first time, but no one does. Learning mathematics takes time and patience. So just hang in there and keep trying. Once you feel you've mastered the work in this chapter, you'll be ready to tackle Chapter 3.

Chapter 3

Multiplying a Triple-Digit Number by a Single-Digit Number

So far we've multiplied single-digit numbers and two-digit numbers. Multiplying a triple-digit number is just taking the process one step further. So let's begin with this problem:

$$\begin{array}{r} 326 \\ \times\ \ 8 \\ \hline \end{array}$$

Solution:

$$\begin{array}{r} 326 \\ \times\ \ 8 \\ \hline 8 \end{array}$$

6 x 8 = 48. Write down the 8 and carry the 4.

$$\begin{array}{r} 326 \\ \times\ \ 8 \\ \hline 08 \end{array}$$

2 x 8 = 16. 16 + 4 = 20. Write down the 0 and carry the 2.

$$\begin{array}{r} 326 \\ \times\ \ 8 \\ \hline 2{,}608 \end{array}$$

3 x 8 = 24. 24 + 2 = 26. Write down the 26. The answer is 2,608.

Are you catching on? Here's another one:

```
  4 0 7
x   6
-------
```

Solution:

```
  4 0 7
x   6
-------
    2
```

7 x 6 = 42. Write down the 2 and carry the 4.

```
  4 0 7
x   6
-------
  4 2
```

0 x 6 is 0. 4 + 0 = 4. Write down the 4.

```
    4 0 7
x       6
---------
2, 4 4 2
```

4 x 6 = 24. Write down the 24. The answer is 2,442.

We just tried to pull a fast one on you. We multiplied a number, 407, that contained a zero, or 0. When we multiplied 0 by 6, what did we get?

We got 0. *To generalize, any number times 0 is 0*. For example, 7 x 0 = 0. 0 x 4 = 0. 237 x 0 = 0. Even 0 x 0 = 0.

When we have a zero in the number we're multiplying, we can save a step. When we multiplied 407 by 6, the first step was to multiply 7 by 6, which gave us a product of 42. Next we multiplied 0 by 6 giving us a product of 0. Then we added 0 and 4 giving us 4, which we then wrote down.

We can save a step when we multiply 7 by 6 by just writing down the product of 42. We don't need to carry the 4. You'll recognize these situations as we go along. For example, the same situation comes up in the next problem:

$$\begin{array}{r} 503 \\ \times\ \ 8 \\ \hline \end{array}$$

Solution:

$$\begin{array}{r} 503 \\ \times\ \ 8 \\ \hline 24 \end{array}$$

3 x 8 = 24. Write down the 24.

$$\begin{array}{r} 503 \\ \times\ \ 8 \\ \hline 4,024 \end{array}$$

5 x 8 = 40. Write down the 40. The answer is 4,024.

Self-Test 5

(1) $\begin{array}{r} 814 \\ \times\ \ 6 \\ \hline \end{array}$ (2) $\begin{array}{r} 325 \\ \times\ \ 3 \\ \hline \end{array}$ (3) $\begin{array}{r} 529 \\ \times\ \ 5 \\ \hline \end{array}$ (4) $\begin{array}{r} 736 \\ \times\ \ 4 \\ \hline \end{array}$

(5) $\begin{array}{r} 617 \\ \times\ \ 8 \\ \hline \end{array}$ (6) $\begin{array}{r} 822 \\ \times\ \ 5 \\ \hline \end{array}$ (7) $\begin{array}{r} 906 \\ \times\ \ 7 \\ \hline \end{array}$ (8) $\begin{array}{r} 437 \\ \times\ \ 9 \\ \hline \end{array}$

(9) $\begin{array}{r} 547 \\ \times\ \ 2 \\ \hline \end{array}$ (10) $\begin{array}{r} 928 \\ \times\ \ 3 \\ \hline \end{array}$ (11) $\begin{array}{r} 205 \\ \times\ \ 9 \\ \hline \end{array}$ (12) $\begin{array}{r} 416 \\ \times\ \ 4 \\ \hline \end{array}$

(13) $\begin{array}{r} 174 \\ \times\ \ 6 \\ \hline \end{array}$ (14) $\begin{array}{r} 562 \\ \times\ \ 7 \\ \hline \end{array}$ (15) $\begin{array}{r} 841 \\ \times\ \ 9 \\ \hline \end{array}$ (16) $\begin{array}{r} 904 \\ \times\ \ 5 \\ \hline \end{array}$

Answers to Self-Test 5

(1) 4,884	(2) 975	(3) 2,645	(4) 2,944
(5) 4,936	(6) 4,110	(7) 6,342	(8) 3,933
(9) 1,094	(10) 2,784	(11) 1,845	(12) 1,664
(13) 1,044	(14) 3,934	(15) 7,569	(16) 4,520

If you got them all right, then go directly to Chapter 4. If not, then please do Self-Test 6.

Self-Test 6

(1) 4 9 6 x 4	(2) 1 8 7 x 6	(3) 2 3 5 x 9	(4) 6 0 9 x 3
(5) 5 3 8 x 3	(6) 6 2 4 x 5	(7) 4 2 6 x 6	(8) 2 8 3 x 7
(9) 8 0 4 x 9	(10) 7 2 2 x 3	(11) 3 8 6 x 2	(12) 4 1 7 x 7
(13) 4 6 6 x 8	(14) 8 0 8 x 2	(15) 1 9 5 x 5	(16) 2 3 6 x 3

Answers to Self-Test 6

(1) 1,984	(2) 1,122	(3) 2,115	(4) 1,827
(5) 1,614	(6) 3,120	(7) 2,556	(8) 1,981
(9) 7,236	(10) 2,166	(11) 772	(12) 2,919
(13) 3,728	(14) 1,616	(15) 975	(16) 708

Did you get everything right? If the answer is “yes,” then go directly to Chapter 4. If you got even one problem wrong, then please copy over the ones you missed in Self-Tests 5 and 6 and redo them.

Chapter 4

Multiplying Two-Digit Numbers by Two-Digit Numbers

Let’s add another wrinkle to multiplication. Until now we’ve been multiplying by single-digit numbers. Now let’s multiply by two-digit numbers.

Let’s do the following problem:

```
  5 3
x 4 6
```

Solution:

```
  5 3
x 4 6
    8
```

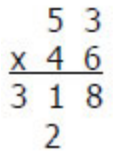
3 x 6 = 18. Write down the 8 and carry the 1.

```
  5 3
x 4 6
3 1 8
```

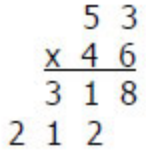
5 x 6 = 30. 30 + 1 = 31. Write down the 31.

So far we've multiplied 53 by 6. Next we're going to multiply 53 by 4. If we wrote 46 in extended form, it would be 40 + 6. In other words, 46 consists of 4 tens and 6 ones.

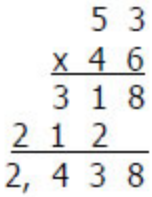
So now, when we multiply 53 by 4, what we're really doing is multiplying 53 by 40. In order to do that, we'll indent, or move the resulting product one space to the left. That may sound a little odd, but you'll be doing it automatically.



4 x 3 = 12. Write down the 2 and carry the 1.

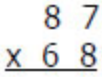


4 x 5 = 20. 20 + 1 = 21. Write down the 21.



Now add to get the answer of 2,438.

Once you get the hang of this, you'll be all set. We promise that everything else in this book will be comparatively easy. Let's do another problem:



Solution:

```
  8 7
x 6 8
6 9 6
```

7 x 8 = 56. Write down the 6 and carry the 5. 8 x 8 = 64. 64 + 5 = 69. Write down the 69.

```
  8 7
x 6 8
6 9 6
5 2 2
```

6 x 7 = 42. Write down the 2 and carry the 4. 6 x 8 = 48. 48 + 4 = 52. Write down the 52.

```
  8 7
x 6 8
6 9 6
5 2 2
5,9 1 6
```

Now add.

Self-Test 7

(1) 7 5 x 3 3	(2) 3 6 x 4 5	(3) 2 3 x 8 3	(4) 5 8 x 5 9
(5) 3 5 x 2 6	(6) 9 2 x 4 3	(7) 6 4 x 8 8	(8) 8 7 x 2 5
(9) 6 6 x 3 4	(10) 7 2 x 2 9	(11) 5 3 x 4 7	(12) 6 7 x 5 2
(13) 6 8 x 3 8	(14) 3 7 x 2 4	(15) 9 6 x 4 6	(16) 7 9 x 9 8

Answers to Self-Test 7

(1) 2,475	(2) 1,620	(3) 1,909	(4) 3,422
(5) 910	(6) 3,956	(7) 5,632	(8) 2,175
(9) 2,244	(10) 2,088	(11) 2,491	(12) 3,484
(13) 2,584	(14) 888	(15) 4,416	(16) 7,742

OK, here's the deal. If you got every problem right, then you may go to Chapter 5. If you got even one wrong answer, then please do Self-Test 8. Don't worry, even if you got two or three wrong, you're definitely on the right track and just need to get more problems under your belt.

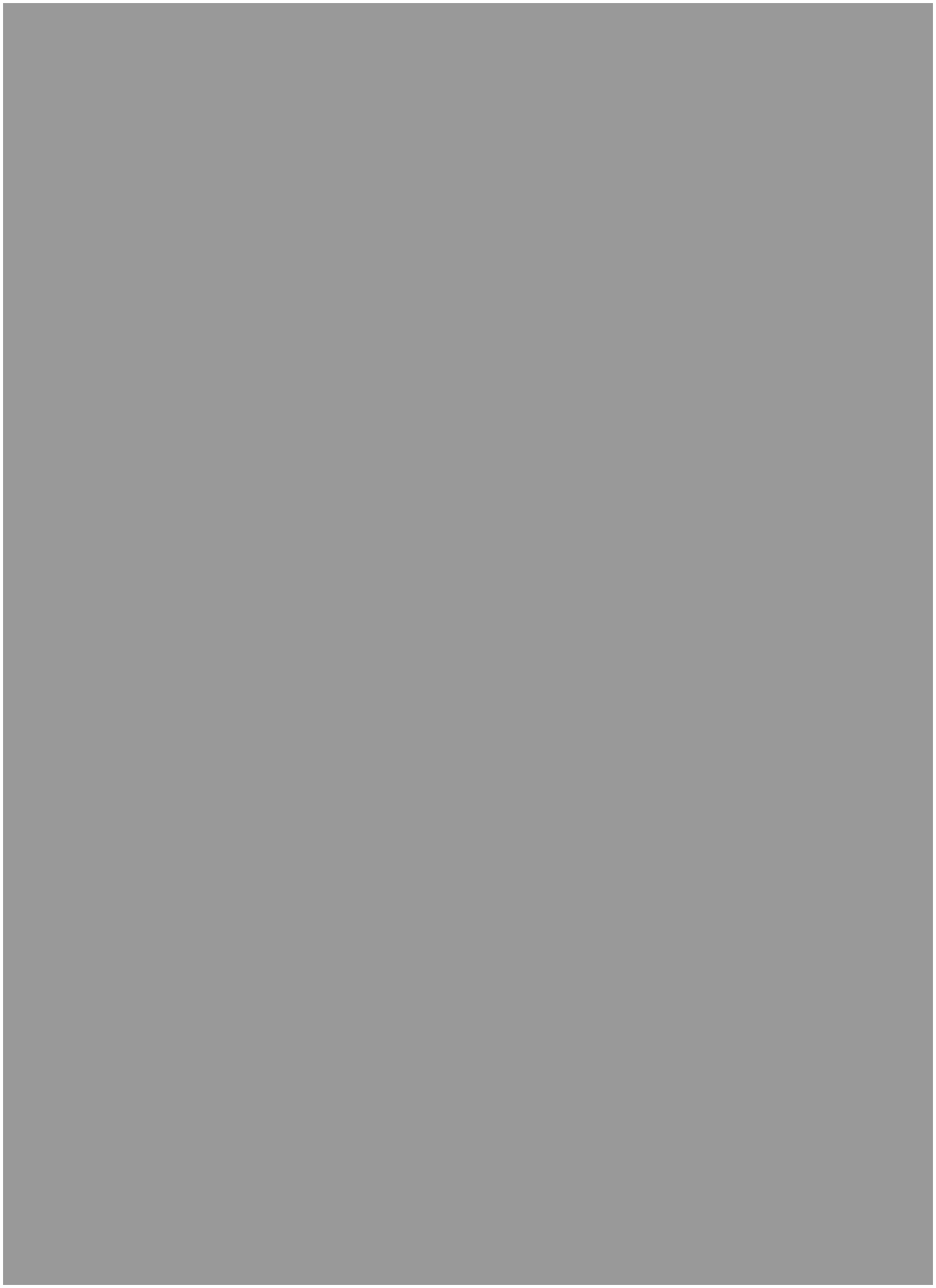
Self-Test 8

(1) 52 x 24	(2) 83 x 55	(3) 36 x 92	(4) 27 x 39
(5) 94 x 34	(6) 72 x 75	(7) 48 x 96	(8) 79 x 54
(9) 23 x 35	(10) 52 x 86	(11) 63 x 73	(12) 42 x 59
(13) 84 x 63	(14) 66 x 66	(15) 83 x 74	(16) 29 x 92

Answers to Self-Test 8

(1) 1,248	(2) 4,565	(3) 3,312	(4) 1,053
(5) 3,196	(6) 5,400	(7) 4,608	(8) 4,266
(9) 805	(10) 4,472	(11) 4,599	(12) 2,478
(13) 5,292	(14) 4,356	(15) 6,142	(16) 2,668

If you got everything right, then go directly to Chapter 5. If you got even one problem wrong, then please go back to the beginning of this chapter and rework all of the problems. Don’t worry, the second time around is much more fun.



Chapter 5

Multiplying Three-Digit Numbers by Two-Digit Numbers

We're going to take it up a notch, but if you got through the last chapter in one piece, you should come out whole at the end of this one. See if you can solve *this* problem:

```
  8 5 9
x 6 7
```

Solution:

```
   8 5 9
 x   6 7
6, 0 1 3
```

859 x 7 = 6,013.

```
    8 5 9
  x 6 7
  6 0 1 3
5 1 5 4
```

859 x 6 = 5,154.

```
    8 5 9
x     6 7
  6 0 1 3
5 1 5 4
5 7, 5 5 3
```

Add.

Here's one more problem for you to solve.

```
  3 0 8
x 9 5
```

Solution:

```
  3 0 8
x 9 5
-------
1 5 4 0
```

308 x 5 = 1,540.

```
  3 0 8
x 9 5
-------
1 5 4 0
2 7 7 2
```

308 x 9 = 2,772.

```
  3 0 8
x 9 5
-------
1 5 4 0
2 7 7 2
-------
2 9,2 6 0
```

Add.

Self-Test 9

(1) 3 7 2 x 4 5

(2) 8 2 2 x 3 6

(3) 1 7 6 x 8 4

(4) 3 5 9 x 5 3

(5) 5 0 6 x 2 4

(6) 8 4 3 x 7 2

(7) 9 2 5 x 3 4

(8) 4 2 8 x 6 5

(9) 1 2 5 x 4 3

(10) 3 0 9 x 7 7

(11) 4 6 2 x 9 3

(12) 8 4 6 x 3 8

(13) 8 4 7 x 5 6

(14) 5 5 2 x 7 8

(15) 6 4 9 x 2 6

(16) 4 8 3 x 5 9

Answers to Self-Test 9

(1) 16,740	(2) 29,592	(3) 14,784	(4) 19,027
(5) 12,144	(6) 60,696	(7) 31,450	(8) 27,820
(9) 5,375	(10) 23,793	(11) 42,966	(12) 32,148
(13) 47,432	(14) 43,056	(15) 16,874	(16) 28,497

You know how things work around here. If you got a perfect score, then head right to Chapter 6. And if you got even one problem wrong, we're going to give you another chance to grab the gold ring by doing Self-Test 10 on the next page.

Self-Test 10

(1) 6 3 6 x 3 2	(2) 5 3 8 x 7 8	(3) 8 7 2 x 4 4	(4) 7 0 3 x 9 2
(5) 9 1 3 x 4 6	(6) 7 2 5 x 2 8	(7) 8 4 9 x 6 3	(8) 3 2 6 x 9 8
(9) 6 3 3 x 4 3	(10) 2 7 3 x 8 4	(11) 5 2 4 x 6 5	(12) 5 8 5 x 9 2
(13) 4 0 3 x 3 4	(14) 2 8 6 x 5 9	(15) 7 5 3 x 4 8	(16) 8 0 2 x 2 7

Answers to Self-Test 10

(1) 20,352	(2) 41,964	(3) 38,368	(4) 64,676
(5) 41,998	(6) 20,300	(7) 53,487	(8) 31,948
(9) 27,219	(10) 22,932	(11) 34,060	(12) 53,820
(13) 13,702	(14) 16,874	(15) 36,144	(16) 21,654

Did you get all these problems right? Or did you get just one wrong? Well, we're feeling good, so in either case, go directly to Chapter 6. If you got more than one wrong, then you'll need to

rework all the problems in this chapter. Once you've got all that under your belt, you'll be ready to move on to Chapter 6.

Chapter 6

Multiplying Three-Digit Numbers by Three-Digit Numbers

By now you can see where we're going. We're multiplying larger and larger numbers. In order to do that, you need to know the multiplication table we presented all the way back in the Introduction to *The Book of Multiplication*. If you've gotten this far, then you have that table committed to memory. So what are we waiting for? Let's get started! See if you can solve this problem:

```
  5 8 3
x 4 6 9
-------
```

Solution:

```
  5 8 3
x 4 6 9
-------
5 2 4 7
```

583 x 9 = 5,247.

```
    5 8 3
  x 4 6 9
  -------
  5 2 4 7
3 4 9 8
```

583 x 6 = 3,498 You need to remember to indent.

583 x 4 = 2,332.

```
   5 8 3
 x 4 6 9
 -------
   5 2 4 7
 3 4 9 8
2 3 3 2
```

```
   5 8 3
 x 4 6 9
 -------
   5 2 4 7
 3 4 9 8
2 3 3 2
-------
2 7 3,4 2 7
```

Add.

The important thing is to remember to indent. So the second line of numbers (3,498) is one space to the left of the first line (5,247). And the third line (2,332) is one space to the left of the second line (3,498).

Ready for another problem?

```
   6 2 5
 x 9 7 3
 -------
```

Solution:

```
   6 2 5
 x 9 7 3
 -------
1 8 7 5
```

625 x 3 = 1,875.

```
   6 2 5
 x 9 7 3
 -------
   1 8 7 5
4 3 7 5
```

625 x 7 = 4,375

625 x 9 = 5,625

$$\begin{array}{r} 625 \\ \times\ 973 \\ \hline 1875 \\ 4375 \\ 5625 \end{array}$$

$$\begin{array}{r} 625 \\ \times\ 973 \\ \hline 1875 \\ 4375 \\ 5625 \\ \hline 608,125 \end{array}$$

Add.

Self-Test 11

(1) 532×247

(2) 905×732

(3) 284×493

(4) 362×839

(5) 952×275

(6) 685×376

(7) 458×394

(8) 526×642

(9) 704×748

(10) 285×373

(11) 757×483

(12) 862×826

(13) 534×486

(14) 859×834

(15) 948×279

(16) 558×948

Answers to Self-Test 11

(1) 131,404

(2) 662,460

(3) 140,012

(4) 303,718

(5) 261,800

(6) 257,560

(7) 180,452

(8) 337,692

(9) 526,592

(10) 106,305

(11) 365,631

(12) 712,012

(13) 259,524

(14) 716,406

(15) 264,492

(16) 528,984

Now see if you can do this problem:

```
  7 4 8
x 5 2 0
```

Solution:

```
    7 4 8      748 x 0 = 0, or 000.
  x 5 2 0      748 x 2 = 1,496.
    0 0 0      748 x 5 = 3,740.
  1 4 9 6      Then add.
3 7 4 0
3 8 8,9 6 0
```

Next problem:

```
  9 5 2
x 5 0 8
```

Solution:

```
    9 5 2      952 x 8 = 7,616.
  x 5 0 8      952 x 0 = 0, or 000.
  7 6 1 6      952 x 5 = 4,760.
  0 0 0        Then add.
4 7 6 0
4 8 3,6 1 6
```

Self-Test 12

(1) 6 6 2 x 5 3 0	(2) 8 3 5 x 7 0 9	(3) 4 6 8 x 3 8 0	(4) 5 2 8 x 6 7 0
(5) 5 5 7 x 4 7 0	(6) 9 0 4 x 8 0 9	(7) 7 2 0 x 4 4 0	(8) 6 0 6 x 3 0 8
(9) 8 7 4 x 5 4 0	(10) 3 9 0 x 7 0 3	(11) 5 3 6 x 4 0 0	(12) 3 0 5 x 3 0 2
(13) 6 5 0 x 5 0 9	(14) 7 0 0 x 6 2 8	(15) 9 1 8 x 5 0 0	(16) 7 0 3 x 7 4 0

Answers to Self-Test 12

(1) 350,860	(2) 592,015	(3) 177,840	(4) 353,760
(5) 261,790	(6) 731,336	(7) 316,800	(8) 186,648
(9) 471,960	(10) 274,170	(11) 214,400	(12) 92,110
(13) 330,850	(14) 439,600	(15) 459,000	(16) 520,220

OK, it's time to take stock. If you got a total of no more than two wrong in Self-Tests 11 and 12, then you're ready for Chapter 7. Otherwise, we want you to go back and redo any problems you got wrong.

Chapter 7

Checking Your Answers

You remember how we checked the answers to subtraction problems? We checked them by doing addition. After all, addition is the reverse of subtraction.

So how do you think we could check the products of our multiplication problems? Did someone say “Division”? You’d be right. The only problem is that we will not be taking up division until later in this book. So what do we do in the meanwhile?

A good way of checking our work would be to redo each problem. For example, suppose we wanted to check the answer to *this* problem:

```
  5 7
x 4 2
```

Solution:

```
    5 7
  x 4 2
  1 1 4
2 2 8
2,3 9 4
```

To check our answer, we could just do the same problem over again:

```
   5 7
 x 4 2
   1 1 4
2 2 8
2,3 9 4
```

If we got the same answer, then, chances are, it's the right answer. But there is still the sneaking suspicion that just maybe we might have made the same mistake both times, which would have given us the same *wrong* answer.

OK, then, here's another way we could check our answer and avoid making the same mistake twice:

```
   4 2
 x 5 7
```

We just switch around the numbers we're multiplying. Instead of multiplying 57 by 42, we're now multiplying 42 by 57. And do we get the same answer? Let's find out.

Solution:

```
   4 2
 x 5 7
   2 9 4
2 1 0
2,3 9 4
```

We got the same answer, so we can be virtually certain that 2,394 is the correct answer to this problem. Now let's see if we can check our work, this time multiplying two three-digit numbers.

```
   4 7 5
 x 9 3 8
```

Don’t wait for us to do this problem. Go ahead and solve it, and then check your work.

Solution:

```
      4 7 5
    x 9 3 8
    3 8 0 0
  1 4 2 5
4 2 7 5
4 4 5,5 5 0
```

Check:

```
      9 3 8
    x 4 7 5
    4 6 9 0
  6 5 6 6
3 7 5 2
4 4 5,5 5 0
```

Check your answers whenever you have the time to do so. Then you’ll know for sure if your answers are right or wrong. When we get to *The Book of Division*, we’ll show you another way to check your multiplication.

Self-Test 13

After solving each problem, check your work.

```
(1) 7 3      (2) 5 6      (3) 4 3      (4) 5 7 4
  x 3 9        x 3 7        x 1 9        x 4 2 2

(5) 3 5 8    (6) 8 4 0    (7) 6 0 5    (8) 3 0 0
  x 2 9 6      x 2 5 4      x 1 8 7      x 9 2 5
```

Answers to Self-Test 13

(1) 73 × 39 = 2,847

(2) 56 × 37 = 2,072

(3) 43 × 19 = 817

(4) 574 × 422 = 242,228

Check:

39 × 73 = 2,847

37 × 56 = 2,072

19 × 43 = 817

422 × 574 = 242,228

(5) 358 × 296 = 105,968

(6) 840 × 254 = 213,360

(7) 605 × 187 = 113,135

(8) 300 × 925 = 277,500

Check:

296 × 358 = 105,968

254 × 840 = 213,360

187 × 605 = 113,135

925 × 300 = 277,500

Chapter 8

Multiplying by 10, 100, and 1,000

Now you're going to get a chance to catch your breath. We promise you that you'll find this a very easy chapter. But we'll start out by asking you a hard question. How much is one thousand times one thousand? In other words, what is the product of 1,000 x 1,000?

Did you write down your answer? We'll come back to this question on the next page. By then you will think this is a very easy question.

- How much is 34 x 10?

  The answer is 340. Here's a fast way of doing it: Just tack on a zero to 34.
- How much is 9 x 10?

The answer is 90. Again, just add a zero to 9. When you want to multiply a number by 10, what do you do? You add a zero to that number.

- Now we're ready to multiply by 100. How much is 642 x 100?

  The answer is 64,200. All we did was add two zeros to 642.
- How much is 17 x 100?

  The answer is 1,700.
- How much is 100 x 100?

The answer is 10,000. We added two zeros to 100. So when you want to multiply a number by 100, just add two zeros.

- Now let’s multiply by 1,000. How much is 170 x 1,000?

The answer is 170,000. All we did was add three zeros to 170. So when you want to multiply a number by 1,000, just add three zeros.

Remember the problem we had at the beginning of the chapter – How much is one thousand times one thousand? What was your answer? Just to check your work, do the problem again right now.

Did you get an answer of 1,000,000? That number is one million. It’s the highest number you’ll see in this book.

Here’s how we did the problem:

1,000 x 1,000 = 1,000 + 3 zeros = 1,000,000

Self-Test 14

(1) How much is 10 times to Self-Test 14

a) 13? b) 1,200? c) 80? d) 51,000?

(2) How much is 100 times

a) 1,000? b) 60? c) 400? d) 9,800?

(3) How much is 1,000 times

a) 51? b) 30? c) 235? d) 110?

(4) Multiply each of these numbers by 10, 100, and 1,000:

a) 100

b) 7

c) 410

d) 60

Answers to Self-Test 14

(1)	a) 130	b) 12,000	c) 800	d) 510,000
(2)	a) 100,000	b) 6,000	c) 40,000	d) 980,000
(3)	a) 51,000	b) 30,000	c) 235,000	d) 110,000
(4)	a) 1,000;	10,000;	100,000	
	b) 70;	700;	7,000	
	c) 4,100;	41,000;	410,000	
	d) 600;	6,000;	60,000	

Did you ace Self-Test 13? Yes? Then please go on to Chapter 9. If you didn't, just go through the chapter again, and then you should be OK.

Chapter 9

Exponents

An exponent tells us to multiply a number by itself. For example, $3^2 = 3 \times 3 = 9$. In words, three squared equals nine. Or, three to the second power equals nine.

$2^3 = 2 \times 2 \times 2 = 8$. In words, two cubed equals eight. Or, two to the third power equals eight.

- Find 5^2.

Solution:

$5^2 = 5(5) = 25$. We can express the multiplication of two numbers with an x or with parentheses. So $5 \times 5 = 5(5)$.

- Find 4^4.

Solution:

$4^4 = 4 \times 4 \times 4 \times 4$

$4^2 = 4 \times 4 = 16$. $16 \times 4 = 64$. $64 \times 4 = 256$

- Find 7^1

Solution:

$7^1 = 7$. Any number to the first power is equal to itself.

Let’s look at a special case:

3 °= 1

9 ° = 1 A basic rule of exponents is: *Anything except 0 to the zero power is 1* (0 ° is an indeterminate form. That’s the last you’ll hear of this until you get to a higher level of mathematics.)

- Find 5 °.

Solution: 5 °= 1

Self-Test 15

(1) Find the value of

a) 5^3 b) 3^4 c) 2^6 d) 6^2

(2) Find the value of

a) 9^0 b) 4^4 c) 8^3 d) 7^1

(3) Find the value of

a) 2^8 b) 5^0 c) 4^1 d) 3^5

(4) Find the value of

a) 9^0 b) 9^1 c) 9^2 d) 9^3

Answers to Self-Test 15

(1) a) $5^3 = 5(5)(5) = 125$ b) $3^4 = 3(3)(3)(3) = 81$

c) $2^6 = 2(2)(2)(2)(2)(2) = 64$ d) $6^2 = 6 \times 6 = 36$

(2) a) $9^0 = 1$ b) $4^4 = 4(4)(4)(4) = 256$

c) $8^3 = 8(8)(8) = 512$ d) $7^1 = 7$

(3) a) $2^8 = 2(2)(2)(2)(2)(2)(2)(2) = 256$ b) $5^0 = 1$

c) $4^1 = 4$ d) $3^5 = 3(3)(3)(3)(3) = 243$

(4) a) $9^0 = 1$ b) $9^1 = 9$

c) $9^2 = 9(9) = 81$ d) $9^3 = 9(9)(9) = 243$

If you missed more than one of these problems, please redo all the problems in this chapter. Otherwise, go right to Chapter 10.

Chapter 10

Applications

It’s time to apply all those multiplication skills you’ve picked up so far. Let’s begin by doing this problem:

- If one tee shirt cost $3, how much would it cost to buy 117 tee shirts?

Solution:

$$\begin{array}{r} 1\ 1\ 7 \\ \times\quad\ 3 \\ \hline \$3\ 5\ 1 \end{array}$$

Next problem: A plane can hold 248 passengers. How many passengers could ride in 250 planes?

Solution:

$$\begin{array}{r} 2\ 4\ 8 \\ \times\ 2\ 5\ 0 \\ \hline 0\ 0\ 0 \\ 1\ 2\ 4\ 0 \\ 4\ 9\ 6 \\ \hline 6\ 2,0\ 0\ 0 \end{array}\ \text{passengers}$$

One more problem: There are 23 girls in a club. Each girl brings 48 cookies to a party. How many cookies do they bring all together?

Solution:

```
   2 3
 x 4 8
 1 8 4
 9 2
-------
1 1 0 4 cookies
```

Self-Test 16

1. Every day Sung Won Sohn gives 160 pennies to his grandmother. How many pennies does he give her in 7 days?
2. If Abdel Magead Nigohosian hits an average of 47 home runs each year and his career lasted 23 years, how many home runs did he hit during his career?
3. Sunshine Bandyopadhyay received a check each month for $1,750. How much money did she receive over a period of 100 months?
4. Ms. Grzadzielweski left 170 acres of land to each of her 39 relatives. How many acres of land did she leave all together?
5. If 863 people each paid $125 to attend a charity ball, what was the total amount of money collected?
6. Shoeleh Mutameni averaged 57 miles per hour on his cross country trip. If he drove a total of 44 hours, how many miles did he drive?
7. Deepa Paranjpe and her eleven siblings each inherited 48 acres of land. How many acres did they inherit all together?
8. How much is one hundred times one hundred?
9. If you walked twenty-two miles a day for eighteen days, how far would you have walked?
10. In 1,800 the fishing fleet based in Halifax caught 847 tons of fish a month. Today they catch 100 times as much fish. How many tons of fish a month does the fleet catch today?
11. Bernd Pischetsrieder eats 365 tuna fish sandwiches a year. If he keeps up this pace for 80 years, how many tuna fish sandwiches will he eat?
12. Dagfin Hoybraaten runs 13 miles a day. How far does he run in 90 days?

13. Bjoern Tjessem spends $100 on birthday presents. If he buys a total of 3,196 birthday presents over his lifetime, how much will he have spent?
14. If you can pack 36 cans of soup in one carton, how many cans can you pack in 78 cartons?
15. How much is two thousand times three hundred?

Answers to Self-Test 16

(1) 1,120 pennies

(2) 1,081 home runs

(3) $175,000

(4) 6,630 acres

(5) $107,875

(6) 2,508 miles

(7) 576 acres

(8) 10,000

(9) 396 miles

(10) 84,700 tons

(11) 29,200 sandwiches

(12) 1,170 miles

(13) $319,960

(14) 2,808 cans

(15) 600,000

Do you think you're ready to take a final exam? This will cover every-thing you've done in *The Book of Multiplication*. After you've finished, please check your answers.

Final Exam

Chapter 1:

(1) 7 x 8 =　　(2) 4 x 9 =　　(3) 9 x 6 =　　(4) 8 x 8 =

Chapter 2:

(1) 6 3 x 7　　(2) 8 4 x 9　　(3) 9 6 x 6　　(4) 7 8 x 4

Chapter 3:

(1) 4 2 6 x 7　　(2) 8 4 3 x 5　　(3) 7 9 4 x 3　　(4) 5 7 8 x 2

Chapter 4:

(1) 5 4 x 4 6　　(2) 8 3 x 7 9　　(3) 6 7 x 3 6　　(4) 9 5 x 7 3

Chapter 5:

(1) 3 2 6 x 7 6　　(2) 6 3 9 x 4 7　　(3) 5 8 4 x 3 4　　(4) 9 5 2 x 8 6

Chapter 6:

(1) 6 3 3 x 4 5 5　　(2) 4 9 5 x 3 0 8　　(3) 8 0 6 x 7 4 2　　(4) 9 7 6 x 9 5 0

Chapter 7:

After solving each problem, check your work.

(1)	(2)	(3)	(4)
58	695	509	837
x 72	x 437	x 276	x 204

Chapter 8:

Multiply each of these numbers by 10, 100, and 1,000:

(1) 750

(2) 4

(3) 32

(4) 10

Chapter 9:

Find the value of

(1) 6^2

(2) 2^5

(3) 7^3

(4) 5^0

(5) 3^4

(6) 4^1

Chapter 10:

1. Jagadeesh Gokhale drove 54 miles an hour for 32 hours. How far did he drive?
2. How much is ten times fifteen hundred?
3. Toshihiko Fukui consumes 2,143 calories a day for 150 days. How many calories does he consume over this period?
4. If there are 249 seats on a plane, how many people can ride on 174 planes?

Answers to Final Exam

Chapter 1:

(1) 56 (2) 36 (3) 54 (4) 64

Chapter 2:

(1) 441 (2) 756 (3) 576 (4) 312

Chapter 3:

(1) 2,982 (2) 4,215 (3) 2,382 (4) 1,156

Chapter 4:

(1) 2,484 (2) 6,557 (3) 2,412 (4) 6,935

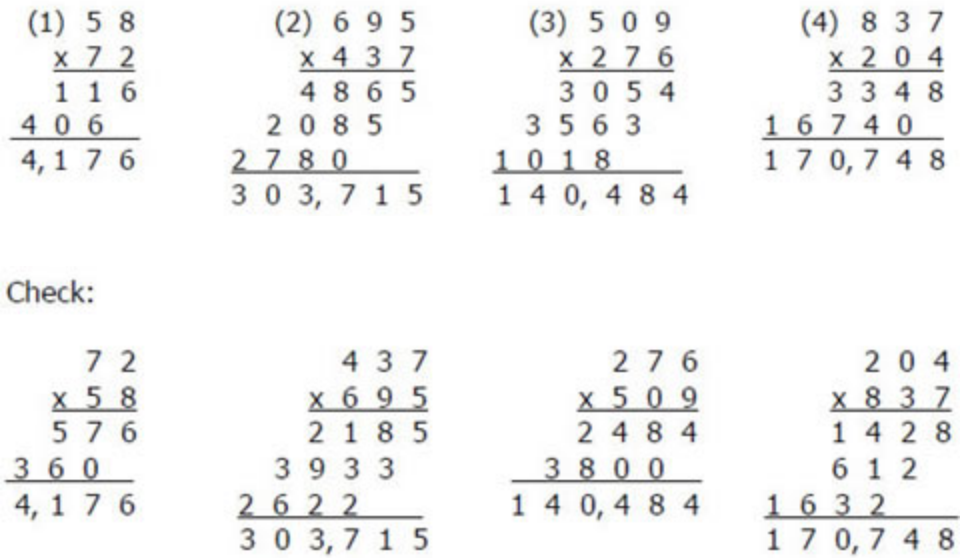
Chapter 5:

(1) 24,776 (2) 30,033 (3) 19,856 (4) 81,872

Chapter 6:

(1) 288,015 (2) 152,460 (3) 598,052 (4) 927,200

Chapter 7:



Chapter 8:

(1) 7,500;75,000; 750,000

(2) 40; 400; 4,000

(3) 320; 3,200; 32,000

(4) 100; 1,000; 10,000

Chapter 9:

(1) $6^2 = 6 \times 6 = 36$

(2) $2^5 = 2(2)(2)(2)(2) = 32$

(3) $7^3 = 7(7)(7) = 343$

(4) $5^0 = 1$

(5) $3^4 = 3(3)(3)(3) = 81$

(6) $4^1 = 4$

Chapter 10:

(1) 1,728 miles

(2) 15,000

(3) 321,450 calories

(4) 43,326 people

Last Word

OK, three down and one to go. Multiplication is the key skill you need to solve math problems. Now that you have mastered that skill, you will be able to apply it by doing division.

The Book of Division

Introduction

Would you believe you're starting the fourth and last volume of *Back to Basics?* After addition, subtraction, and multiplication, you're ready for division.

- Did you know that division is the reverse of multiplication?
- Here's an example: How much is 5 x 4?

  5 x 4 = 20.
- Now how much is 20 divided by 5?

  The answer is 4.
- How about this one? How much is 20 divided by 4?

  The answer is 5.

So if we multiply 5 x 4 to get 20, we can do the reverse. If we divide 20 by 4, we get 5. And if we divide 20 by 5, we get 4.

- As you might know, we're not real big on vocabulary, but it's very important to learn one word. When one number is divided by another number, the answer is called the *quotient*. So what's the quotient of 35 divided by 7?

  The quotient is 5.
- One more: What's the quotient of 24 divided by 6?

  The quotient is 4.

  Before we get started, you'll need to remember these two rules.

Rule number one: You may not use a calculator. Using a calculator interferes with your learning math. So just give it away because you're not

going to need it any more.

Rule number two: Working your way through this book, you must be confident that you understand what you're doing. If something isn't clear, then go over it until it is. For example, in the first chapter, you MUST learn to divide a two-digit number by a single-digit number. No ifs, ands or buts. You need to know how to divide these numbers WITHOUT using a calculator.

Chapter 1

Dividing Two-Digit Numbers by Single-Digit Numbers

At the beginning of *the Books of Addition, Subtraction, and Multiplication*, we tested your knowledge of the basics. You were asked, for instance, to add 4 and 8, subtract 4 from 8, and multiply 4 times 8. Now we'll be solving problems like how much is 8 divided by 4?

We're sure you knew the answer was 2. So what we'll be doing in this chapter is a lot of basic division problems. After you've worked your way through the chapter, you need to be completely confident that you know how to divide before you move on to Chapter 2.

So let's see what you know. After you've completed Self-Test 1, check your answers.

Self-Test 1

(1)	$16 \div 4 =$ _____	(2)	$42 \div 7 =$ _____	(3)	$81 \div 9 =$ _____
(4)	$75 \div 5 =$ _____	(5)	$28 \div 7 =$ _____	(6)	$48 \div 6 =$ _____
(7)	$18 \div 2 =$ _____	(8)	$49 \div 7 =$ _____	(9)	$56 \div 8 =$ _____
(10)	$32 \div 4 =$ _____	(11)	$40 \div 4 =$ _____	(12)	$70 \div 7 =$ _____
(13)	$25 \div 5 =$ _____	(14)	$60 \div 5 =$ _____	(15)	$20 \div 4 =$ _____
(16)	$27 \div 3 =$ _____	(17)	$90 \div 9 =$ _____	(18)	$15 \div 5 =$ _____
(19)	$14 \div 2 =$ _____	(20)	$30 \div 6 =$ _____	(21)	$64 \div 8 =$ _____
(22)	$56 \div 8 =$ _____	(23)	$75 \div 15 =$ _____	(24)	$80 \div 10 =$ _____
(25)	$21 \div 3 =$ _____	(26)	$100 \div 10 =$ _____	(27)	$16 \div 8 =$ _____
(28)	$45 \div 9 =$ _____	(29)	$72 \div 12 =$ _____	(30)	$40 \div 4 =$ _____
(31)	$10 \div 5 =$ _____	(32)	$60 \div 4 =$ _____	(33)	$27 \div 9 =$ _____
(34)	$20 \div 2 =$ _____	(35)	$54 \div 6 =$ _____	(36)	$72 \div 9 =$ _____
(37)	$24 \div 6 =$ _____	(38)	$32 \div 4 =$ _____	(39)	$30 \div 5 =$ _____
(40)	$36 \div 12 =$ _____	(41)	$72 \div 8 =$ _____	(42)	$4 \div 2 =$ _____
(43)	$30 \div 10 =$ _____	(44)	$6 \div 3 =$ _____	(45)	$45 \div 15 =$ _____

Answers to Self-Test 1

(1) 4	(2) 6	(3) 9
(4) 15	(5) 4	(6) 8
(7) 9	(8) 7	(9) 7
(10) 8	(11) 10	(12) 10
(13) 5	(14) 12	(15) 5
(16) 9	(17) 10	(18) 3
(19) 7	(20) 5	(21) 8
(22) 7	(23) 5	(24) 8
(25) 7	(26) 10	(27) 2
(28) 5	(29) 6	(30) 10
(31) 2	(32) 15	(33) 3
(34) 10	(35) 9	(36) 8
(37) 4	(38) 8	(39) 6
(40) 3	(41) 9	(42) 2
(43) 3	(44) 2	(45) 3

If you got everything right, then you're ready to take Self-Test 2, which is three pages ahead. If not, please make a flash card for each problem you missed. Keep going over them until you know the answers to each problem. Then take Retest: Self-Test 1 on the next page.

Retest: Self-Test 1

(1)	16 ÷ 4 = _____	(2)	42 ÷ 7 = _____	(3)	81 ÷ 9 = _____
(4)	75 ÷ 5 = _____	(5)	28 ÷ 7 = _____	(6)	48 ÷ 6 = _____
(7)	18 ÷ 2 = _____	(8)	49 ÷ 7 = _____	(9)	56 ÷ 8 = _____
(10)	32 ÷ 4 = _____	(11)	40 ÷ 4 = _____	(12)	70 ÷ 7 = _____
(13)	25 ÷ 5 = _____	(14)	60 ÷ 5 = _____	(15)	20 ÷ 4 = _____
(16)	27 ÷ 3 = _____	(17)	90 ÷ 9 = _____	(18)	15 ÷ 5 = _____
(19)	14 ÷ 2 = _____	(20)	30 ÷ 6 = _____	(21)	64 ÷ 8 = _____
(22)	56 ÷ 8 = _____	(23)	75 ÷ 15 = _____	(24)	80 ÷ 10 = _____
(25)	21 ÷ 3 = _____	(26)	100 ÷ 10 = _____	(27)	16 ÷ 8 = _____
(28)	45 ÷ 9 = _____	(29)	72 ÷ 12 = _____	(30)	40 ÷ 4 = _____
(31)	10 ÷ 5 = _____	(32)	60 ÷ 4 = _____	(33)	27 ÷ 9 = _____
(34)	20 ÷ 2 = _____	(35)	54 ÷ 6 = _____	(36)	72 ÷ 9 = _____
(37)	24 ÷ 6 = _____	(38)	32 ÷ 4 = _____	(39)	30 ÷ 5 = _____
(40)	36 ÷ 12 = _____	(41)	72 ÷ 8 = _____	(42)	4 ÷ 2 = _____
(43)	30 ÷ 10 = _____	(44)	6 ÷ 3 = _____	(45)	45 ÷ 15 = _____

Retest: Answers to Self-Test 1

(1) 4	(2) 6	(3) 9
(4) 15	(5) 4	(6) 8
(7) 9	(8) 7	(9) 7
(10) 8	(11) 10	(12) 10
(13) 5	(14) 12	(15) 5
(16) 9	(17) 10	(18) 3
(19) 7	(20) 5	(21) 8
(22) 7	(23) 5	(24) 8
(25) 7	(26) 10	(27) 2
(28) 5	(29) 6	(30) 10
(31) 2	(32) 15	(33) 3
(34) 10	(35) 9	(36) 8
(37) 4	(38) 8	(39) 6
(40) 3	(41) 9	(42) 2
(43) 3	(44) 2	(45) 3

Now you should be ready for Self-Test 2. But keep those flash cards handy. You're probably going to need more practice before we're done with this chapter.

Self-Test 2

(1)	8 ÷ 2 = _____	(2)	24 ÷ 4 = _____	(3)	70 ÷ 10 = _____
(4)	12 ÷ 6 = _____	(5)	56 ÷ 7 = _____	(6)	12 ÷ 4 = _____
(7)	18 ÷ 9 = _____	(8)	50 ÷ 5 = _____	(9)	16 ÷ 2 = _____
(10)	18 ÷ 6 = _____	(11)	40 ÷ 5 = _____	(12)	12 ÷ 3 = _____
(13)	48 ÷ 12 = _____	(14)	15 ÷ 3 = _____	(15)	54 ÷ 9 = _____
(16)	14 ÷ 7 = _____	(17)	48 ÷ 6 = _____	(18)	6 ÷ 2 = _____
(19)	20 ÷ 5 = _____	(20)	24 ÷ 3 = _____	(21)	36 ÷ 4 = _____
(22)	90 ÷ 10 = _____	(23)	45 ÷ 3 = _____	(24)	21 ÷ 7 = _____
(25)	9 ÷ 3 = _____	(26)	24 ÷ 12 = _____	(27)	36 ÷ 9 = _____
(28)	80 ÷ 8 = _____	(29)	42 ÷ 6 = _____	(30)	36 ÷ 3 = _____
(31)	72 ÷ 6 = _____	(32)	45 ÷ 5 = _____	(33)	20 ÷ 10 = _____
(34)	8 ÷ 4 = _____	(35)	24 ÷ 2 = _____	(36)	18 ÷ 3 = _____
(37)	32 ÷ 8 = _____	(38)	50 ÷ 5 = _____	(39)	40 ÷ 8 = _____
(40)	30 ÷ 3 = _____	(41)	12 ÷ 2 = _____	(42)	48 ÷ 4 = _____
(43)	24 ÷ 8 = _____	(44)	60 ÷ 15 = _____	(45)	72 ÷ 6 = _____

Answers to Self-Test 2

(1) 4	(2) 6	(3) 7
(4) 2	(5) 8	(6) 3
(7) 2	(8) 10	(9) 8
(10) 3	(11) 8	(12) 4
(13) 4	(14) 5	(15) 6
(16) 2	(17) 8	(18) 3
(19) 4	(20) 8	(21) 9
(22) 9	(23) 15	(24) 3
(25) 3	(26) 2	(27) 4
(28) 10	(29) 7	(30) 12
(31) 12	(32) 9	(33) 2
(34) 2	(35) 12	(36) 6
(37) 4	(38) 10	(39) 5
(40) 10	(41) 6	(42) 12
(43) 3	(44) 4	(45) 12

Did you get everything right? If you did, then go straight to Chapter 2. But if you got even one problem wrong, then you'll need to add to your set of flash cards.

Once you've mastered all the flash cards, we'd like you to retake Self-Tests 1 and 2. When you do, we expect you to get perfect scores.

Retest: Self-Test 2

(1)	8 ÷ 2 = _____	(2)	24 ÷ 4 = _____	(3)	70 ÷ 10 = _____
(4)	12 ÷ 6 = _____	(5)	56 ÷ 7 = _____	(6)	12 ÷ 4 = _____
(7)	18 ÷ 9 = _____	(8)	50 ÷ 5 = _____	(9)	16 ÷ 2 = _____
(10)	18 ÷ 6 = _____	(11)	40 ÷ 5 = _____	(12)	12 ÷ 3 = _____
(13)	48 ÷ 12 = _____	(14)	15 ÷ 3 = _____	(15)	54 ÷ 9 = _____
(16)	14 ÷ 7 = _____	(17)	48 ÷ 6 = _____	(18)	6 ÷ 2 = _____
(19)	20 ÷ 5 = _____	(20)	24 ÷ 3 = _____	(21)	36 ÷ 4 = _____
(22)	90 ÷ 10 = _____	(23)	45 ÷ 3 = _____	(24)	21 ÷ 7 = _____
(25)	9 ÷ 3 = _____	(26)	24 ÷ 12 = _____	(27)	36 ÷ 9 = _____
(28)	80 ÷ 8 = _____	(29)	42 ÷ 6 = _____	(30)	36 ÷ 3 = _____
(31)	72 ÷ 6 = _____	(32)	45 ÷ 5 = _____	(33)	20 ÷ 10 = _____
(34)	8 ÷ 4 = _____	(35)	24 ÷ 2 = _____	(36)	18 ÷ 3 = _____
(37)	32 ÷ 8 = _____	(38)	50 ÷ 5 = _____	(39)	40 ÷ 8 = _____
(40)	30 ÷ 3 = _____	(41)	12 ÷ 2 = _____	(42)	48 ÷ 4 = _____
(43)	24 ÷ 8 = _____	(44)	60 ÷ 15 = _____	(45)	72 ÷ 6 = _____

Retest: Answers to Self-Test 2

(1) 4	(2) 6	(3) 7
(4) 2	(5) 8	(6) 3
(7) 2	(8) 10	(9) 8
(10) 3	(11) 8	(12) 4
(13) 4	(14) 5	(15) 6
(16) 2	(17) 8	(18) 3
(19) 4	(20) 8	(21) 9
(22) 9	(23) 15	(24) 3
(25) 3	(26) 2	(27) 4
(28) 10	(29) 7	(30) 12
(31) 12	(32) 9	(33) 2
(34) 2	(35) 12	(36) 6
(37) 4	(38) 10	(39) 5
(40) 10	(41) 6	(42) 12
(43) 3	(44) 4	(45) 12

How did you do? If you are not completely confident that you know *every* division problem, then please keep working with your flash cards until you know them cold. Once you do, you'll be ready to move on to Chapter 2.

Chapter 2

Getting Started

When we divide one number by another, our answer is called the *quotient*. We're going to ask you to learn just two more words, and that's it! But first, find the quotient of 32 divided by 4.

- The quotient is 8. We call the number being divided, the *dividend*. So what's the *dividend* in this problem? The dividend is 32. The number that does the dividing is called the *divisor*. So what's the divisor in this problem?

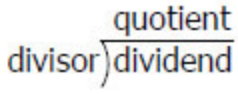
  The divisor is 4.

Next problem:

- How much is 21 divided by 3? After you work that out, write down the dividend, the divisor, and the quotient.

Solution: 21 ÷ 3 = 7. The dividend is 21, the divisor is 3, and the quotient is 7.

We can sum up this way:



The divisor is to the left of the division box, the dividend is in the division box, and the quotient is above the division box.

- For this problem, how much is the divisor, dividend, and quotient?

$$8\overline{)24}\quad 3$$

Solution: The divisor is 8, the dividend is 24, and the quotient is 3. We promise you that these are the only three terms you'll need to know.

- Four friends share an eight-slice pizza. How many slices does each person get?

  The answer is 2.

What we did was divide 8 by 4. There are several ways we can express this division:

$8 \div 4$ $\quad 4\overline{)8}$ $\quad$ 8 divided by 4 $\quad$ 4 into 8 $\quad$ 8/4

- What is the quotient of 45 and 9?

Solution: $45 \div 9 = 5$

- How much is 15 divided by 3?

Solution: 15 divided by 3 = 5.

- How much is 8 into 56?

Solution: 8 into 56 = 7.

Self-Test 3

Please solve each of these division problems:

(1) $18 \div 2$	(2) 28 divided by 4	(3) 48/6
(4) $7\overline{)49}$	(5) 5 into 40	(6) 63/7
(7) 14 divided by 2	(8) $20 \div 5$	(9) 3 into 12
(10) 30 divided by 6	(11) 72/9	(12) $8\overline{)64}$

Answers to Self-Test 3

(1) 9	(2) 7	(3) 8
(4) 7	(5) 8	(6) 9
(7) 7	(8) 4	(9) 4
(10) 5	(11) 8	(12) 8

Now we'll do a few problems using our three division terms – divisor, dividend, and quotient.

- Find the quotient if the dividend is 20 and the divisor is 2.

Solution*:* 20 ÷ 2 = 10.

- Find the quotient if the dividend is 24 and the divisor is 3.

Solution**:** 24/3 = 8.

- Find the quotient if the divisor is 6 and the dividend is 54.

Solution: 54 divided by 6 = 9.

Self-Test 4

Find the quotient for each of these problems.

(1) The dividend is 24 and the divisor is 4.

(2) The dividend is 28 and the divisor is 7.

(3) The dividend is 64 and the divisor is 8.

(4) The dividend is 63 and the divisor is 7.

(5) The divisor is 5 and the dividend is 45.

(6) The divisor is 9 and the dividend is 81.

(7) The divisor is 7 and the dividend is 49.

(8) The divisor is 2 and the dividend is 18.

(9) The divisor is 5 and the dividend is 35.

(10) The dividend is 40 and the divisor is 4.

(11) The dividend is 42 and the divisor is 6.

(12) The divisor is 3 and the dividend is 24.

Answers to Self-Test 4

(1) 6	(2) 4	(3) 8	(4) 9	(5) 9	(6) 9
(7) 7	(8) 9	(9) 7	(10) 10	(11) 7	(12) 8

If you got 100 on Self-Test 3, then you're ready for Chapter 3. If not, you probably need to go back over this chapter. Once you've done that, you should be all set for Chapter 3.

Chapter 3

Dividing a Triple-Digit Number by a Single-Digit Number

Let’s get right into it. See if you can solve this problem:

$$5\overline{)100}$$

Did you get 20? Let’s go over the solution step-by-step:

$$\begin{array}{r} 2 \\ 5\overline{)100} \\ -\,10 \\ \hline 0 \end{array}$$

5 goes into 10 two times. Write the 2 directly over the first 0. Subtract 10 from 10.

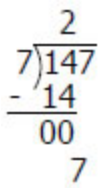
$$\begin{array}{r} 20 \\ 5\overline{)100} \end{array}$$

5 goes into 0 zero times. Write the 0 directly over the second 0. So our quotient is 20.

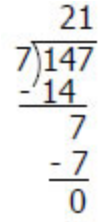
Next problem:

$$7\overline{)147}$$

Solution:



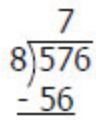
7 goes into 14 two times. Write the 2 directly over the 4. 14 - 14 = 0. Bring down the 7.



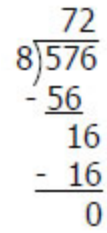
7 goes into 7 one time. 7 - 7 = 0. Write the 1 directly over the 7. Our quotient is 21.

Are you getting the hang of it? We certainly hope so. Here's another problem: How much is 576 divided by 8?

Solution:



Ask yourself, does 8 go into 5? The answer is no, so we don't begin writing our answer over the 5. Does 8 go into 57? Yes, so we start writing our answer over the 7. We know 8(7) = 56. So we write 7 over the 7 in 57 and 56 below 57. Next, subtract 56 from 57 and get 1. Then bring down the next number, 6.



How many times does 8 go into 16? It goes in twice, so we write a 2 over the 6 in 576. 2 x 8 = 16. Subtract 16 from 16.

That was so much fun, let's work out one more problem. Find the quotient if the dividend is 648 and the divisor is 9.

Solution:

```
   7
9)648
 -63
   1
```

9 does not go into 6. 9 goes into 64 seven times. So write the 7 over the 4. 9 x 7 = 63. Write 63 directly below 64 and subtract. 64 - 63 = 1.

```
  72
9)648
 -63
  18
 -18
   0
```

Now bring down the 8. How many times does 9 go into 18? 2 times. Write the 2 above the 8. 2 x 9 = 18. Subtract 18 from 18.

Self-Test 5

Please do each of these problems.

(1) $5\overline{)240}$ (2) $2\overline{)166}$ (3) $6\overline{)504}$

(4) $7\overline{)357}$ (5) $4\overline{)524}$ (6) $9\overline{)423}$

(7) $8\overline{)632}$ (8) $2\overline{)906}$ (9) $7\overline{)833}$

(10) $5\overline{)280}$ (11) $6\overline{)540}$ (12) $8\overline{)736}$

Answers to Self-Test 5

(1)
```
   48
5)240
 -20
  40
 -40
```

(2)
```
   83
2)166
 -16
   6
 - 6
```

(3)
```
   84
6)504
 -48
  24
 -24
```

(4)
```
   51
7)357
 -35
   7
 - 7
```

(5)
```
   131
4)524
 - 4
  12
 -12
   4
 - 4
```

(6)
```
   47
9)423
 -36
  63
 -63
```

(7)
$$\begin{array}{r} 79 \\ 8\overline{)632} \\ -\,56 \\ \hline 72 \\ -\,72 \\ \hline \end{array}$$

(8)
$$\begin{array}{r} 453 \\ 2\overline{)906} \\ -\,8 \\ \hline 10 \\ -\,10 \\ \hline 6 \\ -\,6 \\ \hline \end{array}$$

(9)
$$\begin{array}{r} 119 \\ 7\overline{)833} \\ -\,7 \\ \hline 13 \\ -\,7 \\ \hline 63 \\ -\,63 \\ \hline \end{array}$$

(10)
$$\begin{array}{r} 56 \\ 5\overline{)280} \\ -\,25 \\ \hline 30 \\ -\,30 \\ \hline \end{array}$$

(11)
$$\begin{array}{r} 90 \\ 6\overline{)540} \\ -\,54 \\ \hline \end{array}$$

(12)
$$\begin{array}{r} 92 \\ 8\overline{)736} \\ -\,72 \\ \hline 16 \\ -\,16 \\ \hline \end{array}$$

If you got everything right, then you're definitely ready for Chapter 4, so go right there. If you got any wrong, we'd like you to go back to the beginning of this chapter and redo all the work, including Self-Test 5. If you get everything right this time, then you're ready to tackle Chapter 4.

But if you're still having trouble doing these division problems, we have a suggestion. You've certainly noticed that division requires certain multiplication skills. So you need to ask yourself: Self: do I really know enough multiplication? And especially, do I know the multiplication table?

If there is ANY doubt in your mind, then you need to go back to *The Book of Multiplication*. You need to go through all your multiplication flashcards. And when you get all the right answers, then you'll be ready to do some division. We know this sounds discouraging, but remember, *Back to Basics* covers four years of math. So even if it takes you an extra few days, those few days will really pay off.

Chapter 4

Dividing a Four-Digit Number by a Single-Digit Number

Now we'll carry our division one step further. Are you ready? All right, then, see if you can do *this* problem:

$4\overline{)3296}$

Solution:

$$\begin{array}{r} 824 \\ 4\overline{)3296} \\ -\,32 \\ \hline 9 \\ -\,8 \\ \hline 16 \\ -\,16 \end{array}$$

4 goes into 32 eight times. Write the 8 over the 2. 4 x 8 = 32. 32 - 32 = 0. 4 goes into 9 two times. Write the 2 over the 9. 4 x 2 = 8. 9 - 8 = 1. Bring down the 6. 4 goes into 16 four times. Write the 4 over the 6.

Here's another problem for you to do:

$9\overline{)7155}$

Solution:

```
   795
9)7155
 - 63
   85
 - 81
    45
  - 45
```

Self-Test 6

(1) $5\overline{)6735}$ (2) $3\overline{)4581}$ (3) $2\overline{)5838}$

(4) $7\overline{)4893}$ (5) $6\overline{)8490}$ (6) $8\overline{)7320}$

(7) $5\overline{)7390}$ (8) $9\overline{)8280}$ (9) $4\overline{)9368}$

(10) $7\overline{)8554}$ (11) $3\overline{)8619}$ (12) $8\overline{)7496}$

Answers to Self-Test 6

(1)
```
   1347
5)6735
 - 5
   17
 - 15
    23
  - 20
     35
   - 35
```

(2)
```
   1527
3)4581
 - 3
   15
 - 15
    8
  - 6
    21
  - 21
```

(3)
```
   2919
2)5838
 - 4
   18
 - 18
    3
  - 2
    18
  - 18
```

(4)
```
    699
7)4893
 - 42
   69
 - 63
   63
 - 63
```

(5)
```
   1415
6)8490
 - 6
   24
 - 24
    9
  - 6
    30
  - 30
```

(6)
```
    915
8)7320
 - 72
   12
 - 8
   40
 - 40
```

(7)
$$\begin{array}{r} 1478 \\ 5\overline{)7390} \\ -\,5 \\ \hline 23 \\ -\,20 \\ \hline 39 \\ -\,35 \\ \hline 40 \\ -\,40 \\ \hline \end{array}$$

(8)
$$\begin{array}{r} 920 \\ 9\overline{)8280} \\ -\,81 \\ \hline 18 \\ -\,18 \\ \hline \end{array}$$

(9)
$$\begin{array}{r} 2342 \\ 4\overline{)9368} \\ -\,8 \\ \hline 13 \\ -\,12 \\ \hline 16 \\ -\,16 \\ \hline 8 \\ -\,8 \\ \hline \end{array}$$

(10)
$$\begin{array}{r} 1222 \\ 7\overline{)8554} \\ -\,7 \\ \hline 15 \\ -\,14 \\ \hline 15 \\ -\,14 \\ \hline 14 \\ -\,14 \\ \hline \end{array}$$

(11)
$$\begin{array}{r} 2873 \\ 3\overline{)8619} \\ -\,6 \\ \hline 26 \\ -\,24 \\ \hline 21 \\ -\,21 \\ \hline 9 \\ -\,9 \\ \hline \end{array}$$

(12)
$$\begin{array}{r} 937 \\ 8\overline{)7496} \\ -\,72 \\ \hline 29 \\ -\,24 \\ \hline 56 \\ -\,56 \\ \hline \end{array}$$

If you got a perfect score, then please skip the rest of this chapter and go directly to Chapter 5. If you got any wrong, please redo these problems. Then, to make sure you've really got it down, take Self-Test 7.

Self-Test 7

(1) $5\overline{)2075}$ (2) $9\overline{)8424}$ (3) $7\overline{)9184}$

(4) $3\overline{)7197}$ (5) $8\overline{)7664}$ (6) $2\overline{)9058}$

(7) $9\overline{)3825}$ (8) $4\overline{)7296}$ (9) $8\overline{)9072}$

(10) $6\overline{)5280}$ (11) $5\overline{)7110}$ (12) $9\overline{)6786}$

Answers to Self-Test 7

(1)
$$\begin{array}{r} 415 \\ 5\overline{)2075} \\ -\,20 \\ \hline 7 \\ -\,5 \\ \hline 25 \\ -\,25 \\ \hline \end{array}$$

(2)
$$\begin{array}{r} 936 \\ 9\overline{)8424} \\ -\,81 \\ \hline 32 \\ -\,27 \\ \hline 54 \\ -\,54 \\ \hline \end{array}$$

(3)
$$\begin{array}{r} 1312 \\ 7\overline{)9184} \\ -\,7 \\ \hline 21 \\ -\,21 \\ \hline 8 \\ -\,7 \\ \hline 14 \\ -\,14 \\ \hline \end{array}$$

(4)
$$\begin{array}{r} 2399 \\ 3\overline{)7197} \\ -\,6 \\ \hline 11 \\ -\,9 \\ \hline 29 \\ -\,27 \\ \hline 27 \\ -\,27 \\ \hline \end{array}$$

(5)
$$\begin{array}{r} 958 \\ 8\overline{)7664} \\ -\,72 \\ \hline 46 \\ -\,40 \\ \hline 64 \\ -\,64 \\ \hline \end{array}$$

(6)
$$\begin{array}{r} 4529 \\ 2\overline{)9058} \\ -\,8 \\ \hline 10 \\ -\,10 \\ \hline 5 \\ -\,4 \\ \hline 18 \\ -\,18 \\ \hline \end{array}$$

(7)
$$\begin{array}{r} 425 \\ 9\overline{)3825} \\ -\,36 \\ \hline 22 \\ -\,18 \\ \hline 45 \\ -\,45 \\ \hline \end{array}$$

(8)
$$\begin{array}{r} 1824 \\ 4\overline{)7296} \\ -\,4 \\ \hline 32 \\ -\,32 \\ \hline 9 \\ -\,8 \\ \hline 16 \\ -\,16 \\ \hline \end{array}$$

(9)
$$\begin{array}{r} 1134 \\ 8\overline{)9072} \\ -\,8 \\ \hline 10 \\ -\,8 \\ \hline 27 \\ -\,24 \\ \hline 32 \\ -\,32 \\ \hline \end{array}$$

(10)
$$\begin{array}{r} 880 \\ 6\overline{)5280} \\ -\,48 \\ \hline 48 \\ -\,48 \\ \hline \end{array}$$

(11)
$$\begin{array}{r} 1422 \\ 5\overline{)7110} \\ -\,5 \\ \hline 21 \\ -\,21 \\ \hline 10 \\ -\,10 \\ \hline \end{array}$$

(12)
$$\begin{array}{r} 754 \\ 9\overline{)6786} \\ -\,63 \\ \hline 48 \\ -\,45 \\ \hline 36 \\ -\,36 \\ \hline \end{array}$$

It's time to take stock. If you got everything right in Self-Tests 6 and 7, then you're definitely ready to tackle Chapter 5. What if you got just answer? Well, nobody's perfect, so you should be ready for Chapter 5. But what if you got more than one wrong in each self-test?

Then you could certainly use more practice. Why not go back to the beginning of Chapter 3 and redo that chapter and this one. They say that practice makes perfect. Let’s see if it does.

Chapter 5

Solving Problems Containing Zeros in Their Quotients

Generations of students have been confused trying to solve problems like *this* one. See if you can find the right answer.

$$7\overline{)7434}$$

Solution:

$$\begin{array}{r} 1 \\ 7\overline{)7434} \\ \underline{-\,7} \\ 4 \end{array}$$

7 ÷ 7 = 1; bring down the 4.

How many times does 7 go into 4? What do you think?

You can't really divide 7 into 4. So what do you write down in the quotient above 4?

You write down "0". OK, moving right along, let's finish off the problem.

```
   1062
7)7434
- 7
    43
  - 42
     14
   - 14
```

A very common mistake is to not put the “0” in the quotient. Instead, many people put the 6 over the first 4 in the dividend. Now let’s do another one.

```
3)8121
```

Solution:

```
   2707
3)8121
- 6
   21
- 21
     21
   - 21
```

Here’s one more problem for you to work out.

```
4)4008
```

Solution:

```
   1002
4)4008
- 4
     8
   - 8
```

Self-Test 8

(1) $2\overline{)6158}$ (2) $9\overline{)5436}$ (3) $5\overline{)5430}$

(4) $8\overline{)7264}$ (5) $6\overline{)6054}$ (6) $3\overline{)5124}$

(7) $4\overline{)4108}$ (8) $9\overline{)1863}$ (9) $5\overline{)5005}$

Answers to Self-Test 8

(1)
```
   3079
2)6158
 - 6
   15
 - 14
    18
  - 18
```

(2)
```
    604
9)5436
 - 54
    36
  - 36
```

(3)
```
   1086
5)5430
 - 5
    43
  - 40
    30
  - 30
```

(4)
```
    908
8)7264
 - 72
    64
  - 64
```

(5)
```
   1009
6)6054
 - 6
    54
  - 54
```

(6)
```
   1708
3)5124
 - 3
    21
  - 21
     24
   - 24
```

(7)
```
   1027
4)4108
 - 4
    10
  - 8
    28
  - 28
```

(8)
```
    207
9)1863
 - 18
    63
  - 63
```

(9)
```
   1001
5)5005
 - 5
     5
   - 5
```

Please go directly to Chapter 6 if you got a perfect score. If you got just one wrong, please copy the problem over and work it out again. If you got two or more wrong, then you'll need to redo the entire chapter. You should do much better when you retake the self-test, and you'll be ready to tackle Chapter 6.

Chapter 6

Dividing a Three-Digit Number by a Two-Digit Number

Let’s get right into it. See if you can do this problem. Just work it out any way you can.

$12\overline{)144}$

Solution:

$$\begin{array}{r} 1 \\ 12\overline{)144} \\ \underline{-\,12} \\ 2 \end{array}$$

How many times does 12 go into 14? It goes in one time. Write 1 just above the first 4. Subtract 12 from 14 and get 2.

$$\begin{array}{r} 12 \\ 12\overline{)144} \\ \underline{-\,12} \\ 24 \\ \underline{-24} \end{array}$$

Bring down the 4 to make 24. How many times does 12 go into 24? It goes in 2 times. Write the 2 above the second 4.

Next problem:

$25\overline{)650}$

Solution:

$$\begin{array}{r} 2 \\ 25\overline{)650} \\ -\ 50 \\ \hline 15 \end{array}$$

25 goes into 65 two times. Write the 2 over the 5. 2 x 25 = 50. 65 - 50 = 15.

$$\begin{array}{r} 26 \\ 25\overline{)650} \\ -\ 50 \\ \hline 150 \\ -\ 150 \\ \hline \end{array}$$

Bring down the 0 to make 150. How many times does 25 go into 150? It goes in 6 times. Write the 6 above the 0.

Self-Test 9

(1) $14\overline{)392}$ (2) $32\overline{)960}$ (3) $16\overline{)992}$

(4) $24\overline{)576}$ (5) $53\overline{)954}$ (6) $17\overline{)901}$

(7) $27\overline{)999}$ (8) $61\overline{)793}$ (9) $86\overline{)946}$

(10) $11\overline{)814}$ (11) $29\overline{)986}$ (12) $43\overline{)989}$

Answers to Self-Test 9

(1) $\begin{array}{r} 28 \\ 14\overline{)392} \\ -\ 28 \\ \hline 112 \\ -\ 112 \\ \hline \end{array}$ (2) $\begin{array}{r} 30 \\ 32\overline{)960} \\ -\ 96 \\ \hline \end{array}$ (3) $\begin{array}{r} 62 \\ 16\overline{)992} \\ -\ 96 \\ \hline 32 \\ -\ 32 \\ \hline \end{array}$

(4) $\begin{array}{r} 24 \\ 24\overline{)576} \\ -\ 48 \\ \hline 96 \\ -\ 96 \\ \hline \end{array}$ (5) $\begin{array}{r} 18 \\ 53\overline{)954} \\ -53 \\ \hline 424 \\ -\ 424 \\ \hline \end{array}$ (6) $\begin{array}{r} 53 \\ 17\overline{)901} \\ -\ 85 \\ \hline 51 \\ -\ 51 \\ \hline \end{array}$

(7) $\begin{array}{r} 37 \\ 27\overline{)999} \\ -\ 81 \\ \hline 189 \\ -\ 189 \\ \hline \end{array}$ (8) $\begin{array}{r} 13 \\ 61\overline{)793} \\ -\ 61 \\ \hline 183 \\ -\ 183 \\ \hline \end{array}$ (9) $\begin{array}{r} 11 \\ 86\overline{)946} \\ -\ 86 \\ \hline 86 \\ -\ 86 \\ \hline \end{array}$

(10)
$$\begin{array}{r} 74 \\ 11\overline{)814} \\ \underline{-\,77} \\ 44 \\ \underline{-\,44} \end{array}$$

(11)
$$\begin{array}{r} 34 \\ 29\overline{)986} \\ \underline{-\,87} \\ 116 \\ \underline{-\,116} \end{array}$$

(12)
$$\begin{array}{r} 23 \\ 43\overline{)989} \\ \underline{-\,86} \\ 129 \\ \underline{-\,129} \end{array}$$

Before we go on to even greater things, let's look a little more closely at what we've been doing. Consider our solution to problem 7. First question: How many times does 27 go into 99? Twice? Three times? Four times?

When you're used to working with numbers you know that 27 goes into 99 three times, with something left over. But what if you're *not* used to working with numbers? What do you do *then?*

You guess! Suppose you guess that 27 goes into 99 two times. Multiply 27 by 2 and get 54. Then subtract 54 from 99. Go ahead and do it. What did you get?

99 - 54 = 45. Since 45 is more than 27, we can see that 27 goes into 99 more than two times. OK, let's try 3. 27 x 3 = 81. 99 - 81 = 18. Now we know that 27 goes into 99 three times, with 18 left over.

So what division all comes down to is guesswork. Or, what we sometimes call trial and error. It's a lot like a scientific experiment. You pour some chemicals into a test tube, and stand back and watch the reaction. After you've been around chemicals for a while, you can predict many chemical reactions before they happen. It's the same when you get used to working with numbers.

Chapter 7

Dividing Four-Digit Numbers by Two-Digit Numbers

There's not much that's new here. It's just an extension of the work we did in the last chapter. So work out *this* problem:

$$12\overline{)1668}$$

Solution:

$$\begin{array}{r} 1 \\ 12\overline{)1668} \\ -\ \underline{12} \\ 4 \end{array}$$

12 goes into 16 one time. Write the 1 over the first 6. 16 - 12 = 4.

$$\begin{array}{r} 13 \\ 12\overline{)1668} \\ -\ \underline{12} \\ 46 \\ -\ \underline{36} \\ 10 \end{array}$$

Bring down the 6 to make 46. 12 goes into 46 three times. Write the 3 over the second 6.
3 x 12 = 36.
46 - 36 = 10.

Bring down the 8 to make 108. How many times does 12 go into 108? Let's try eight times. 8 x 12 = 96. 108 - 96 = 12. So 12 must go into 108 nine times. 9 x 12 = 108. Write the 9 over the 8 in 1668.

```
    139
12)1668
 - 12
    46
  - 36
    108
  - 108
```

Self-Test 10

(1) $19\overline{)7638}$ (2) $67\overline{)8844}$ (3) $55\overline{)9460}$

(4) $23\overline{)9223}$ (5) $16\overline{)9872}$ (6) $49\overline{)6272}$

(7) $94\overline{)9494}$ (8) $33\overline{)7524}$ (9) $81\overline{)8748}$

(10) $25\overline{)7050}$ (11) $19\overline{)9462}$ (12) $36\overline{)9684}$

Answers to Self-Test 10

(1)
```
    402
19)7638
 - 76
    38
  - 38
```

(2)
```
    132
67)8844
 - 67
    214
  - 201
    134
  - 134
```

(3)
```
    172
55)9460
 - 55
    396
  - 385
    110
  - 110
```

(4)
```
    401
23)9223
 - 92
    23
  - 23
```

(5)
```
    617
16)9872
 - 96
    27
  - 16
    112
  - 112
```

(6)
```
    128
49)6272
 - 49
    137
  - 98
    392
  - 392
```

(7)
$$\begin{array}{r} 101 \\ 94\overline{)9494} \\ -\,94 \\ \hline 94 \\ -\,94 \\ \hline \end{array}$$

(8)
$$\begin{array}{r} 228 \\ 33\overline{)7524} \\ -\,66 \\ \hline 92 \\ -\,66 \\ \hline 264 \\ -\,264 \\ \hline \end{array}$$

(9)
$$\begin{array}{r} 108 \\ 81\overline{)8748} \\ -\,81 \\ \hline 648 \\ -\,648 \\ \hline \end{array}$$

(10)
$$\begin{array}{r} 282 \\ 25\overline{)7050} \\ -\,50 \\ \hline 205 \\ -\,200 \\ \hline 50 \\ -\,50 \\ \hline \end{array}$$

(11)
$$\begin{array}{r} 198 \\ 19\overline{)9462} \\ -\,76 \\ \hline 186 \\ -\,171 \\ \hline 152 \\ -\,152 \\ \hline \end{array}$$

(12)
$$\begin{array}{r} 269 \\ 36\overline{)9684} \\ -\,72 \\ \hline 248 \\ -\,216 \\ \hline 324 \\ -\,324 \\ \hline \end{array}$$

How did you do? If you got everything right, then please go straight to Chapter 8. If not, we need to take stock. If you got just one wrong answer, we can chalk that up to carelessness. So don't worry about it and go on to Chapter 8.

If you got more than one wrong, then we want to take a closer look at what went wrong. We are particularly concerned with problems 1, 4, 7, and 9, because the quotient of each contains a "0". And that was the topic of Chapter 5.

You can probably guess what's coming next. That's right: If you got any of those four problem wrong, we'd like you to rework your way through Chapter 5. Once you do, we're confident that you'll have no trouble with problems like 1, 4, 7, and 9. And just to prove our point, once you've gone through Chapter 5, come back and redo any of the problems you missed in Self-Test 10. And then you'll be all set for Chapter 8.

Chapter 8

Checking Your Work

Are you ready to try something just a little bit different? We're going to check our work. How do we know that we've been getting the right answers?

Well, you can say, "We know we have because our answers match those in the book."

That might be called the 'Great minds think alike proof,' which *does* make a lot of sense. The only trouble is that it doesn't work on exams. That is, unless they are open book exams.

And out in the 'real world,' you won't *have* a book, and certainly not one as wonderful as *Back to Basics*, with which to check your answers.

Suppose that you and your fiancée are paying $30,000 for a wedding that will have 75 guests. How much does that come to per guest? Work it out right now.

Solution:

$$75\overline{)\$30,000}$$

$$\begin{array}{r} \$400 \\ 75\overline{)\$30,000} \\ -\ \underline{300} \end{array}$$

That comes to $400 per guest. But are you sure? Maybe you made a mistake and the quotient is, say, $40. Or $4,000. We need to check our answer.

The way we check quotients is to multiply them by the divisor. So go ahead and do that.

Solution:

$$\begin{array}{r} \$400 \\ \times\ 75 \\ \hline 2000 \\ 2800\ \ \\ \hline \$30{,}000 \end{array}$$

So we've proven that $400 *is* the right answer. In general, then, *to prove that a quotient is correct, we multiply that quotient by the divisor.*

This makes sense because, mathematically, multiplication and division are opposite processes. Just like addition and subtraction. Back in the Book of Subtraction, we proved our subtraction answers by adding.

Let's do another proof. Please divide 24 into 5,760 and then prove your answer.

Solution:

$$\begin{array}{r} 240 \\ 24\overline{)5760} \\ -\ 48 \\ \hline 96 \\ -\ 96 \\ \hline \end{array}$$

Our quotient is 240. Now let's prove that we have the right answer. We need to multiply the quotient by the divisor:

$$\begin{array}{r} 240 \\ \times\ 24 \\ \hline 960 \\ 480\ \ \\ \hline 5{,}760 \end{array}$$

Self-Test 11

For each problem, please find the quotient and then check your answer.

(1) $35\overline{)7385}$ (2) $22\overline{)6864}$ (3) $17\overline{)9911}$

(4) $58\overline{)9976}$ (5) $29\overline{)8874}$ (6) $84\overline{)8904}$

(7) $36\overline{)8964}$ (8) $72\overline{)9216}$ (9) $11\overline{)8206}$

(10) $47\overline{)7003}$ (11) $15\overline{)7590}$ (12) $84\overline{)9660}$

Answers to Self-Test 11

(1)
$$\begin{array}{r} 211 \\ 35\overline{)7385} \\ -\ 70 \\ \hline 38 \\ -\ 35 \\ \hline 35 \\ -\ 35 \\ \hline \end{array}$$

(2)
$$\begin{array}{r} 312 \\ 22\overline{)6864} \\ -\ 66 \\ \hline 26 \\ -\ 22 \\ \hline 44 \\ -\ 44 \\ \hline \end{array}$$

(3)
$$\begin{array}{r} 583 \\ 17\overline{)9911} \\ -\ 85 \\ \hline 141 \\ -\ 136 \\ \hline 51 \\ -\ 51 \\ \hline \end{array}$$

Check:
$$\begin{array}{r} 211 \\ \times\ 35 \\ \hline 1055 \\ 633\ \ \\ \hline 7{,}385 \end{array}$$

Check:
$$\begin{array}{r} 312 \\ \times\ 22 \\ \hline 624 \\ 624\ \ \\ \hline 6{,}864 \end{array}$$

Check:
$$\begin{array}{r} 583 \\ \times\ 17 \\ \hline 4081 \\ 583\ \ \\ \hline 9{,}911 \end{array}$$

(4)
$$\begin{array}{r} 172 \\ 58\overline{)9976} \\ -\ 58 \\ \hline 417 \\ -\ 406 \\ \hline 116 \\ -\ 116 \\ \hline \end{array}$$

(5)
$$\begin{array}{r} 306 \\ 29\overline{)8874} \\ -\ 87 \\ \hline 174 \\ -\ 174 \\ \hline \end{array}$$

(6)
$$\begin{array}{r} 106 \\ 84\overline{)8904} \\ -\ 84 \\ \hline 504 \\ -\ 504 \\ \hline \end{array}$$

Check: 172
x 58
1376
860
9,976

Check: 306
x 29
2754
612
8,874

Check: 106
x 84
424
848
8,904

(7) 36)8964
249
- 72
176
- 144
324
- 324

(8) 72)9216
128
- 72
201
- 144
576
- 576

(9) 11)8206
746
- 77
50
- 44
66
- 66

Check: 249
x 36
1494
747
8,964

Check: 128
x 72
256
896
9,216

Check: 746
x 11
746
746
8,206

(10) 47)7003
149
- 47
230
- 188
423
- 423

(11) 15)7590
506
- 75
90
- 90

(12) 84)9660
115
- 84
126
- 84
420
- 420

Check: 149
x 47
1043
596
7,003

Check: 506
x 15
2530
506
7,590

Check: 115
x 84
460
920
9,660

You know exactly how you did because you checked all your answers. Suppose after checking, you found that two of your quotients were wrong. So you went back over these two division problems, found your mistakes, and corrected them. Did you get these problems right or wrong?

A perfectionist would say that you got them wrong. But, as we're fond of saying, "Nobody's perfect." We *all* make mistakes. What's so

wonderful about checking our work is that we can usually catch these mistakes and correct them.

OK, if you *did* get a couple of wrong answers, but went back over the division and fixed your mistakes, do you get those problems right or wrong? In *our* book you got them right. And after all, this *is* our book.

Chapter 9

Dividing Five-Digit Numbers by Two-Digit Numbers

This is just an extension of the work we did in the last chapter. Here's the first problem for you to solve:

$$34\overline{)96662}$$

Solution:

$$\begin{array}{r} 2843 \\ 34\overline{)96662} \\ \underline{-\ 68} \\ 286 \\ \underline{-272} \\ 146 \\ \underline{-136} \\ 102 \\ \underline{-\ 102} \end{array}$$

Check:

$$\begin{array}{r} 2843 \\ \times\ 34 \\ \hline 11372 \\ \underline{8529\ \ } \\ 96{,}662 \end{array}$$

Here's one more problem:

$75\overline{)81300}$

Solution:

$$
\begin{array}{r}
1084 \\
75\overline{)81300} \\
-\ 75 \\
\hline
630 \\
-\ 600 \\
\hline
300 \\
-\ 300 \\
\hline
\end{array}
$$

Check:

$$
\begin{array}{r}
1084 \\
\times\ 75 \\
\hline
5420 \\
7588\ \ \\
\hline
80{,}300
\end{array}
$$

Are you ready for another self-test? All right, then! Remember to check your answers.

Self-Test 12

(1) $17\overline{)64889}$ (2) $94\overline{)87608}$ (3) $56\overline{)84448}$

(4) $25\overline{)69800}$ (5) $37\overline{)73112}$ (6) $64\overline{)62912}$

(7) $46\overline{)67850}$ (8) $97\overline{)77988}$ (9) $30\overline{)17370}$

(10) $13\overline{)61334}$ (11) $41\overline{)85895}$ (12) $15\overline{)92055}$

Answers to Self-Test 12

(1)
```
   3817
17)64889
 - 51
   138
 - 136
    28
  - 17
    119
  - 119
```

(2)
```
   932
94)87608
 - 846
   300
 - 282
   188
 - 188
```

(3)
```
   1508
56)84448
 - 56
   284
 - 280
    448
  - 448
```

(4)
```
   2792
25)69800
 - 50
   198
 - 175
    230
  - 225
     50
   - 50
```

(5)
```
   1976
37)73112
 - 37
   361
 - 333
    281
  - 259
    222
  - 222
```

(6)
```
   983
64)62912
 - 576
   531
 - 512
    192
  - 192
```

(7)
```
   1475
46)67850
 - 46
   218
 - 184
    345
  - 322
    230
  - 230
```

(8)
```
   804
97)77988
 - 776
   388
 - 388
```

(9)
```
   579
30)17370
 - 150
   237
 - 210
    270
  - 270
```

(10)
```
   4718
13)61334
 - 52
   93
 - 91
    23
  - 13
    104
  - 104
```

(11)
```
   2095
41)85895
 - 82
   389
 - 369
    205
  - 205
```

(12)
```
   6137
15)92055
 - 90
   20
 - 15
    55
  - 45
    105
  - 105
```

Did you check your work? If you did, chances are you got them all right. We can't emphasize enough how important it is to check your work.

Are you ready for something a little different? Well, ready or not, in the next chapter, we’re going to be working with remainders.

Chapter 10

Quotients with Remainders

So far every problem we've solved had a quotient that worked out very nicely. For example, 24 divided by 6 is 4. Or, 120 divided by 10 is 12. Now let's divide 15 by 4.

Solution:

$$\begin{array}{r} 3\text{ R3} \\ 4\overline{)15} \\ \underline{-\ 12} \\ 3 \end{array}$$

So 4 goes into 15 three times, but we have 3 left over. What do we do with the 3? We call it the remainder. So our quotient is 3 R3. Kind of sounds like the name of a robot. Here's another problem for you to solve:

$$18\overline{)419}$$

Solution:

$$\begin{array}{r} 23\text{ R5} \\ 18\overline{)419} \\ \underline{-\ 36} \\ 59 \\ \underline{-\ 54} \\ 5 \end{array}$$

How many times goes 18 go into 419? It goes in 23 times with a remainder of 5. One more problem:

$38\overline{)12761}$

Solution:

$$
\begin{array}{r}
335\ R31 \\
38\overline{)12761} \\
-\ 114 \\
\hline
136 \\
-\ 114 \\
\hline
221 \\
-\ 190 \\
\hline
31
\end{array}
$$

Self-Test 13

(1) $9\overline{)125}$ (2) $28\overline{)673}$ (3) $35\overline{)1707}$

(4) $62\overline{)5619}$ (5) $44\overline{)16201}$ (6) $7\overline{)22100}$

(7) $29\overline{)42118}$ (8) $4\overline{)1097}$ (9) $81\overline{)7917}$

(10) $76\overline{)90205}$ (11) $24\overline{)85675}$ (12) $51\overline{)9901}$

Answers to Self-Test 13

(1)
$$
\begin{array}{r}
13\ R8 \\
9\overline{)125} \\
-\ 9 \\
\hline
35 \\
-\ 27 \\
\hline
8
\end{array}
$$

(2)
$$
\begin{array}{r}
24\ R1 \\
28\overline{)673} \\
-\ 56 \\
\hline
113 \\
-\ 112 \\
\hline
1
\end{array}
$$

(3)
$$
\begin{array}{r}
48\ R27 \\
35\overline{)1707} \\
-\ 140 \\
\hline
307 \\
-\ 280 \\
\hline
27
\end{array}
$$

(4)
```
      90 R39
62)5619
 - 558
     39
```

(5)
```
      368 R9
44)16201
 - 132
     300
   - 264
      361
    - 352
        9
```

(6)
```
      3157 R1
7)22100
 - 21
     11
   - 7
     40
   - 35
      50
    - 49
       1
```

(7)
```
      1452 R10
29)42118
 - 29
    131
 - 116
     151
   - 145
       68
    - 58
       10
```

(8)
```
      274 R1
4)1097
 - 8
    29
 - 28
     17
   - 16
      1
```

(9)
```
      977 R37
81)79174
 - 729
    627
 - 567
    604
 - 567
     37
```

(10)
```
      1186 R69
76)90205
 - 76
    142
 - 76
     660
   - 608
       525
    - 456
       69
```

(11)
```
      3569 R19
24)85675
 - 72
    136
 - 120
     167
   - 144
      235
    - 216
       19
```

(12)
```
      1941 R23
51)99014
 - 51
    480
 - 459
     211
   - 204
       74
    - 51
       23
```

We won't ask you if you got all the right answers. After all, this was your first shot at doing division problems that had quotients with remainders. And besides, how can you check your work?

Well, we've got some good news and some bad news. The good news is that there *is* a way to check your work. The bad news is checking requires an extra step. Let's check the quotient we got for problem number 12 of Self-Test 12.

The checking requires two steps: (1) Multiply the quotient by the divisor; and (2) add it to the remainder. That sum should be equal to the divisor. See if you can check your answer to problem 12.

Solution:

(1) 1941 x 51 = 1941 + 9705 = 98,991

(2) 98,991 + 23 = 99,014

Since 99,014 is the dividend, our quotient is correct. Let's work out another problem. Find the quotient and then check your work.

$40\overline{)7129}$

Solution:

$$
\begin{array}{r}
178\ \text{R}9 \\
40\overline{)7129} \\
-\ 40 \\
\hline
312 \\
-280 \\
\hline
329 \\
-\ 320 \\
\hline
9
\end{array}
$$

Check:

178 x 40 = 7,120

7,120 + 9 = 7,129

Did you do OK? We certainly hope so, because there's another self-test coming up.

Self-Test 14

For each of these problems, find the quotient and then check your work.

(1) $3\overline{)679}$ (2) $19\overline{)5400}$ (3) $32\overline{)15071}$

(4) $68\overline{)51109}$ (5) $11\overline{)40000}$ (6) $25\overline{)97316}$

(7) $17\overline{)15228}$ (8) $9\overline{)45163}$ (9) $50\overline{)84632}$

(10) $74\overline{)90125}$ (11) $56\overline{)20973}$ (12) $13\overline{)92550}$

Answers to Self-Test 14

(1) $3\overline{)679}$ = 226 R1

- 6
7
- 6
19
- 18
1

Check: 226 x 3 = 678; 678 + 1 = 679

(2) $19\overline{)5400}$ = 284 R4

- 38
160
- 152
80
- 76
4

Check: 284 x 19 = 2556; 2556 + 284 = 5,396; 5,396 + 4 = 5,400

(3) $32\overline{)15071}$ = 470 R31

- 128
227
- 224
31

Check: 470 x 32 = 940; 940 + 1410 = 15,040; 15,040 + 31 = 15,071

(4) $68\overline{)51109}$ = 751 R41

- 476
350
- 340
109
- 68
41

(5) $11\overline{)40000}$ = 3636 R4

- 33
70
- 66
40
- 33
70
- 66
4

(6) $25\overline{)97316}$ = 3892 R16

- 75
223
- 200
231
- 225
66
- 50
16

Check: 751
x 68
6008
4506
51,068
+ 41
51,109

Check: 3636
x 11
3636
3636
39,996
+ 4
40,000

Check: 3892
x 25
19460
7784
97,300
+ 16
97,316

(7) 17)15228 = 895 R13
- 136
162
- 153
98
- 85
13

(8) 9)45163 = 5018 R1
- 45
16
- 9
73
- 72
1

(9) 50)84632 = 1692 R32
- 50
346
- 300
463
- 450
132
- 100
32

Check: 895
x 17
6265
895
15,215
+ 13
15,228

Check: 5018
x 9
45,162
+ 1
45,163

Check: 1692
x 50
84,600
+ 32
84,632

(10) 74)90125 = 1217 R67
- 74
161
- 148
132
- 74
585
- 518
67

(11) 56)20973 = 374 R29
- 168
417
- 392
253
- 224
29

(12) 13)92550 = 7119 R3
- 91
15
- 13
25
- 13
120
- 117
3

Check: 1217
x 74
4868
8519
90,058
+ 67
90,125

Check: 374
x 56
2244
1870
20,944
+ 29
20,973

Check: 7119
x 13
21357
7119
92,547
+ 3
92,550

Chapter 11

Dividing by Three-Digit Numbers

If you can get through this chapter in good shape, then the rest of the book will be a piece of cake. So what are we waiting for? Let's get started!

Please work out this problem:

$$125\overline{)5000}$$

Solution:

$$\begin{array}{r} 40 \\ 125\overline{)5000} \\ \underline{-\ 500} \end{array}$$

That was an easy one. Now we're going to take off the gloves, if you get our drift. See what you can do with *this* problem:

$$438\overline{)70492}$$

Solution:

$$\begin{array}{r} 160\ \text{R412} \\ 438\overline{)70492} \\ \underline{-\ 438} \\ 2669 \\ \underline{-\ 2628} \\ 412 \end{array}$$

Let's do one more problem:

$907\overline{)125735}$

Solution:

$$
\begin{array}{r}
138\ \text{R}569 \\
907\overline{)125735} \\
-\ 907 \\
\hline
3503 \\
-\ 2721 \\
\hline
7825 \\
-\ 7256 \\
\hline
569
\end{array}
$$

You may have noticed that we've stopped checking our answers. Actually we

really have checked them. When we finished writing this book, we went back and redid every problem a couple of times. Trust us: we caught quite a few errors.

So if *we* have to check our work, what about *you*? As the saying goes,

"Nobody's perfect." So from here on in, please check your answer to every problem that you solve. And remember, if you correct a mistake, that mistake never happened.

Self-Test 15

(1) $150\overline{)7800}$

(2) $925\overline{)37000}$

(3) $234\overline{)19700}$

(4) $629\overline{)141896}$

(5) $144\overline{)104544}$

(6) $375\overline{)151125}$

(7) $904\overline{)497081}$

(8) $490\overline{)350000}$

(9) $217\overline{)639772}$

(10) $504\overline{)218113}$

(11) $819\overline{)724228}$

(12) $121\overline{)146894}$

Answers to Self-Test 15

(1) 150)7800 — 52; −750; 300; −300

(2) 925)37000 — 40; −3700

(3) 234)19700 — 84 R44; −1872; 980; −936; 44

(4) 629)141896 — 225 R371; −1258; 1609; −1258; 3516; −3145; 371

(5) 144)104544 — 726; −1008; 374; −288; 864; −864

(6) 375)151125 — 403; −1500; 1125; −1125

(7) 904)497081 — 549 R785; −4520; 4508; −3616; 8921; −8136; 785

(8) 490)350000 — 714 R140; −3430; 700; −490; 2100; −1960; 140

(9) 217)639772 — 2948 R5; −434; 2057; −1953; 1047; −868; 1792; −1736; 56

(10) 504)218113 — 432 R385; −2016; 1651; −1512; 1393; −1008; 385

(11) 819)724228 — 884 R232; −6552; 6902; −6552; 3508; −3276; 232

(12) 121)146894 — 1214; −121; 258; −242; 169; −121; 484; −484

Let's take a minute to catch our breath. We've just covered the hardest chapter in *The Book of Division*. From here on out it's all downhill.

Are you confident that you can do division by three-digit numbers? Have you been getting a lot of wrong answers? Remember, it's only human to make mistakes. We *all* make mistakes – even the authors of this book. The trick is to catch those mistakes and to correct them. That's why it's essential to keep checking your work.

Chapter 12

Division with Zeros

Let's take a look at two more types of division problems:

0 ÷ 7, which is read 0 divided by 7.

7 ÷ 0, which is read 7 divided by 0.

These two problems look very similar, but have very different answers.

Let's take a closer look at 0 ÷ by 7. The 0 is the dividend, so it goes inside the division box, and the 7 is the divisor, so it goes outside the box.

$7\overline{)0}$ We ask ourselves, what number times 7 would give us 0? 0, of course. So 0 divided by 7 is 0.

$7\overline{)\begin{matrix}0\\0\end{matrix}}$ Check: 0 x 7 = 0

How about 0 ÷ 4? What number times four would give us 0? 0, of course.

$4\overline{)\begin{matrix}0\\0\end{matrix}}$ Check: 0 x 4 = 0

So, we can say that *zero divided by any number is zero*. The only exception to this rule is 0 ÷ 0, which is an indeterminate form. Don't worry about this for now. You can worry about it again when you go on to a more advanced math book.

0 ÷ 9 = 0 0 ÷ 3 = 0 0 ÷ 592 = 0

Now let's look at the other type of problem, 7 ÷ 0. Using a division box, the 0 is on the outside and the 7 is inside the box, like this:

$0\overline{)7}$. Let's ask ourselves, what number times 0 is 7?

Can you think of *any* number times 0 that will give us 7? Well, *we* certainly can't. Why not? Because 0 times any number is always 0. Whenever we divide by 0, the answer is called *undefined*. So, 7 ÷ 0 is undefined. This is a very important concept in mathematics. But don't worry; in this book, you'll just need to remember that the quotient of any number divided by 0 is undefined. OK, what is the quotient of 143 ÷ 0?

It's undefined. What is the quotient of 10 ÷ 0? It's undefined.

Self-Test 16

(1) 0 ÷ 6	(2) 6 ÷ 0	(3) 145 ÷ 0
(4) 0 ÷ 145	(5) 0 ÷ 15	(6) 15 ÷ 0

Answers to Self-Test 16

(1) 0	(2) undefined	(3) undefined
(4) 0	(5) 0	(6) undefined

Chapter 13

Dividing by Ten, One Hundred, and One Thousand

- How much is 12,000 divided by 10?

Solution: When a number ends with one or more zeros, to divide it by 10, just cross out the last zero. So 12,000 divided by 10 is 1,200.

- Next question: How much is 150,000 divided by 100?

Solution: 150,000 ÷ 100 = 1,500. Just knock off the last two zeros from 150,000 to make 1,500.

- How much is 210,000 divided by 1,000?

Solution: 210,000 ÷ 1,000 = 210. Just knock off the last three zeros from 210,000 to make 210.

Let's sum up:

1) To divide a number by 10, cross off one zero.

2) To divide a number by 100, cross off two zeros.

3) To divide a number by 1,000, cross off three zeros.

Self-Test 17

(1) Divide each of these numbers by 10:

a) 150 b) 4,000 c) 600 d) 100,000

(2) Divide each of these numbers by 100:

a) 700 b) 50,000 c) 701,000 d) 18,600

(3) Divide each of these numbers by 1,000:

a) 1,000 b) 400,000 c) 175,000 d) 10,000

(4) Divide 230,000 by

a) 10 b) 100 c) 1,000

(5) Divide 2,000 by

a) 10 b) 100 c) 1,000

(6) Divide 1,000,000 by

a) 10 b) 100 c) 1,000

Answers to Self-Test 17

(1)	a) 15	b) 400	c) 60	d) 10,000
(2)	a) 7	b) 500	c) 7,010	d) 186
(3)	a) 1	b) 400	c) 175	d) 10
(4)	a) 23,000	b) 2,300	c) 230	
(5)	a) 200	b) 20	c) 2	
(6)	a) 100,000	b) 10,000	c) 1,000	

Chapter 14

Applications

We do division every day, so now's the chance to apply all those division skills you've picked up so far. Let's begin by doing *this* problem:

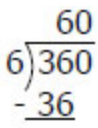
- If three pairs of socks cost $6, how much would it cost to buy one pair?

Solution:

$6 ÷ 3 = $2

- Next problem: A plane can carry 360 passengers. If there are 6 passengers in each row, how many rows of passengers does the plane have

Solution:



Problem: Avnish Bajaj walked 8 hours, covering 32 miles. How many miles per hour did he walk?

Solution: 32 ÷ 4 = 8 miles per hour

One more problem: Leviev Boynelgreen dies, leaving a two-hundred thousand dollar inheritance to his ten children, who split the inheritance

equally. How much money does each child receive?

Solution: $200,000 ÷ 10 = $20,000

Self-Test 18

1. A 72-ounce cake is shared equally by 12 people. How many ounces of cake does each person get?
2. A football stadium has 64,800 seats. If there are 32 sections in the stadium,each with the same number of seats. How many seats are in each section?
3. Happy Harry's Hardware Store had sales of $208, 000 in 2008. How much does that come to per week? (There are 52 weeks in a year.)
4. In her lifetime, a hen laid 1,080 eggs. How many dozen eggs did she lay?
5. Hossein Eslambolchi went on a cross country trip covering 2,940 miles. If the trip took seven days, how many miles, on average, did he drive each day?
6. Jhumpa Lahiri had a weekly payroll of $144,000. If she had 288 employees, how much was the average weekly salary that she paid?
7. How much is six hundred fifty thousand divided by one hundred?
8. Lars Ljungqvist ran 3,000 miles in 2009. If he ran the same distance each month, how many miles did he run in January?
9. Selma's Sleepy Store has 384 beds. Selma asked four volunteers to sleep in the store every night to make sure that every bed was comfortable. If no one slept in the same bed as anyone else, how many nights would it take until every bed had been slept in?
10. A one hundred twenty-two acre farm received shipment of 42,334 pounds of fertilizer. If the fertilizer was spread evenly, how many pounds offertilizer would be spread on each acre?
11. A refund of five hundred thousand dollars was given to 100 people who won a class action law suit. If the money was divided evenly, how much did each person receive?

12. The mythical country of Arcadia is 375,000 square miles and has 25 provinces that are exactly the same size. How large is each province?

Answers to Self-Test 18

1. 72 ÷ 12 = 6 oz.

2.
```
     2025 seats
32)64800
  - 64
     80
   - 64
    160
   - 160
```

3.
```
      $4000
52)$208000
  - 208
```

4.
```
     90 dozen
12)1080
  - 108
```

5.
```
     420 miles
7)2940
 - 28
    14
  - 14
```

6.
```
        $500
288)$144000
   - 1440
```

7. 6,500

8.
```
     250 miles
12)3000
  - 24
    60
   -60
```

9.
```
      96 nights
   4)384
   - 36
     24
    -24
```

10.
```
        347 pounds
  122)42334
    - 366
      573
    -  488
       854
     -  854
```

11. $500,000 ÷ 100 = $5,000

12.
```
       15000 square miles
  25)375000
   - 25
     125
   -  125
```

Believe it or not, you've just completed the last chapter of *Back to Basics*. Just do the final exam and you're out of here. You can pick up your diploma when you leave the exam.

Final Exam

Chapter 1:

(1) $70 \div 10 =$ ____

(2) $20 \div 5 =$ ____

(3) $72 \div 8 =$ ____

(4) $42 \div 7 =$ ____

Chapter 2:

(1) 48 divided by 8 = _____

(2) $9\overline{)81}$

(3) 8 into 40

(4) 27/3 =

Chapter 3:

(1) $6\overline{)240}$

(2) $9\overline{)432}$

(3) $7\overline{)854}$

(4) $3\overline{)822}$

Chapter 4:

(1) $5\overline{)7940}$

(2) $8\overline{)7720}$

(3) $3\overline{)9132}$

(4) $5\overline{)9045}$

Chapter 5:

(1) $8\overline{)8752}$

(2) $6\overline{)4236}$

(3) $9\overline{)6354}$

(4) $4\overline{)8052}$

Chapter 6

(1) $12\overline{)864}$ (2) $39\overline{)936}$

(3) $97\overline{)873}$ (4) $25\overline{)790(}$

Chapter 7:

(1) $17\overline{)5134}$ (2) $59\overline{)4366}$

(3) $88\overline{)9416}$ (4) $34\overline{)9486}$

Chapter 8:

Find the quotient and check your work.

(1) $37\overline{)8066}$ (2) $49\overline{)9261}$

(3) $24\overline{)9960}$ (4) $17\overline{)7837}$

Chapter 9:

For each problem, please find the quotient and then check your answer.

(1) $44\overline{)99880}$ (2) $19\overline{)96957}$

(3) $53\overline{)89040}$ (4) $72\overline{)16848}$

Chapter 10:

(1) $7\overline{)93375}$ (2) $29\overline{)65787}$

(3) $40\overline{)99910}$ (4) $72\overline{)86315}$

Chapter 11:

(1) $350\overline{)62650}$ (2) $717\overline{)92416}$

(3) $219\overline{)84534}$ (4) $143\overline{)75000}$

Chapter 12:

(1) $4 \div 0 =$

(2) $0 \div 5 =$

(3) $0 \div 9 =$

(4) $7 \div 0 =$

Chapter 13:

(1) Divide 10,000 by
- a) 10
- b) 100
- c) 1,000

(2) Divide 450,000 by
- a) 10
- b) 100
- c) 1,000

Chapter 14:

1. Zydrunas Hgauskas mined 10,872 ounces of copper last year. How many ounces did he average per month?
2. A one-million dollar lottery prize was divided equally among ten winners who shared the ticket. How much money did each winner get?
3. Holssein Shariatmadari left 90,000 acres of land to his 18 children. If the land were divided equally, how many acres did each child receive?
4. During the year 2009 (not a leap year), Ingrid Hannesson, who had terrible allergies, sneezed 91,615 times. How many sneezes did she average per day?

Answers to Final Exam

Chapter 1:

(1) 7 (2) 4 (3) 9 (4) 6

Chapter 2:

(1) 6 (2) 9 (3) 5 (4) 9

Chapter 3:

(1)
$$\begin{array}{r} 40 \\ 6\overline{)240} \\ -\ 24 \end{array}$$

(2)
$$\begin{array}{r} 48 \\ 9\overline{)432} \\ -\ 36 \\ \hline 72 \\ -\ 72 \end{array}$$

(3)
$$\begin{array}{r} 122 \\ 7\overline{)854} \\ -\ 7 \\ \hline 15 \\ -\ 14 \\ \hline 14 \\ -\ 14 \end{array}$$

(4)
$$\begin{array}{r} 274 \\ 3\overline{)822} \\ -\ 6 \\ \hline 22 \\ -\ 21 \\ \hline 12 \\ -\ 12 \end{array}$$

Chapter 4:

(1)
```
  1588
5)7940
 - 5
  29
 - 25
   44
 - 40
    40
 - 40
```

(2)
```
   965
8)7720
 - 72
   52
 - 48
   40
 - 40
```

(3)
```
  3044
3)9132
 - 9
   13
 - 12
    12
 - 12
```

(4)
```
  1809
5)9045
 - 5
  40
 - 40
    45
 - 45
```

Chapter 5:

(1)
```
  1094
8)8752
 - 8
   75
 - 72
    32
 - 32
```

(2)
```
   706
6)4236
 - 42
    36
 - 36
```

(3)
```
   706
9)6354
 - 63
    54
 - 54
```

(4)
```
  2013
4)8052
 - 8
    5
 - 4
    12
 - 12
```

Chapter 6:

(1)
$$\begin{array}{r} 72 \\ 12\overline{)864} \\ -\ 84 \\ \hline 24 \\ -\ 24 \\ \hline \end{array}$$

(2)
$$\begin{array}{r} 24 \\ 39\overline{)936} \\ -\ 78 \\ \hline 156 \\ -\ 156 \\ \hline \end{array}$$

(3)
$$\begin{array}{r} 9 \\ 97\overline{)873} \\ -\ 873 \\ \hline \end{array}$$

(4)
$$\begin{array}{r} 316 \\ 25\overline{)7900} \\ -\ 75 \\ \hline 40 \\ -\ 25 \\ \hline 150 \\ -\ 150 \\ \hline \end{array}$$

Chapter 7:

(1)
$$\begin{array}{r} 302 \\ 17\overline{)5134} \\ -\ 51 \\ \hline 34 \\ -\ 34 \\ \hline \end{array}$$

(2)
$$\begin{array}{r} 74 \\ 59\overline{)4366} \\ -\ 413 \\ \hline 236 \\ -\ 236 \\ \hline \end{array}$$

(3)
$$\begin{array}{r} 107 \\ 88\overline{)9416} \\ -\ 88 \\ \hline 616 \\ -\ 616 \\ \hline \end{array}$$

(4)
$$\begin{array}{r} 279 \\ 34\overline{)9486} \\ -\ 68 \\ \hline 268 \\ -\ 238 \\ \hline 306 \\ -\ 306 \\ \hline \end{array}$$

Chapter 8:

(1)
$$\begin{array}{r} 218 \\ 37\overline{)8066} \\ -\ 74 \\ \hline 66 \\ -\ 37 \\ \hline 296 \\ -\ 296 \\ \hline \end{array}$$

(2)
$$\begin{array}{r} 189 \\ 49\overline{)9261} \\ -\ 49 \\ \hline 436 \\ -\ 392 \\ \hline 441 \\ -\ 441 \\ \hline \end{array}$$

Check:

```
  218
x  37
 1526
 654
8,066
```

```
  189
x  49
 1701
 756
9,261
```

(3)
```
     415
  24)9960
   - 96
     36
   - 24
     120
   - 120
```

(4)
```
     461
  17)7837
   - 68
     103
   - 102
      17
   - 17
```

Check:

```
  415
x  24
 1660
 830
9,960
```

```
  461
x  17
 3227
 461
7,837
```

Chapter 9:

(1)
```
     2270
  44)99880
   - 88
     118
   - 88
     308
   - 308
```

(2)
```
     5103
  19)96957
   - 95
      19
   - 19
      57
   - 57
```

Check:

```
  2270
x   44
 9080
 9080
99,880
```

```
  5103
x   19
 45927
 5103
96,957
```

(3)
```
      1680
53 ) 89040
   - 53
     360
   - 318
     424
   -  424
```

(4)
```
       234
72 ) 16848
   -  144
      244
   -  216
      288
   -  288
```

Check:

```
  1680
x   53
  5040
 8400
89,040
```

```
   234
x  72
   468
 1638
16,848
```

Chapter 10:

(1)
```
      13339  R2
7 ) 93375
  - 7
    23
  - 21
     23
   - 21
     27
   - 21
     65
   - 63
      2
```

(2)
```
       2268  R15
29 ) 65787
   - 58
     77
   - 58
     198
   - 174
      247
   -  232
       15
```

(3)
```
      2497  R30
40 ) 99910
   - 80
     199
   - 160
      391
   - 360
      310
   -  280
       30
```

(4)
```
      1198  R59
72 ) 86315
   - 72
     143
   -  72
     711
   - 648
      635
   - 576
       59
```

Chapter 11:

(1)
```
      179
350)62650
  - 350
    2765
  - 2450
     3150
   - 3150
```

(2)
```
      128  R640
717)92416
  - 717
    2071
  - 1434
     6376
   - 5736
      640
```

(3)
```
      386
219)84534
  - 657
    1883
  - 1752
     1314
   - 1314
```

(4)
```
      524  R68
143)75000
  - 715
     350
   - 286
      640
    - 572
       68
```

Chapter 12:

(1) undefined (2) 0 (3) 0 (4) undefined

Chapter 13:

(1) a) 1,000 b) 100 c) 10

(2) a) 45,000 b) 4,500 c) 450

Chapter 14:

1.
```
      906 oz.
12)10872
  - 108
     72
   - 72
```

2. $100,000

3.
```
      5000 acres
18)90000
  - 90
```

4.
```
      251 sneezes
365)91615
   - 730
     1861
   - 1825
       365
     - 365
```

Last Word

Congratulations! You have just learned or relearned four years of arithmetic. You are now fully capable of going on to more advanced work.

You now know how to add, subtract, multiply, and divide without needing a calculator. So what's next? Fractions, decimals, and percentages. It just so happens that these topics are covered in our book, *Basic Mathematics.*

You're probably wondering, how can I get a copy of this wonderful book?.

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