



POWER **Basic** BASICS **Mathematics**



Student Resource

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To the Student

Welcome to *Power Basics® Basic Mathematics*. This book will help you learn how to perform basic math operations. Each lesson builds on what you have already learned. As you go through the lessons step by step, you will master basic mathematics. This knowledge will help you at school, at work, and in other parts of your life.

In **Unit 1, Addition and Subtraction**, you will learn how to add and subtract in columns, add multi-digit numbers, add with carrying, subtract numbers with different numbers of digits, and subtract with borrowing.

In **Unit 2, Multiplication and Division**, you will learn how to multiply in columns, multiply by 1, 0, and multiples of 10, and multiply with carrying. You will learn how to divide large numbers, use zeroes as placeholders, divide by 1 or the dividend, and solve division problems with remainders.

In **Unit 3, Fractions and Decimals**, you will learn fraction concepts, including reducing to lowest terms, operations with fractions, and working with improper fractions and mixed numbers. You will also learn what decimals are, how to do operations with decimals, and how to write fractions as decimals.

In **Unit 4, Percents, Powers, and Roots**, you will learn what percents are, how to find the percent of a whole, how to find the whole from a percent, and how to convert between fractions, decimals, and percents. You will also learn how to work with exponents, how to solve for perfect squares and square roots, and how to find square roots.

To the Student, *continued*

Each lesson is made up of short sections that explain important math concepts. Each of these sections is followed by a few problems to help you practice what you have learned. Each unit ends with a Unit Review. The Unit Review is followed by application activities. These activities will let you extend and apply what you have learned in the unit.

Power Basics Basic Mathematics has many special features that make learning easier. “Tips” give you hints on ways to master the ideas and facts in the text. “Think About It” questions ask you to look at geometry in new ways. “In Real Life” sections show you how the skills you are learning are used in the world outside the classroom. The “Words to Know” section at the start of most lessons includes important new terms introduced in the lesson. The first time each word is used, it is defined for you. This first use appears in bold type. All the terms in the “Words to Know” section are also defined in the Glossary at the end of the book. If you can’t remember what a term means, you can look it up in the Glossary. Station-based activities help you extend concepts introduced in the lessons. Finally, the appendixes at the back of the book include the mathematical rules, formulas, and other important information introduced in the lessons.

As you move through *Power Basics Basic Mathematics*, you will become a more confident and skilled mathematician. We hope that you enjoy this material as you learn.

UNIT 1

Addition and Subtraction



LESSON 1: Addition

GOAL: To review the addition of numbers to four digits with carrying, and to use addition in word problems

WORDS TO KNOW

carry	plus sign
column	row
digit	sum
equal sign	total

What Is Addition?

When you add, you combine two or more groups into one group. These groups can include one thing or more than one thing. The number of things in one group can be added to the number of things in another group. Adding is quicker than counting.

You have three apples in one group below and two apples in the other.

Group One



Group Two



How many apples do you have altogether?

To answer this question, you can count:

1 → 2 → 3 → 4 → 5

Or, even faster, you can add:

3 → + → 2 → = 5

The sign for addition is + . It is called the **plus sign**. The plus sign tells you to add the numbers before and after the sign. The answer in an addition problem is called the **sum** or **total**. The result of addition equals the sum or total. The **equal sign** is = .

Look at the examples below.

Example 1

$3 + 7 = 10$ Three plus seven equals ten. The sum or total is 10.

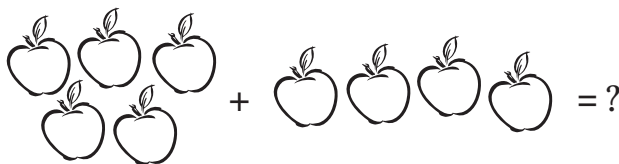
Example 2

$8 + 4 = 12$ Eight plus four equals twelve. The sum or total is 12.

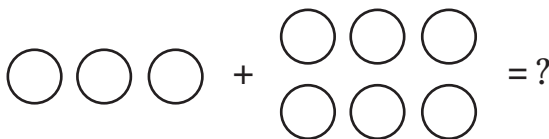
■ PRACTICE 1: Addition

Answer the question about each set of pictures. Write your answer on the line after each question.

1. Look at the apples below. How many apples are there altogether? _____ apples



2. Look at the circles below. How many circles are there altogether? _____ circles



Find the sum for each addition problem. Write your answer on the line after each problem.

3. $1 + 1 =$ _____

4. $2 + 1 =$ _____

5. $2 + 2 =$ _____

6. $2 + 3 =$ _____

7. $3 + 1 =$ _____

8. $4 + 3 =$ _____

Addition Problems in Columns

Addition problems can be written in different ways. You can write an addition problem in a **row**, in which the numbers are lined up horizontally. Look at the example below.

Example 1

$$8 + 6 = 14$$

However, you will more often write an addition problem in a **column**. Put the addition sign to the left of the last number to be added. Then put a line under the last number, separating it from the total. Look at the example below.

Example 2

$$\begin{array}{r} 8 \\ + 6 \\ \hline 14 \end{array}$$

Addition problems are easier to solve when they are written in columns, especially if you are adding large numbers.

TIP



The word *sum* comes from a Latin word that means “highest.” So when we say “The sum of 6 and 3 is 9,” we mean that the sum (9) is the highest number in the problem.

■ PRACTICE 2: Addition Problems in Columns

Write each problem in a column. Then solve the problem. Write your answer in the space beside each problem.

Example: $9 + 2 =$
$$\begin{array}{r} 9 \\ + 2 \\ \hline 11 \end{array}$$

1. $7 + 6 =$

2. $8 + 8 =$

3. $5 + 4 =$

4. $6 + 0 =$

5. $6 + 9 =$

6. $4 + 8 =$

7. $7 + 4 =$

8. $5 + 9 =$

9. $4 + 6 =$

10. $8 + 3 =$

11. $7 + 7 =$

12. $8 + 9 =$

Adding More Than Two Numbers

Sometimes you will have to add more than two numbers. Follow the steps below.

Example

Add the four numbers 1, 2, 3, and 4.

$$1 + 2 + 3 + 4 = ? \quad \text{or} \quad \begin{array}{r} 1 \\ 2 \\ 3 \\ + 4 \\ \hline ? \end{array}$$

Step 1. Add the first two numbers of the group.

$$1 + 2 = 3 \quad \begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array}$$

Step 2. Then add the next number (3) to the sum of the first two (3).

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

Step 3. Finally, add the last number (4) to the sum of the first three (6).

$$4 + 6 = 10 \quad \begin{array}{r} 4 \\ + 6 \\ \hline 10 \end{array}$$

The sum is 10.

■ PRACTICE 3: Adding More Than Two Numbers

Find the sum for each problem. Circle your answer when you have finished.

$$\begin{array}{r} 1. \ 3 \\ \ 4 \\ \ 2 \\ + 6 \\ \hline \end{array}$$

$$2. \ 1 + 5 + 3 + 2 = \underline{\hspace{2cm}}$$

$$\begin{array}{r} 3. \ 1 \\ \ 3 \\ \ 4 \\ + 5 \\ \hline \end{array}$$

$$4. \ 4 + 2 + 1 + 3 = \underline{\hspace{2cm}}$$

$$\begin{array}{r} 5. \ 5 \\ \ 2 \\ \ 2 \\ + 7 \\ \hline \end{array}$$

$$6. \ 3 + 4 + 2 + 6 = \underline{\hspace{2cm}}$$

■ IN REAL LIFE



Addition skills can help you do work around the house. Ellis wants to make some shelves for his living room. He measures his living room wall and decides that each shelf should be 4 feet long. At the lumber yard, he notices that boards are sold in lengths of 6 feet, 8 feet, 10 feet, 12 feet, and 16 feet. The salesperson tells him he can buy one piece of wood and cut it into three pieces. If Ellis wants three shelves, each 4 feet long, which length of board should he buy? Write your answer on a separate sheet of paper.

Adding Two-Digit Numbers

A **digit** is any of the symbols used to write numbers: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. So far we have added numbers with one digit. Numbers from 10 to 99 have two digits.

Some One-Digit Numbers Some Two-Digit Numbers

1, 3, 7, 6

10, 36, 21, 55

To add two-digit numbers, follow the steps below.

Example

$$35 + 54$$

Step 1. Line up the ones and tens digits in columns.

$$\begin{array}{r} \text{tens} \quad \text{ones} \\ 35 \\ + 54 \\ \hline \end{array}$$

Step 2. Add the digits in the ones column.

$$\begin{array}{r} 35 \\ + 54 \\ \hline 9 \end{array}$$

Step 3. Add the digits in the tens column.

$$\begin{array}{r} 35 \\ + 54 \\ \hline 89 \end{array}$$

The sum is 89.

■ PRACTICE 4: Adding Two-Digit Numbers

Find each sum. Write your answer on the line after each problem.

1. $74 + 12 =$ _____

2. $23 + 14 =$ _____

3. $64 + 31 =$ _____

4. $11 + 27 =$ _____

5. $66 + 22 =$ _____

6. $60 + 23 =$ _____

7. $47 + 22 =$ _____

8. $34 + 25 =$ _____

9. $16 + 12 =$ _____

10. $51 + 48 =$ _____

Adding Three-Digit Numbers

Numbers from 100 through 999, such as 100, 134, or 305, have three digits. They not only have a ones and a tens digit, they also have a hundreds digit. To add three-digit numbers, follow the steps below.

Example

$$635 + 254$$

Step 1. Line up the numbers so the ones, tens, and hundreds digits are in columns.

$$\begin{array}{r} \text{hundreds} \\ \text{tens} \\ \text{ones} \\ 635 \\ + 254 \\ \hline \end{array}$$

Step 2. Add the digits in the ones column.

$$\begin{array}{r} 635 \\ + 254 \\ \hline 9 \end{array}$$

Step 3. Then add the digits in the tens column.

$$\begin{array}{r} 635 \\ + 254 \\ \hline 89 \end{array}$$

Step 4. Finally, add the digits in the hundreds column.

$$\begin{array}{r} 635 \\ + 254 \\ \hline 889 \end{array}$$

The sum is 889.

IN REAL LIFE



Knowing how to add will help you plan your shopping. Risa is having some friends over to watch a football game. She wants to buy some drinks and snacks before they come. She only has \$6 in her wallet. She finds a sale flyer from the local supermarket. Risa looks up the items she needs: soda is \$1, potato chips are \$2 per bag, and pretzels are \$1.50 per bag. She figures she will need three bottles of soda, two bags of potato chips, and two bags of pretzels. Risa adds up the cost of all the items she needs and sees that she will need \$10 plus tax. Now she knows that she will have to stop by the bank before she goes shopping!

■ PRACTICE 5: Adding Three-Digit Numbers

Find each sum. Write your answer on the line after each problem.

1. $672 + 127 =$ _____

2. $463 + 224 =$ _____

3. $276 + 313 =$ _____

4. $327 + 632 =$ _____

5. $811 + 126 =$ _____

6. $522 + 145 =$ _____

7. $154 + 234 =$ _____

8. $351 + 642 =$ _____

9. $372 + 125 =$ _____

10. $411 + 351 =$ _____

Adding Four-Digit Numbers

Numbers from 1000 to 9999, such as 1021, 2001, or 3419, have four digits. For instance, 2134 has four digits: The ones digit is 4, the tens digit is 3, the hundreds digit is 1, and the thousands digit is 2. To add four-digit numbers, follow the steps on the next page.

Example

$$6635 + 1254$$

Step 1. Line up the numbers so the ones, tens, hundreds, and thousands digits are in columns.

$$\begin{array}{r} \text{thousands} \\ \text{hundreds} \\ \text{tens} \\ \text{ones} \\ 6635 \\ + 1254 \\ \hline \end{array}$$

Step 2. Add the ones column.

$$\begin{array}{r} 6635 \\ + 1254 \\ \hline 9 \end{array}$$

Step 3. Then add the tens column.

$$\begin{array}{r} 6635 \\ + 1254 \\ \hline 89 \end{array}$$

Step 4. Next, add the hundreds column.

$$\begin{array}{r} 6635 \\ + 1254 \\ \hline 889 \end{array}$$

Step 5. Finally, add the thousands column.

$$\begin{array}{r} 6635 \\ + 1254 \\ \hline 7889 \end{array}$$

The sum is 7889, or 7,889.