DIVISION FACTS THAT STICK

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Help Your Child Master the Division Facts for Good in Just Ten Weeks

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WELL-TRAINED MIND PRESS

DEDICATION

As I wrap up the *Facts That Stick* series with this volume, I'd like to thank all the children who have helped me pilot-test the lessons and games in these books. Many thanks especially to Nataliya, who originally inspired *Addition Facts That Stick*, and to my own children, Henry and Elizabeth, who have helped me test all of the games.

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PREFACE

When I was a teenager, I couldn't wait to learn to drive. But a huge obstacle stood between my driver's license and me: my family's cars both had stick shifts. Even after practicing with my parents in empty parking lots, I still froze at every intersection, terrified that I would stall the car when the stoplight turned green. Stopping on hills was especially nerve-wracking, since I might roll into the car behind me when I tried to accelerate. And backing up was the absolute worst, since the reverse gear was very jumpy. If I didn't release the clutch perfectly, our little Toyota Tercel would leap backwards as though it were possessed. I knew I'd never pass my driving test until I mastered stick shift, but my endlessly-patient parents only had so many hours to practice driving with me.

One wintry afternoon, I hit upon a way to get more practice without needing my parents: I could practice by myself in the driveway. After hours of lurching up and down the driveway, I finally mastered stick shift. Now that I could drive both forwards and backwards without conscious effort, I was ready to learn more advanced driving skills—like not crashing into the other cars.

Your child has many complex, multi-step math topics on the horizon: long division, fractions, decimals, ratios, proportions, measurement conversions, and more. Simple division is at the heart of all of these new concepts. If he has to sweat over division every time he faces one of these problems, he'll get stuck, just as I did as a new driver. But once your child masters the division facts, he'll be well prepared to tackle these more difficult concepts. Instead of wasting energy figuring out $48 \div 8$, his working memory will be available for higher-level thinking. Instead of inching backwards and forwards in the driveway, he'll be ready to get out on the open road!

Happy Math!
Kate Snow
Grand Rapids, Michigan

INTRODUCTION

Building on a solid foundation

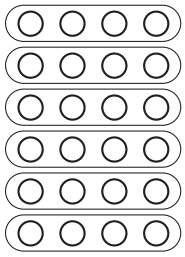
The division facts are the final set of math facts for children to learn. Before your child tackles this book, he should already have mastered the addition, subtraction, and multiplication facts. It's especially important that your child knows the multiplication facts thoroughly. Since division is the opposite of multiplication, your child will build on this multiplication knowledge to master the division facts. For example, to learn $35 \div 5 = 7$, it helps to already know that $7 \times 5 = 35$. (See pages 17–18 for more details on what your child should know before beginning this book.)

The good news is that if your child already knows the multiplication facts, he should find it relatively easy to master the division facts. But, no matter how well your child knows the multiplication facts, he still needs focused practice to learn the division facts by heart. After all, just because we know something "forwards" doesn't automatically mean we know it "backwards." (If you've ever tried reciting the alphabet backwards, you've likely experienced this for yourself!)

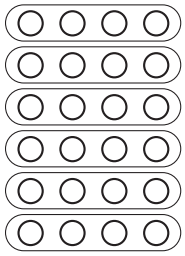
The dot array: Helping your child *see* the connection between multiplication and division

In order for your child to successfully use multiplication to help solve division problems, he must first understand the relationship between the two operations. Many children find this relationship very difficult to grasp unless they have a visual model to help them see the connection. In this book, you'll use a simple grid of circles called a dot array to show your child this important link.

For example, one dot array can illustrate both 6 × 4 and 24 ÷ 4. On one hand, 6 × 4 means "Six groups of four." Six groups of four dots equals 24 dots, and so 6 × 4 = 24.



On the other hand, 24 ÷ 4 means, "How many groups of four equal 24?"[1] The dot array shows that 24 dots divided into groups of four yields six groups, and so 24 ÷ 4 = 6.



Looking at the same array for both 6 × 4 = 24 and 24 ÷ 4 = 6 will help your child see that division is simply the opposite of multiplication. When we multiply, we join together equal groups; when we divide, we break a quantity apart into equal groups. After consistent practice with the dot array, your child will understand how multiplying and dividing are connected so that he can successfully use multiplication to master the division facts.

Division as backwards multiplication

As your child begins to understand the relationship between multiplication and division more clearly, you'll also teach him to think of division problems as *backwards multiplication* so that he can apply this relationship and solve division problems.

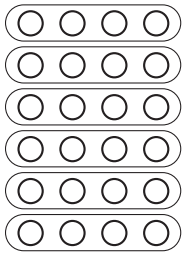
1. Note that division problems can be interpreted in two different ways. 12 ÷ 3 can be thought of as "How many groups of three are in 12?" Or, it can be thought of as, "If I divide 12 into three parts, how many will be in each part?" Both ways are correct, but we will use only the first interpretation in this book because most children find it easier to understand and visualize.

For example, let's look at 24 ÷ 4 again. This problem means, "How many groups of four equal 24?" Or, in other words, "What times four equals 24?"

24 ÷ 4 = _____	_____ × 4 = 24
"How many groups of 4 equal 24?"	"What times 4 equals 24?"

Two ways to write the same problem.

Writing the division problem as a backwards multiplication problem (a multiplication problem with a missing number) will help your child see exactly how to use multiplication to find the answer. Since six groups of four equal 24, it's clear that if we divide 24 into groups of four, we get six groups. In other words, since 6 × 4 = 24, 24 divided by four must equal six.



6 × 4 = 24
↓
24 ÷ 4 = 6

As your child works through the book, this kind of thinking will become second nature to him. He'll be able to look at a problem like 63 ÷ 7 and think "What times seven equals 63?" to help him immediately identify the answer. By thinking of division problems as backwards multiplication, he'll be able to build on his multiplication knowledge to master all the division facts.

Division facts that stick

Memorizing the division facts purely by rote is time-consuming, tedious, and often frustrating. But when children build on their multiplication knowledge instead, they learn the division facts much more easily.

In this book, your child won't mindlessly drill the division facts over and over. Instead, he will practice using backwards multiplication until the answers become automatic. When he occasionally forgets an answer, he'll still be able to figure out the answer quickly and easily, without the need for never-ending review. Through the practice provided by the games and practice pages, your child will become faster and faster at solving division problems. Before long, he will "just know" the answers and have the division facts fully mastered.

HOW TO USE THIS BOOK

Is your child ready to master the division facts?

Math fact sequence

American math curricula typically teach the math facts as follows (although different publishers vary):

- Addition facts: 1st grade
- Subtraction facts: 2nd grade
- Multiplication facts: 3rd grade
- Division facts: 4th grade.

No matter what grade your child is in, it's essential that he learn the math facts in this order, because each set of facts builds logically on the previous one. If your child has not yet learned the addition, subtraction, or multiplication facts, have him work through *Addition Facts That Stick*, *Subtraction Facts That Stick*, and/or *Multiplication Facts That Stick* before you return to this book.

Prerequisite skills

This book is designed for children who have studied the concept of division in a math program but have not yet memorized the division facts. It is *not* meant to be your child's first exposure to division. Children need a thorough grasp of what division means (for example, that 8 ÷ 4 means "How many groups of four equal eight?") before they're ready to memorize the facts. You'll review the meaning of division in Week 1, but this brief refresher is not meant to be a substitute for more in-depth study.

In addition to understanding the meaning of division, your child also must know the multiplication facts from 1 × 1 up to 10 × 10 before beginning this program. Mastering the division facts relies heavily on backwards multiplication, so it's crucial that your child is fluent with the multiplication facts. It's fine if he is still slow at recalling some of the harder facts, but he should know the answers to most of the multiplication facts

automatically before beginning division. (As a bonus, learning the division facts will help him nail down those last few hard-to-remember multiplication facts like 8 × 7.)

While it's fine to use this book to introduce your younger child to the division facts, don't expect thorough mastery until your child is at least eight years old. Most children's brains aren't developmentally mature enough to memorize all the division facts until this age.

Weekly overview

You'll focus on just one division table each week so that your child can learn the facts in a sequential, logical order without feeling overwhelmed. A division table is simply a set of division facts in which each number is divided by the same number. For example, the ÷4 table is 4 ÷ 4, 8 ÷ 4, and so on, up to 40 ÷ 4.)

4 ÷ 4 = 1
8 ÷ 4 = 2
12 ÷ 4 = 3
16 ÷ 4 = 4
20 ÷ 4 = 5
24 ÷ 4 = 6
28 ÷ 4 = 7
32 ÷ 4 = 8
36 ÷ 4 = 9
40 ÷ 4 = 10

The ÷4 table.

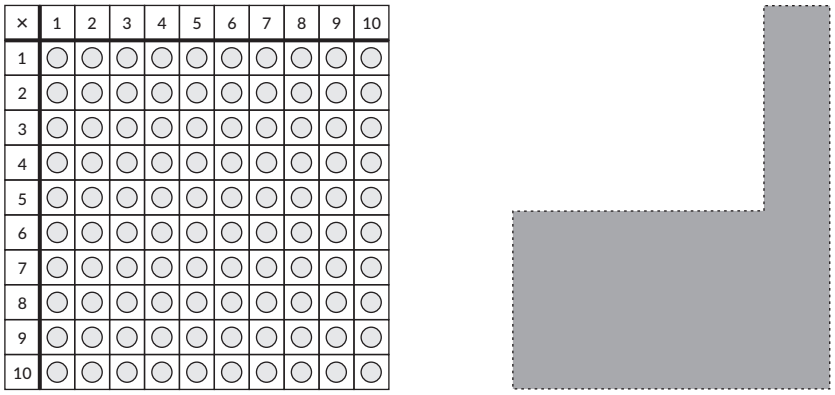
The only exception is Week 1, when your child will learn both the ÷1 and ÷2 facts. You'll use direct teaching, recitation, games, and written practice pages to help your child master the division facts for each week.

While the goal is for your child to learn one division table per week, please don't feel that you must stick to this exact schedule. All children are unique and learn at their own speed, and you are free to adjust the pacing and activities to best suit your child's needs. (For example, if your child has trouble writing, the practice pages can also be done orally—see below.)

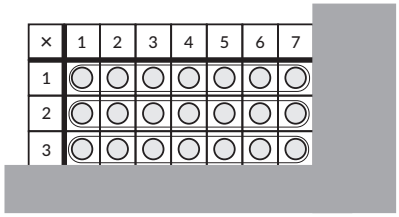
Direct teaching

On the first day of each week, you'll teach a short, scripted lesson to introduce the division facts for the week. (During Week 1, you will also do a quick review of the multiplication facts and meaning of division.)

In the lessons, you'll use a dot array to show your child how to use backwards multiplication to master the new division facts. A dot array is simply a ten-by-ten grid of circles that will help your child visualize what the problems mean, along with an L-shaped paper cover to focus your child's attention on one section of the dot array at a time.



By sliding the L-cover across the dot array, you can model any division problem from 1 ÷ 1 up to 100 ÷ 10. Each lesson will show you how to use the dot array and L-cover to teach your child the division facts for the week. (You can find your own dot array and L-cover on pages 109 and 111. You'll want to pull both pages out of the book for you and your child to use together.)



An example of how you'll use the dot array and L-cover to show 21 ÷ 7 = 3. Since three groups of seven equal 21, 21 divided by seven equals three.

Recitation

On days 2–5 each week, your child will recite the week's corresponding times table as a warm-up. For example, during the week that your child learns the ÷3 facts, he will recite the ×3 times table each day.

This quick, regular multiplication review will help your child recall the multiplication facts so that he can use them to solve division problems. At the beginning of the week, he will recite while sliding the L-cover over the dot array. Looking at a visual model of each fact as he recites will remind him of the meaning of each fact (for example, that 7 × 3 means "Seven groups of three"). It will also help him keep track of where he is in the table. As he becomes more proficient, encourage him to recite the week's times table from memory.

Games

Each day, you and your child will play a game that practices the new division facts. These fun games provide a lot of practice in a short amount of time. They also allow you to monitor your child's progress and correct any mistakes right away.

Practice pages

Your child will also complete a two-sided practice page each day. On the front of the page, your child will practice the new division facts for the week, along with related backwards multiplication problems. On the back of the page, your child will practice the new division facts for the week, mixed in with review facts from previous weeks.

Teaching tips

- Schedule a consistent time each day for division fact practice. You'll be less likely to forget, and your child will be less likely to argue. Try to choose a time when your child is alert and easily able to concentrate.
- Plan to work on the activities in this book for about 20 minutes each session, with five sessions per week. However, different children need different amounts of time to master each group of facts. Feel free to take as long as your child needs to master each new set of facts, and don't move on to the new week until your child has the current week's division facts learned.
- Some math programs teach children to skip-count to help them find answers to division problems. (For example, a child might skip-count by 6 seven times to

solve 42 ÷ 6: "6, 12, 18, 24, 30, 36, 42. There are 7 sixes in 42, so the answer is seven.") Instead, encourage your child to try to use the multiplication facts to find the answer more efficiently. For example, to solve 42 ÷ 6, he might think, "Five groups of six is 30, so that's pretty close. I can add two more groups of six to get to 42. So, there are 7 sixes in 42, and 42 ÷ 6 = 7." This type of reasoning helps develop your child's number sense, and it's also faster and less error-prone than skip-counting.

- Keep the practice sessions positive, upbeat, and fast-paced. Have fun playing the games with your child, and enjoy the one-on-one time together.
- If your child is a reluctant writer, don't let writing difficulties interfere with mastering the division facts. It's fine to have your child answer the worksheet problems orally rather than writing them.
- Many children freeze when they feel time pressure. Encourage your child to work as efficiently as possible, but don't time him as he does the Practice Pages unless he's 10 or older. For an older child, aim for him to know each division fact in three seconds or less.

What you'll need

All of the game boards and practice pages you'll need for this program are included in the back of the book. You may want a folder to store the game boards, in case you want to play them again for review.

Before beginning Week 1, cut out the dot array and L-cover from pages 109 and 111. Prepare the L-cover by cutting along the dotted line and discarding the white rectangle as indicated.

You'll also need a few everyday items to complete the activities and play the games:

- 25 small counters of two different colors (tiles, blocks, plastic bears, coins, etc.)
- Deck of regular playing cards with face cards removed
- Regular, six-sided die
- Two game tokens
- Coin with heads and tails
- Paper clip
- Paper and pencil.

WEEK 1

DIVIDING BY ONE AND TWO

WEEK 1 AT A GLANCE

Your child will learn the ÷1 and ÷2 facts this week. Even if your child already knows the ÷1 and ÷2 facts, don't skip this week. In the lessons, you'll review multiplication, introduce an important visual model for understanding the relationship between multiplication and division, and teach your child how to solve division problems with backwards multiplication. (For example, you'll teach your child to solve 18 ÷ 2 by thinking, "What times two equals 18?")

Most weeks, you'll only do direct teaching on Day 1. But with so much material this week, you'll teach a short lesson on Days 1, 2, and 3 so that your child is well-prepared to tackle the rest of the division facts.

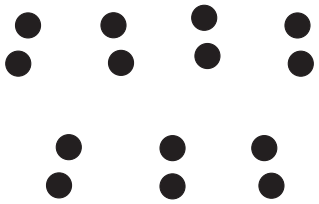
1 ÷ 1 = 1	2 ÷ 2 = 1
2 ÷ 1 = 2	4 ÷ 2 = 2
3 ÷ 1 = 3	6 ÷ 2 = 3
4 ÷ 1 = 4	8 ÷ 2 = 4
5 ÷ 1 = 5	10 ÷ 2 = 5
6 ÷ 1 = 6	12 ÷ 2 = 6
7 ÷ 1 = 7	14 ÷ 2 = 7
8 ÷ 1 = 8	16 ÷ 2 = 8
9 ÷ 1 = 9	18 ÷ 2 = 9
10 ÷ 1 = 10	20 ÷ 2 = 10

Day 1: Multiplication Review

Review the concept of multiplication

"This book will help you learn all of the division facts. You'll use what you already know about multiplication to solve the division problems, so we're going to start by reviewing multiplication."

Write **7 × 2 =** on a piece of paper. "One way to show multiplication problems is to use counters." Lay seven groups of two counters on the table.



"Seven times two means seven groups of two. How many total counters are there in seven groups of two?" *Fourteen*.

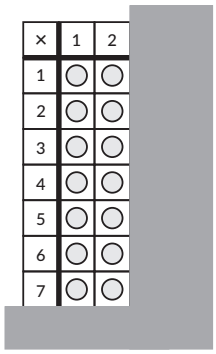
"So, since seven groups of two is 14, 7 × 2 equals 14." Complete the written multiplication problem: **7 × 2 = 14.**

"Counters are helpful for showing problems with small numbers, but they can be a hassle when you multiply bigger numbers. Instead, we'll use a dot array to show multiplication and division problems in this book."

Show your child the dot array. Draw your child's attention to how the dots are arranged in orderly rows and columns, and that each row and column is numbered.

×	1	2	3	4	5	6	7	8	9	10
1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
10	○	○	○	○	○	○	○	○	○	○

"Here's how we show 7 × 2 with the dot array." Slide the L-cover to show seven rows of two dots on the array.



"How many rows are showing?" *Seven.*

"How many dots are showing in each row?" *Two.*

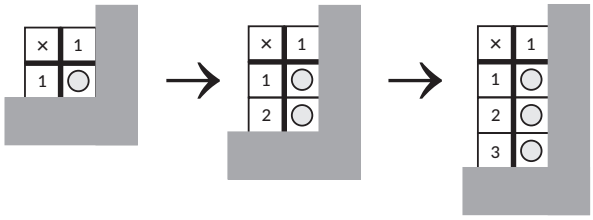
"How many total dots are showing?" *Fourteen.*

"We can think of each row as a group of dots. Seven rows of two dots is seven groups of two. So, since 14 dots are showing, the dot array shows us again that 7 × 2 equals 14."

Recite ×1 and ×2 facts

"You are going to learn the ÷1 and ÷2 division facts this week. Today, we're going to review the ×1 and ×2 facts by reciting the ×1 and ×2 tables. Saying the times tables out loud will prepare you to use these multiplication facts to solve related division problems in the next two lessons."

Demonstrate how to recite the ×1 table. Show one dot on the array and say "1 × 1 is one." Then, slide the L-cover down and say, "2 × 1 is two." Continue in this way through 10 × 1.

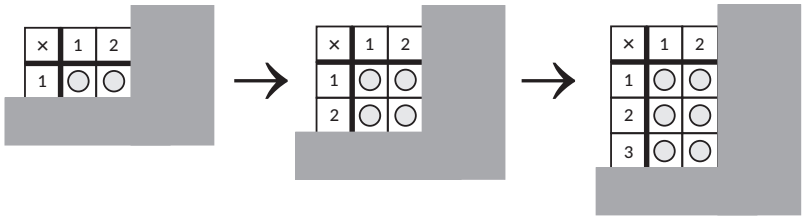


"1 × 1 is one. 2 × 1 is two. 3 × 1 is three . . ."

Then, ask your child to recite the ×1 table on her own, sliding the L-cover as she recites so that the dots match each spoken multiplication fact. If your child has trouble

keeping track of where she is in the table, either recite along with her or prompt her with the next fact: "7 × 1 is?"

Repeat this process with the ×2 table. Again, first demonstrate how to recite the table, sliding the L-cover as you say the facts. Then, have your child recite the ×2 table, with your prompting as needed.



"1 × 2 is two. 2 × 2 is four. 3 × 2 is six . . ."

Play *Multiplication War*

Review more multiplication facts by playing *Multiplication War*.

MATERIALS

- Deck of cards, with face cards removed (40 cards total)

OBJECT OF THE GAME

Win the most cards.

HOW TO PLAY

As in the regular card game War, shuffle the cards and deal out an equal number of cards to each player. Players place their cards face-down in a pile.

To play, turn over the top two cards in your pile and multiply their numbers together. For example, if you turn over a 5 and a 7, say, "5 × 7 = 35." Then the other player does the same. Whoever's answer is greater wins all four cards. If the answers are equal, play again; the player whose answer is greater then wins all eight cards. Set aside the cards that are won.

If your child has trouble remembering any of the multiplication answers, encourage her to find the answer using the closest related fact that she remembers. For example,

to find 7 × 6, she might first recall that 5 × 6 equals 30 and then add two more groups of six to find that the answer is 42.

Play until both players use up all the cards in their piles. Whoever wins the most cards wins the game.

Independent practice

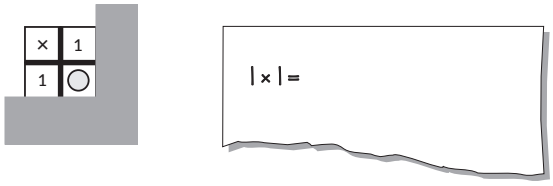
Have your child complete Practice Pages 1A and 1B in the Week 1 section. These pages review the multiplication facts. Answers are on page 342.

Day 2: New Teaching

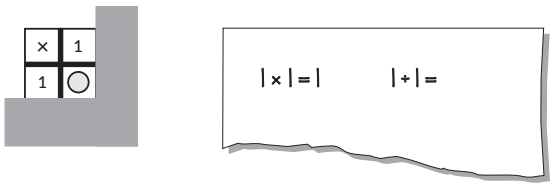
Introduce the ÷1 facts

"You're going to work on the ÷1 division facts today."

Begin a list of the ×1 facts by writing **1 × 1 =** on the left-hand side of a piece of paper. Use the L-cover to show one row of one dot on the dot array.



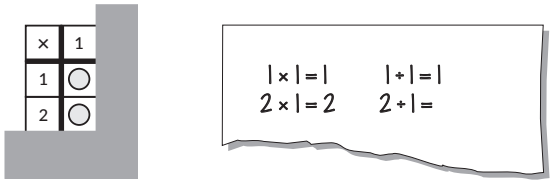
"What is 1 × 1?" *One.* Have your child complete the written multiplication problem: **1 × 1 = 1.** Begin a list of the ÷1 facts by writing **1 ÷ 1 =** on the right-hand side of the paper, directly across from **1 × 1 = 1.**



"One divided by one means, 'How many groups of one equal one?' The matching multiplication problem and dot array show that one group of one equals one. So, one

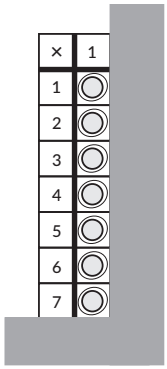
divided by one equals one." Have your child complete the written division problem: **1 ÷ 1 = 1.** Show your child how this division problem relates to the dot array: if we divide one dot into groups of one, we get one group.

Repeat this process with **2 × 1 =.** Show two rows of one dot on the dot array and have your child complete the multiplication problem: **2 × 1 = 2.** Then write **2 ÷ 1 =** on the right-hand side of the paper, directly across from **2 × 1 = 2.** "The multiplication problem and dot array show that two groups of one equal two. So, if we divide two dots into groups of one, we get two groups."



Have your child complete the written division problem: **2 ÷ 1 = 2.**

Continue the lists of ×1 and ÷1 facts with your child. For each pair, ask your child to use the related multiplication fact to help find the answer to the division problem. Also continue using the dot array as needed to demonstrate the relationship between each pair of problems. For example, for 7 × 1 = 7 and 7 ÷ 1 = 7, show seven rows of one on the array. "Since seven groups of one equal seven, we know that if we divide seven dots into groups of one, we'll get seven groups."



Seven dots divided into groups of one make seven groups. So, 7 ÷ 1 = 7.

The completed lists will look like this:

1 × 1 = 1	1 ÷ 1 = 1
2 × 1 = 2	2 ÷ 1 = 2
3 × 1 = 3	3 ÷ 1 = 3
4 × 1 = 4	4 ÷ 1 = 4
5 × 1 = 5	5 ÷ 1 = 5
6 × 1 = 6	6 ÷ 1 = 6
7 × 1 = 7	7 ÷ 1 = 7
8 × 1 = 8	8 ÷ 1 = 8
9 × 1 = 9	9 ÷ 1 = 9
10 × 1 = 10	10 ÷ 1 = 10

Practice ÷1 facts

Put away the lists of ×1 and ÷1 facts. Write **9 ÷ 1 =** on a piece of paper.

"Nine divided by one means, 'How many groups of one equal nine?' So, what's nine divided by one?" *Nine.*

If your child isn't sure, show nine rows of one on the dot array. "If I put each dot into its own group, how many groups would I have?" *Nine groups.*

"Any number divided by one just equals the original number." Have your child practice using the same reasoning to solve 6 ÷ 1, 10 ÷ 1, and 4 ÷ 1.

Use backwards multiplication to practice the ÷1 facts

Put away the lists of ×1 and ÷1 facts. Write **9 ÷ 1 =** on a piece of paper.

"Nine divided by one means, 'How many groups of one equal nine?' It's easier to solve division problems if you think of them as backwards multiplication. For this problem, think, 'What times one equals nine?' "

"We can write the backwards multiplication question like this, with a missing number." Write **____ × 1 = 9** below **9 ÷ 1 =.**

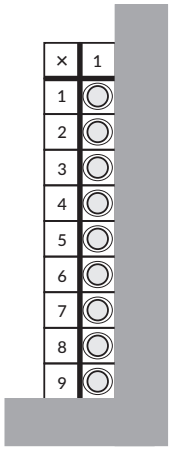
9 ÷ 1 =
__ × 1 = 9

"What times one equals nine?" *Nine*. Have your child complete the multiplication problem: **__9__ × 1 = 9**. (If your child can't recall the missing number, use the dot array to prompt her. Show one dot on the array and ask her to slide the L-cover downward until a total of nine dots are visible.)

"So, what's nine divided by one?" *Nine*. Have your child complete the division problem: **9 ÷ 1 = 9.**

9 ÷ 1 = **9**
9 × 1 = 9

If your child has trouble using the multiplication problem to solve the division problem, use the dot array to help her see the connection. Show nine groups of one on the dot array. "Since nine groups of one equal nine, we know that if we divide nine into groups of one, we'll get nine groups."



Write **6 ÷ 1 =** on a piece of paper.

"Six divided by one means, 'How many groups of one equal six?' What backwards multiplication question can we use to find the answer to this division problem?" *What times one equals six?* (If your child isn't sure, remind her that a backwards multiplication question is a multiplication problem with a missing number. Also review how you turned 9 ÷ 1 into a backwards multiplication problem above.)

Write ____ **× 1 = 6** below **6 ÷ 1 =** and have your child complete both problems.

6 ÷ 1 = 6
6 × 1 = 6

Repeat this process with 5 ÷ 1, 7 ÷ 1, and 10 ÷ 1. For each fact:

1. Write the division problem.
2. Have your child help you write the division problem as a backwards multiplication problem (that is, a multiplication problem with a missing number).
3. Have your child find the missing number in the multiplication problem and solve the corresponding division problem.

5 ÷ 1 = 5 7 ÷ 1 = 7 10 ÷ 1 = 10
5 × 1 = 5 7 × 1 = 7 10 × 1 = 10

Play *Multiplication War*

Review more multiplication facts by playing *Multiplication War* again.

Independent practice

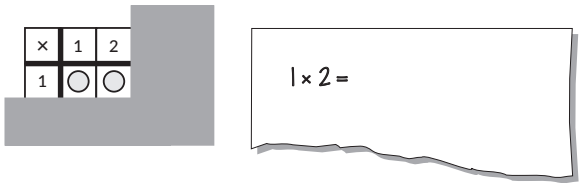
Have your child complete Practice Pages 2A and 2B in the Week 1 section. Answers are on page 342.

Day 3: New Teaching

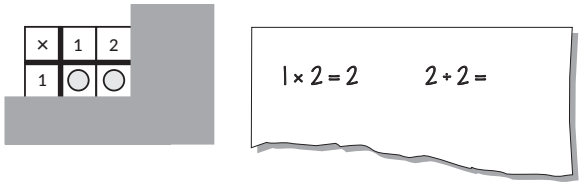
Introduce the ÷2 facts

"You're going to work on the ÷2 division facts today."

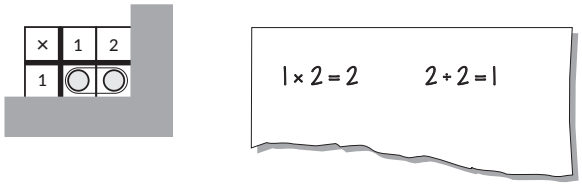
Begin a list of the ×2 facts by writing **1 × 2 =** on the left-hand side of a piece of paper. Use the L-cover to show one row of two dots on the dot array.



"What is 1 × 2?" *Two.* Have your child complete the written multiplication problem: **1 × 2 = 2.** Begin a list of the ÷2 facts by writing **2 ÷ 2 =** on the right-hand side of the paper, directly across from **1 × 2 = 2.**

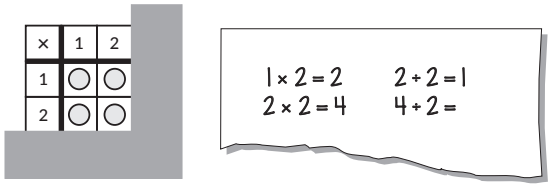


"Two divided by two means, 'How many groups of two equal two?' The matching multiplication problem and dot array show that one group of two equals two. So, two divided by two equals one." Have your child complete the written division problem: **2 ÷ 2 = 1.** Show your child how this division problem relates to the dot array: if we divide two dots into groups of two, we get one group.



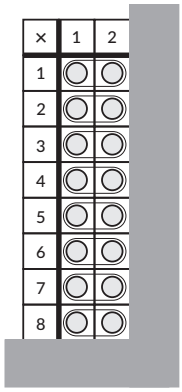
Repeat this process with **2 × 2 =.** Show two rows of two dots on the dot array and have your child complete the multiplication problem: **2 × 2 = 4.** Then write **4 ÷ 2 =** on the right-hand side of the paper, directly across from **2 × 2 = 4.** "The multiplication problem

and dot array show that two groups of two equal four. So, if we divide four dots into groups of two, we get two groups."



Have your child complete the written division problem: **4 ÷ 2 = 2.**

Continue reviewing the lists of ×2 and ÷2 facts with your child. For each pair, ask your child to use the related multiplication fact to help find the answer to the division problem. Also continue using the dot array to demonstrate the relationship between each pair of problems. For example, for 8 × 2 = 16 and 16 ÷ 2 = 8, show eight rows of two dots on the array. "Since eight groups of two equal 16, we know that if we divide 16 dots into groups of two, we'll get eight groups."



Sixteen dots divided into groups of two make eight groups. So, 16 ÷ 2 = 8.

The completed lists will look like this:

1 × 2 = 2	2 ÷ 2 = 1
2 × 2 = 4	4 ÷ 2 = 2
3 × 2 = 6	6 ÷ 2 = 3
4 × 2 = 8	8 ÷ 2 = 4
5 × 2 = 10	10 ÷ 2 = 5
6 × 2 = 12	12 ÷ 2 = 6
7 × 2 = 14	14 ÷ 2 = 7
8 × 2 = 16	16 ÷ 2 = 8
9 × 2 = 18	18 ÷ 2 = 9
10 × 2 = 20	20 ÷ 2 = 10

Use backwards multiplication to practice the ÷2 facts

Put away the lists of ×2 and ÷2 facts. Write **18 ÷ 2 =** on a piece of paper.

"Eighteen divided by two means, 'How many groups of two equal 18?' It's easier to solve division problems if you think of them as backwards multiplication. For this problem, think, 'What times two equals 18?' "

"We can write the backwards multiplication question like this, with a missing number." Write **____ × 2 = 18** below **18 ÷ 2 =.**

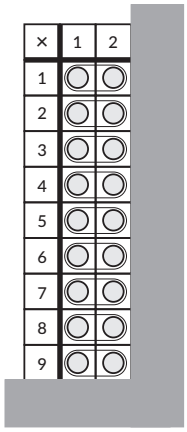
18 ÷ 2 =
__ × 2 = 18

"What times two equals 18?" *Nine.* Have your child complete the multiplication problem: **__9__ × 2 = 18**. (If your child can't recall the missing number, use the dot array to prompt her. Show one group of two on the array and ask her to slide the L-cover downward until a total of 18 dots are visible. Encourage her to use multiplication facts—and not simple skip-counting by 2s—to find the answer efficiently. For example, she might think: *Six times two is 12. That's not enough! Seven groups equal 14 dots, and eight groups equal 16 dots. So nine groups must equal 18 dots.)*

"So, what's 18 divided by two?" *Nine*. Have your child complete the division problem: **18 ÷ 2 = 9.**

18 ÷ 2 = **9**
9 × 2 = 18

If your child has trouble using the multiplication problem to solve the division problem, use the dot array to help her see the connection. Show nine groups of two on the dot array. "Since nine groups of two equal 18, we know that if we divide 18 into groups of two, we'll get nine groups."



Write **12 ÷ 2 =** on a piece of paper.

"Twelve divided by two means, 'How many groups of two equal 12?' What backwards multiplication question can we use to find the answer to this division problem?" *What times two equals 12?* (If your child isn't sure, remind her that a backwards multiplication question is a multiplication problem with a missing number. Also review how you turned 18 ÷ 2 into a backwards multiplication problem above.)

Write **____ × 2 = 12** below **12 ÷ 2 =** and have your child complete both problems.

12 ÷ 2 = **6**
6 × 2 = 12

Repeat this process with 8 ÷ 2, 14 ÷ 2, and 20 ÷ 2. For each fact:

1. Write the division problem.
2. Have your child help you write the division problem as a backwards multiplication problem (that is, a multiplication problem with a missing number).

3. Have your child find the missing number in the multiplication problem and solve the corresponding division problem.

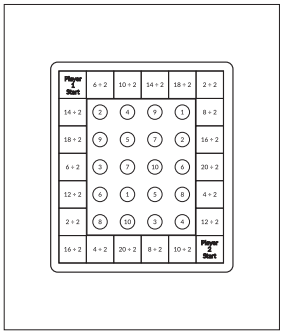
8 ÷ 2 = **4**	14 ÷ 2 = **7**	20 ÷ 2 = **10**
4 × 2 = 8	**7** × 2 = 14	**10** × 2 = 20

Play *Three in a Row (÷2)*

Teach your child how to play *Three in a Row (÷2)* and play one time.

MATERIALS

- *Three in a Row (÷2)* game board (Page 113)



- Two game tokens
- Regular die
- Ten small counters per player, with a different color for each player

OBJECT OF THE GAME

Be the first player to place three counters in a row (horizontally, vertically, or diagonally) in the gray circles in the middle of the game board.

HOW TO PLAY

Have each player choose a game token and place it on one of the Start squares. The game tokens will move clockwise along the path on the outer edge of the game board.

On your turn, roll the die and advance your token the corresponding number of squares clockwise (along the path on the outer edge of the board). Answer the division problem on your landing square, and place a counter on a circle that matches your answer. For example, if you land on 14 ÷ 2, place a counter on a circle with a "7."

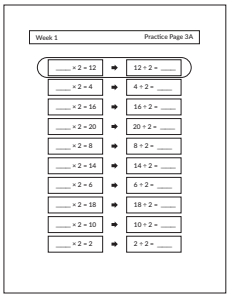
Play until one of you covers three circles in a row, either horizontally, vertically, or diagonally.

Encourage your child to say each division problem out loud as she plays: "12 ÷ 2 is six." Also remind her to use backwards multiplication to find the answers.

Independent practice

Have your child complete Practice Pages 3A and 3B in the Week 1 section. On Practice Page 3A, note that the problems are arranged in pairs: each backwards multiplication problem in the left-hand column matches the division problem in the right-hand column.

Instruct your child *not* to work vertically down each column on pages like this. Instead, she should complete each matching pair of multiplication and division problems before moving on to the next pair.


Week 1 Practice Page 3A

___ × 2 = 12 ➡ 12 ÷ 2 = ___
___ × 2 = 4 ➡ 4 ÷ 2 = ___
___ × 2 = 16 ➡ 16 ÷ 2 = ___
___ × 2 = 20 ➡ 20 ÷ 2 = ___
___ × 2 = 8 ➡ 8 ÷ 2 = ___
___ × 2 = 14 ➡ 14 ÷ 2 = ___
___ × 2 = 6 ➡ 6 ÷ 2 = ___
___ × 2 = 18 ➡ 18 ÷ 2 = ___
___ × 2 = 10 ➡ 10 ÷ 2 = ___
___ × 2 = 2 ➡ 2 ÷ 2 = ___

Instruct your child to solve each pair of problems before moving on to the next pair.

Answers are on page 343.

Days 4-5: Warm-up, Game, and Practice Pages

For the rest of the week, follow this sequence of activities each day.

Warm-up: Recite ×1 and ×2 tables

Ask your child to recite the ×1 and ×2 tables. Encourage her to do so from memory, without using the dot array. However, if she has trouble, allow her to use the dot array and L-cover while reciting, and prompt her as needed.

Play *Three in a Row (÷2)*

Play *Three in a Row (÷2)* with your child. As you play, encourage your child to use backwards multiplication to find the answers to the division problems.

Independent practice

Have your child complete two practice pages each day. For Week 1, Practice Pages 4A and 5A, remind your child to solve each pair of related multiplication and division problems before moving to the next pair.

- Day 4: Complete Practice Pages 4A and 4B in the Week 1 section. Answers are on page 343. If your child is not familiar with using the long division bracket on Practice Page 4B, explain that it is simply another way to write division problems.

Two ways to write 18 divided by two equals nine.

- Day 5: Complete Practice Pages 5A and 5B in the Week 1 section. Answers are on page 344.

PRACTICE PAGES

Week 1 Practice Page 1A

8 × 1 = _____	6 × 9 = _____	6 × 6 = _____
2 × 6 = _____	5 × 10 = _____	3 × 4 = _____
5 × 4 = _____	2 × 3 = _____	7 × 4 = _____
3 × 6 = _____	10 × 8 = _____	6 × 1 = _____
10 × 2 = _____	9 × 5 = _____	10 × 4 = _____
5 × 1 = _____	8 × 5 = _____	2 × 7 = _____
8 × 9 = _____	10 × 10 = _____	6 × 5 = _____
2 × 4 = _____	8 × 2 = _____	3 × 3 = _____
7 × 10 = _____	5 × 3 = _____	1 × 10 = _____

Week 1 — Practice Page 1B

4 × 4	7 × 3	8 × 7	6 × 4	2 × 9
3 × 9	1 × 6	7 × 1	5 × 5	6 × 10
7 × 9	2 × 4	8 × 6	7 × 7	9 × 9
5 × 2	8 × 8	9 × 1	3 × 8	5 × 7
9 × 4	7 × 6	8 × 4	10 × 3	10 × 9

Week 1 Practice Page 2A

4 ÷ 1 = _____

5 ÷ 1 = _____

8 ÷ 1 = _____

10 ÷ 1 = _____

1 ÷ 1 = _____

3 ÷ 1 = _____

7 ÷ 1 = _____

2 ÷ 1 = _____

9 ÷ 1 = _____

6 ÷ 1 = _____

Week 1	Practice Page 2B

8 × 2 = _____	5 × 9 = _____	6 × 6 = _____
3 × 6 = _____	6 × 10 = _____	8 × 8 = _____
5 × 6 = _____	9 × 3 = _____	4 × 4 = _____
3 × 7 = _____	9 × 8 = _____	7 × 1 = _____
10 × 3 = _____	7 × 5 = _____	6 × 7 = _____
5 × 1 = _____	8 × 6 = _____	2 × 7 = _____
8 × 7 = _____	10 × 10 = _____	6 × 9 = _____
9 × 4 = _____	7 × 7 = _____	3 × 7 = _____
7 × 9 = _____	5 × 8 = _____	9 × 9 = _____

Week 1 Practice Page 3A

_____ × 2 = 12	➡	12 ÷ 2 = _____
_____ × 2 = 4	➡	4 ÷ 2 = _____
_____ × 2 = 16	➡	16 ÷ 2 = _____
_____ × 2 = 20	➡	20 ÷ 2 = _____
_____ × 2 = 8	➡	8 ÷ 2 = _____
_____ × 2 = 14	➡	14 ÷ 2 = _____
_____ × 2 = 6	➡	6 ÷ 2 = _____
_____ × 2 = 18	➡	18 ÷ 2 = _____
_____ × 2 = 10	➡	10 ÷ 2 = _____
_____ × 2 = 2	➡	2 ÷ 2 = _____

Week 1	Practice Page 3B

3 ÷ 1 = _____	2 ÷ 2 = _____	5 ÷ 1 = _____
10 ÷ 1 = _____	6 ÷ 2 = _____	20 ÷ 2 = _____
6 ÷ 1 = _____	18 ÷ 2 = _____	2 ÷ 1 = _____
1 ÷ 1 = _____	12 ÷ 2 = _____	16 ÷ 2 = _____
7 ÷ 1 = _____	10 ÷ 2 = _____	7 ÷ 1 = _____
9 ÷ 1 = _____	16 ÷ 2 = _____	14 ÷ 2 = _____
8 ÷ 1 = _____	20 ÷ 2 = _____	8 ÷ 1 = _____
2 ÷ 1 = _____	4 ÷ 2 = _____	18 ÷ 2 = _____
5 ÷ 1 = _____	8 ÷ 2 = _____	9 ÷ 1 = _____
4 ÷ 1 = _____	14 ÷ 2 = _____	12 ÷ 2 = _____

Week 1 Practice Page 4A

_____ × 2 = 8	➡	8 ÷ 2 = _____
_____ × 2 = 16	➡	16 ÷ 2 = _____
_____ × 2 = 4	➡	4 ÷ 2 = _____
_____ × 2 = 12	➡	12 ÷ 2 = _____
_____ × 2 = 20	➡	20 ÷ 2 = _____
_____ × 2 = 18	➡	18 ÷ 2 = _____
_____ × 2 = 6	➡	6 ÷ 2 = _____
_____ × 2 = 14	➡	14 ÷ 2 = _____
_____ × 2 = 2	➡	2 ÷ 2 = _____
_____ × 2 = 10	➡	10 ÷ 2 = _____

Week 1 Practice Page 4B

$1\overline{)5}$	$2\overline{)20}$	$1\overline{)8}$	$2\overline{)14}$
$2\overline{)12}$	$1\overline{)9}$	$2\overline{)2}$	$1\overline{)4}$
$1\overline{)9}$	$2\overline{)20}$	$1\overline{)6}$	$2\overline{)10}$
$2\overline{)4}$	$1\overline{)1}$	$2\overline{)16}$	$1\overline{)7}$
$1\overline{)10}$	$2\overline{)16}$	$1\overline{)8}$	$2\overline{)18}$
$2\overline{)18}$	$1\overline{)7}$	$2\overline{)14}$	$1\overline{)3}$
$1\overline{)2}$	$2\overline{)8}$	$1\overline{)10}$	$2\overline{)6}$

Week 1 Practice Page 5A

_____ × 2 = 14	➡	14 ÷ 2 = _____
_____ × 2 = 4	➡	4 ÷ 2 = _____
_____ × 2 = 16	➡	16 ÷ 2 = _____
_____ × 2 = 20	➡	20 ÷ 2 = _____
_____ × 2 = 18	➡	18 ÷ 2 = _____
_____ × 2 = 12	➡	12 ÷ 2 = _____
_____ × 2 = 6	➡	6 ÷ 2 = _____
_____ × 2 = 8	➡	8 ÷ 2 = _____
_____ × 2 = 10	➡	10 ÷ 2 = _____
_____ × 2 = 2	➡	2 ÷ 2 = _____

Week 1	Practice Page 5B

7 ÷ 1 = _____	6 ÷ 2 = _____	4 ÷ 1 = _____
12 ÷ 2 = _____	10 ÷ 1 = _____	16 ÷ 2 = _____
2 ÷ 1 = _____	12 ÷ 2 = _____	8 ÷ 1 = _____
4 ÷ 2 = _____	6 ÷ 1 = _____	10 ÷ 2 = _____
5 ÷ 1 = _____	14 ÷ 2 = _____	10 ÷ 1 = _____
16 ÷ 2 = _____	1 ÷ 1 = _____	20 ÷ 2 = _____
9 ÷ 1 = _____	2 ÷ 2 = _____	3 ÷ 1 = _____
18 ÷ 2 = _____	8 ÷ 1 = _____	8 ÷ 2 = _____
5 ÷ 1 = _____	14 ÷ 2 = _____	7 ÷ 1 = _____
20 ÷ 2 = _____	9 ÷ 1 = _____	18 ÷ 2 = _____

ANSWER KEYS

Week 1 Practice Page 1A

8 × 1 = 8	6 × 9 = 54	6 × 6 = 36
2 × 6 = 12	5 × 10 = 50	3 × 4 = 12
5 × 4 = 20	2 × 3 = 6	7 × 4 = 28
3 × 6 = 18	10 × 8 = 80	6 × 1 = 6
10 × 2 = 20	9 × 5 = 45	10 × 4 = 40
5 × 1 = 5	8 × 5 = 40	2 × 7 = 14
8 × 9 = 72	10 × 10 = 100	6 × 5 = 30
2 × 4 = 8	8 × 2 = 16	3 × 3 = 9
7 × 10 = 70	5 × 3 = 15	1 × 10 = 10

Week 1 Practice Page 1B

4 × 4 = 16	7 × 3 = 21	8 × 7 = 56	6 × 4 = 24	2 × 9 = 18
3 × 9 = 27	1 × 6 = 6	7 × 1 = 7	5 × 5 = 25	6 × 10 = 60
7 × 9 = 63	2 × 4 = 8	8 × 6 = 48	7 × 7 = 49	9 × 9 = 81
5 × 2 = 10	8 × 8 = 64	9 × 1 = 9	3 × 8 = 24	5 × 7 = 35
9 × 4 = 36	7 × 6 = 42	8 × 4 = 32	10 × 3 = 30	10 × 9 = 90

Week 1 Practice Page 2A

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

Week 1 Practice Page 2B

8 × 2 = 16	5 × 9 = 45	6 × 6 = 36
3 × 6 = 18	6 × 10 = 60	8 × 8 = 64
5 × 6 = 30	9 × 3 = 27	4 × 4 = 16
3 × 7 = 21	9 × 8 = 72	7 × 1 = 7
10 × 3 = 30	7 × 5 = 35	6 × 7 = 42
5 × 1 = 5	8 × 6 = 48	2 × 7 = 14
8 × 7 = 56	10 × 10 = 100	6 × 9 = 54
9 × 4 = 36	7 × 7 = 49	3 × 7 = 21
7 × 9 = 63	5 × 8 = 40	9 × 9 = 81

Week 1 — Practice Page 3A

6 × 2 = 12	12 ÷ 2 = 6
2 × 2 = 4	4 ÷ 2 = 2
8 × 2 = 16	16 ÷ 2 = 8
10 × 2 = 20	20 ÷ 2 = 10
4 × 2 = 8	8 ÷ 2 = 4
7 × 2 = 14	14 ÷ 2 = 7
3 × 2 = 6	6 ÷ 2 = 3
9 × 2 = 18	18 ÷ 2 = 9
5 × 2 = 10	10 ÷ 2 = 5
1 × 2 = 2	2 ÷ 2 = 1

Week 1 — Practice Page 3B

3 ÷ 1 = 3	2 ÷ 2 = 1	5 ÷ 1 = 5
10 ÷ 1 = 10	6 ÷ 2 = 3	20 ÷ 2 = 10
6 ÷ 1 = 6	18 ÷ 2 = 9	2 ÷ 1 = 2
1 ÷ 1 = 1	12 ÷ 2 = 6	16 ÷ 2 = 8
7 ÷ 1 = 7	10 ÷ 2 = 5	7 ÷ 1 = 7
9 ÷ 1 = 9	16 ÷ 2 = 8	14 ÷ 2 = 7
8 ÷ 1 = 8	20 ÷ 2 = 10	8 ÷ 1 = 8
2 ÷ 1 = 2	4 ÷ 2 = 2	18 ÷ 2 = 9
5 ÷ 1 = 5	8 ÷ 2 = 4	9 ÷ 1 = 9
4 ÷ 1 = 4	14 ÷ 2 = 7	12 ÷ 2 = 6

Week 1 — Practice Page 4A

4 × 2 = 8	8 ÷ 2 = 4
8 × 2 = 16	16 ÷ 2 = 8
2 × 2 = 4	4 ÷ 2 = 2
6 × 2 = 12	12 ÷ 2 = 6
10 × 2 = 20	20 ÷ 2 = 10
9 × 2 = 18	18 ÷ 2 = 9
3 × 2 = 6	6 ÷ 2 = 3
7 × 2 = 14	14 ÷ 2 = 7
1 × 2 = 2	2 ÷ 2 = 1
5 × 2 = 10	10 ÷ 2 = 5

Week 1 — Practice Page 4B

$1\overline{)5}$	$2\overline{)20}$	$1\overline{)8}$	$2\overline{)14}$
$2\overline{)12}$	$1\overline{)9}$	$2\overline{)2}$	$1\overline{)4}$
$1\overline{)9}$	$2\overline{)20}$	$1\overline{)6}$	$2\overline{)10}$
$2\overline{)4}$	$1\overline{)1}$	$2\overline{)16}$	$1\overline{)7}$
$1\overline{)10}$	$2\overline{)16}$	$1\overline{)8}$	$2\overline{)18}$
$2\overline{)18}$	$1\overline{)7}$	$2\overline{)14}$	$1\overline{)3}$
$1\overline{)2}$	$2\overline{)8}$	$1\overline{)10}$	$2\overline{)6}$

Week 1 Practice Page 5A

7 × 2 = 14	➡	14 ÷ 2 = 7
2 × 2 = 4	➡	4 ÷ 2 = 2
8 × 2 = 16	➡	16 ÷ 2 = 8
10 × 2 = 20	➡	20 ÷ 2 = 10
9 × 2 = 18	➡	18 ÷ 2 = 9
6 × 2 = 12	➡	12 ÷ 2 = 6
3 × 2 = 6	➡	6 ÷ 2 = 3
4 × 2 = 8	➡	8 ÷ 2 = 4
5 × 2 = 10	➡	10 ÷ 2 = 5
1 × 2 = 2	➡	2 ÷ 2 = 1

Week 1 Practice Page 5B

7 ÷ 1 = 7	6 ÷ 2 = 3	4 ÷ 1 = 4
12 ÷ 2 = 6	10 ÷ 1 = 10	16 ÷ 2 = 8
2 ÷ 1 = 2	12 ÷ 2 = 6	8 ÷ 1 = 8
4 ÷ 2 = 2	6 ÷ 1 = 6	10 ÷ 2 = 5
5 ÷ 1 = 5	14 ÷ 2 = 7	10 ÷ 1 = 10
16 ÷ 2 = 8	1 ÷ 1 = 1	20 ÷ 2 = 10
9 ÷ 1 = 9	2 ÷ 2 = 1	3 ÷ 1 = 3
18 ÷ 2 = 9	8 ÷ 1 = 8	8 ÷ 2 = 4
5 ÷ 1 = 5	14 ÷ 2 = 7	7 ÷ 1 = 7
20 ÷ 2 = 10	9 ÷ 1 = 9	18 ÷ 2 = 9

Week 2 Practice Page 1A

2 × 3 = 6	➡	6 ÷ 3 = 2
5 × 3 = 15	➡	15 ÷ 3 = 5
10 × 3 = 30	➡	30 ÷ 3 = 10
9 × 3 = 27	➡	27 ÷ 3 = 9
1 × 3 = 3	➡	3 ÷ 3 = 1
6 × 3 = 18	➡	18 ÷ 3 = 6
8 × 3 = 24	➡	24 ÷ 3 = 8
3 × 3 = 9	➡	9 ÷ 3 = 3
4 × 3 = 12	➡	12 ÷ 3 = 4
7 × 3 = 21	➡	21 ÷ 3 = 7

Week 2 Practice Page 1B

6 ÷ 3 = 2	8 ÷ 2 = 4	3 ÷ 1 = 3
15 ÷ 3 = 5	6 ÷ 1 = 6	12 ÷ 2 = 6
24 ÷ 3 = 8	18 ÷ 2 = 9	9 ÷ 1 = 9
3 ÷ 3 = 1	7 ÷ 1 = 7	2 ÷ 2 = 1
18 ÷ 3 = 6	16 ÷ 2 = 8	10 ÷ 1 = 10
30 ÷ 3 = 10	1 ÷ 1 = 1	6 ÷ 2 = 3
21 ÷ 3 = 7	10 ÷ 2 = 5	4 ÷ 1 = 4
12 ÷ 3 = 4	2 ÷ 1 = 2	14 ÷ 2 = 7
9 ÷ 3 = 3	20 ÷ 2 = 10	5 ÷ 1 = 5
27 ÷ 3 = 9	8 ÷ 1 = 8	4 ÷ 2 = 2

DIVISION FACTS THAT STICK

The fun, engaging program that will help your child master the subtraction facts once and for all–without spending hours and hours drilling flash cards!

Division Facts That Stick will guide you, step by step, as you teach your child to understand and memorize the division facts, from 1 ÷ 1 up to 100 ÷ 10. Hands-on activities, fun games your child will love, and straightforward practice pages help students remember the division facts for good.

In 15 minutes per day (perfect for after school, or as a supplement to a homeschool math curriculum) any child can master the division facts and develop greater confidence in math, in just ten weeks!
Mastery of the math facts is the foundation for all future math learning. Lay that foundation now, and make it solid, with Division Facts That Stick!

WHAT PARENTS ARE SAYING:

"I like that the lessons are simple and quick. My children's speed and confidence with division facts definitely improved!"

"My guys really enjoyed it, especially the games!"

Kate Snow is a math educator on a mission to help parents raise kids who are capable and confident in math. With experience as a homeschool parent, classroom teacher, and curriculum writer, she holds a B.A. in Mathematics from Harvard University and an M.S. in Elementary Education from Walden University. Kate is the author of *Preschool Math at Home: Simple Activities to Build the Best Possible Foundation for Your Child* and the *Math Facts That Stick* series.
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