

# Word Problems with Whole Numbers

Paul R. Robbins and Sharon K. Hauge

illustrated by Mike Kupperman

J. WESTON  
**WALCH**  
PUBLISHER  
Portland, Maine

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# To the Teacher

This reproducible book is designed to build student skills in two areas of concern for most teachers: using whole numbers and applying arithmetic skills through word problems.

*Word Problems with Whole Numbers* parallels two other books by Paul R. Robbins and Sharon K. Hauge, *Word Problems with Fractions* and *Word Problems with Decimals, Proportions and Percents*. Their books are not dependent on one another, but they can be used together very well. *All* three are written at a level comfortable for almost all junior high and even younger students.

This series of books was created at the urging of J. Weston Walch, the founder of J. Weston Walch, Publisher. Mr. Walch recognized the need to provide texts that would not only teach students fundamental arithmetic skills but also engage their interest in using these skills to solve word problems. The three books emerged as a way of meeting this challenge. We are pleased that the approach has won such acceptance by classroom teachers that the books have remained staples in the Walch catalog since their publication.

Several factors led us to the decision to publish a new edition of these texts. First, to keep the word problems credible to students, we had to use new, realistic prices. A second reason is the explosion of new technologies affecting the lives of young people. We wanted to include word problems that used these technologies, as well as new information and ideas that have come from science. Third, many students are now using hand-held calculators. We believe it is important to show students how to use calculators as tools in solving word problems. For these reasons, we offer the second edition of *Word Problems with Whole Numbers*.

This new edition offers the following:

- plenty of practice exercises;
- updated word problems reflecting current prices;
- a large variety of new items, ranging from exercises about science, to math history, to computer science, to urban renewal;
- introduction of the concept of clock arithmetic;
- encouragement to do library research and experimentation;
- an entire new chapter, "Solving Word Problems with the Aid of a Hand-held Calculator" (emphasizing both the appropriate use as well as the misuse of calculators);
- an answer key with each chapter.

We hope that you will continue to find *Word Problems with Whole Numbers* useful in your classroom teaching. We welcome your comments.

# To the Student

Why should there be activities focusing on word problems? If you know how to add, subtract, multiply, and divide, can't you solve word problems that use numbers without any further instruction? Perhaps, but consider a problem like this:

A bicycle rider averages 15 miles per hour during the first 2 hours and 10 miles per hour during the rest of the trip. If she rides from 8:00 a.m. until 12:00 a.m., how many miles will she travel? \_\_\_\_\_



Simply knowing how to add or subtract, or even multiply or divide, does not tell you what you must do to solve the problem. Before making any calculations, you must **FIRST** figure out just what you have to do—and that's a big part of what these activities are all about. We will show you how to recognize key words, key phrases, and key ideas in word problems that will help you decide what you need to do to solve them. We will also review the arithmetic that you will need to work the problems and then show you how to apply it to the problems.

We hope you'll find *Word Problems with Whole Numbers* interesting, fun, and useful.



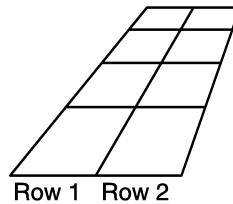
# Multiplication

## Making Sense out of Multiplication

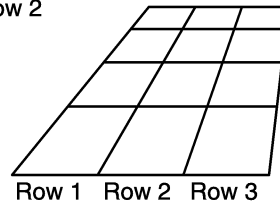
Here is a brand new tile for covering the kitchen floor. You find that 4 tiles will cover the width of the kitchen. That gives you 1 row of tiles. Good start.



You continue to work, and now you have 2 rows. How many tiles did you use? You could count them, and there would be 8. Or you could say  $2 \times 4 = 8$ .



Work goes on. You have now laid 3 rows of tiles.  $3 \times 4 = 12$  (Count them.)



And on!

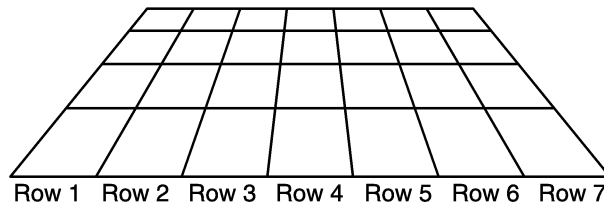
$7 \times 4 = 28$  (Count them.)

When you see problems such as:

$$2 \times 4 =$$

$$\text{or } 3 \times 4 =$$

$$\text{or } 7 \times 4 =$$



the sign  $\times$  means to **multiply**.

You can say these problems and their answers aloud as “Two times four equals eight; three times four equals twelve; and seven times four equals twenty-eight.”

From the pictures, you can see that knowing how to multiply can save you some time in counting the tiles. Furthermore, you might also see that multiplication can be a short cut for addition. This is true when you have things in **equal** amounts, such as the number of tiles in each row, and you want to know how many tiles there are in all the rows.

(continued)



Name \_\_\_\_\_

Date \_\_\_\_\_

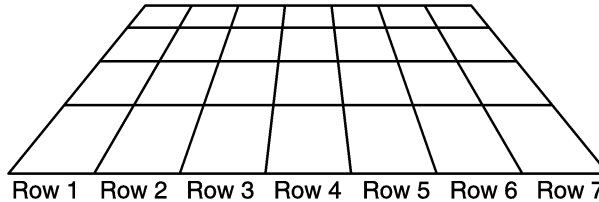


Reproducible

## Multiplication

Take another look at the last picture of tiles. You can see that there are 4 tiles in each row. You can find out how many tiles there are in all by adding up the number of tiles in each row. Let's do this:

Row 1	4
Row 2	4
Row 3	4
Row 4	4
Row 5	4
Row 6	4
Row 7	4
	<hr/>
	28



So, using addition we get 28 tiles, the same number we got by multiplying. However, you will usually find it easier to solve such problems using multiplication. When you solve the above problem by multiplication, you simply ask, "How many are seven 4's? or  $7 \times 4$ ?" If you know your multiplication tables, you know at once that the answer is 28.

Think of multiplication as a short cut for adding two or more equal numbers. For example:

$2 \times 10$ is the same as adding $10 + 10$
$3 \times 6$ is the same as adding $6 + 6 + 6$
$4 \times 1$ is the same as adding $1 + 1 + 1 + 1$
$5 \times 9$ is the same as adding $9 + 9 + 9 + 9 + 9$ .

The idea that multiplication can be a short cut for adding two or more equal numbers is an important one for solving many word problems. We'll come back to this idea later in the chapter. But first we must master the arithmetic needed to solve multiplication problems.

Which brings us back to the tables.

When we were laying tiles for the kitchen floor, we were using  $1 \times 4$ ,  $2 \times 4$ ,  $3 \times 4$ , etc., or the **four table**. If we were laying rows of six tiles, then we would have used  $1 \times 6$ ,  $2 \times 6$ ,  $3 \times 6$ , etc., or the **six table**. To multiply, you must know the **multiplication tables**. You simply have to memorize them. You should know the tables at least as well as the words to "Jingle Bells." You should know the tables so well that you could recite them standing on your head or blind-folded.

Here are the tables. If you don't know them, now is the time to learn them.

(continued)



Name \_\_\_\_\_

Date \_\_\_\_\_



Reproducible

**Multiplication**

## The Multiplication Tables

$1 \times 0 = 0$	$2 \times 0 = 0$	$3 \times 0 = 0$	$4 \times 0 = 0$	$5 \times 0 = 0$
$1 \times 1 = 1$	$2 \times 1 = 2$	$3 \times 1 = 3$	$4 \times 1 = 4$	$5 \times 1 = 5$
$1 \times 2 = 2$	$2 \times 2 = 4$	$3 \times 2 = 6$	$4 \times 2 = 8$	$5 \times 2 = 10$
$1 \times 3 = 3$	$2 \times 3 = 6$	$3 \times 3 = 9$	$4 \times 3 = 12$	$5 \times 3 = 15$
$1 \times 4 = 4$	$2 \times 4 = 8$	$3 \times 4 = 12$	$4 \times 4 = 16$	$5 \times 4 = 20$
$1 \times 5 = 5$	$2 \times 5 = 10$	$3 \times 5 = 15$	$4 \times 5 = 20$	$5 \times 5 = 25$
$1 \times 6 = 6$	$2 \times 6 = 12$	$3 \times 6 = 18$	$4 \times 6 = 24$	$5 \times 6 = 30$
$1 \times 7 = 7$	$2 \times 7 = 14$	$3 \times 7 = 21$	$4 \times 7 = 28$	$5 \times 7 = 35$
$1 \times 8 = 8$	$2 \times 8 = 16$	$3 \times 8 = 24$	$4 \times 8 = 32$	$5 \times 8 = 40$
$1 \times 9 = 9$	$2 \times 9 = 18$	$3 \times 9 = 27$	$4 \times 9 = 36$	$5 \times 9 = 45$
$1 \times 10 = 10$	$2 \times 10 = 20$	$3 \times 10 = 30$	$4 \times 10 = 40$	$5 \times 10 = 50$
$6 \times 0 = 0$	$7 \times 0 = 0$	$8 \times 0 = 0$	$9 \times 0 = 0$	$10 \times 0 = 0$
$6 \times 1 = 6$	$7 \times 1 = 7$	$8 \times 1 = 8$	$9 \times 1 = 9$	$10 \times 1 = 10$
$6 \times 2 = 12$	$7 \times 2 = 14$	$8 \times 2 = 16$	$9 \times 2 = 18$	$10 \times 2 = 20$
$6 \times 3 = 18$	$7 \times 3 = 21$	$8 \times 3 = 24$	$9 \times 3 = 27$	$10 \times 3 = 30$
$6 \times 4 = 24$	$7 \times 4 = 28$	$8 \times 4 = 32$	$9 \times 4 = 36$	$10 \times 4 = 40$
$6 \times 5 = 30$	$7 \times 5 = 35$	$8 \times 5 = 40$	$9 \times 5 = 45$	$10 \times 5 = 50$
$6 \times 6 = 36$	$7 \times 6 = 42$	$8 \times 6 = 48$	$9 \times 6 = 54$	$10 \times 6 = 60$
$6 \times 7 = 42$	$7 \times 7 = 49$	$8 \times 7 = 56$	$9 \times 7 = 63$	$10 \times 7 = 70$
$6 \times 8 = 48$	$7 \times 8 = 56$	$8 \times 8 = 64$	$9 \times 8 = 72$	$10 \times 8 = 80$
$6 \times 9 = 54$	$7 \times 9 = 63$	$8 \times 9 = 72$	$9 \times 9 = 81$	$10 \times 9 = 90$
$6 \times 10 = 60$	$7 \times 10 = 70$	$8 \times 10 = 80$	$9 \times 10 = 90$	$10 \times 10 = 100$

### Drill for Skill (IV)



#### Race the Clock

Instructions: Get a watch with a second hand.  
When the second hand reaches 12, get set and GO!  
Do as many of the multiplication problems as you  
can until the second hand reaches 12 again. Then  
check your answers.

(continued)



Name \_\_\_\_\_

Date \_\_\_\_\_



Reproducible

**Multiplication**

- |                    |                      |                    |                    |
|--------------------|----------------------|--------------------|--------------------|
| 1. $8 \times 7 =$  | 11. $3 \times 3 =$   | 21. $1 \times 1 =$ | 31. $8 \times 8 =$ |
| 2. $2 \times 3 =$  | 12. $9 \times 8 =$   | 22. $3 \times 4 =$ | 32. $9 \times 7 =$ |
| 3. $4 \times 9 =$  | 13. $4 \times 1 =$   | 23. $5 \times 3 =$ | 33. $7 \times 5 =$ |
| 4. $1 \times 6 =$  | 14. $5 \times 6 =$   | 24. $8 \times 4 =$ | 34. $5 \times 4 =$ |
| 5. $5 \times 8 =$  | 15. $3 \times 10 =$  | 25. $9 \times 9 =$ | 35. $3 \times 8 =$ |
| 6. $10 \times 2 =$ | 16. $6 \times 8 =$   | 26. $2 \times 6 =$ | 36. $6 \times 7 =$ |
| 7. $8 \times 10 =$ | 17. $5 \times 9 =$   | 27. $4 \times 6 =$ | 37. $6 \times 9 =$ |
| 8. $2 \times 4 =$  | 18. $2 \times 7 =$   | 28. $7 \times 3 =$ | 38. $4 \times 7 =$ |
| 9. $3 \times 6 =$  | 19. $5 \times 5 =$   | 29. $6 \times 6 =$ | 39. $8 \times 2 =$ |
| 10. $7 \times 7 =$ | 20. $10 \times 10 =$ | 30. $9 \times 0 =$ | 40. $3 \times 9 =$ |

**Prizes**

- |          |                   |
|----------|-------------------|
| 25 right | GOLD medal        |
| 20 right | SILVER medal      |
| 15 right | BRONZE medal      |
| 10 right | Honorable Mention |
- Less than 5 right? Well, **you** name it.

A problem like  $5 \times 3$  is easy enough. Let's try multiplying some larger numbers. For example, can you

Multiply:

$$\begin{array}{r} 120 \\ \times 3 \\ \hline \end{array}$$

Your Answer: \_\_\_\_\_

When we multiply, our answer is called the **product**. The **product** in the above problem is **360**. Did you get it right? Good! Well, multiplication can get harder as we use larger numbers, so let's make sure of the rules before we go on.

