Important Concepts . . .

Preview Review

Mathematics Grade 4 *TEACHER KEY*

W2 - Lesson 3: Division 1

V5-07

Important Concepts of Grade 4 Mathematics

W1 - Lesson 1 ..... Number Concepts
W1 - Lesson 2 ..... Addition and Subtraction
W1 - Lesson 3 ..... Patterns
W1 - Lesson 4 ..... Fractions and Decimals
W1 - Lesson 5 ..... Data Management
W1 - Quiz
W2 - Lesson 1 ..... Multiplication 1
W2 - Lesson 2 ..... Multiplication 2
W2 - Lesson 3 ..... Division 1
W2 - Lesson 4 ..... Division 2
W2 - Lesson 5 ..... Exploring Outcomes
W2 - Quiz
W3 - Lesson 1 ..... Measurement 1
W3 - Lesson 2 ..... Measurement 2
W3 - Lesson 3 ..... Geometry 1
W3 - Lesson 4 ..... Geometry 2
W3 - Lesson 5 ..... Problem Solving
W3 - Quiz

Materials Required

Mathematics Grade 4
Version 5
Preview/Review W2 - Lesson 3 TEACHER KEY

Publisher: Alberta Distance Learning Centre
Author: Eric Boerger, Brian Key
Inhouse Teacher: Brian Key

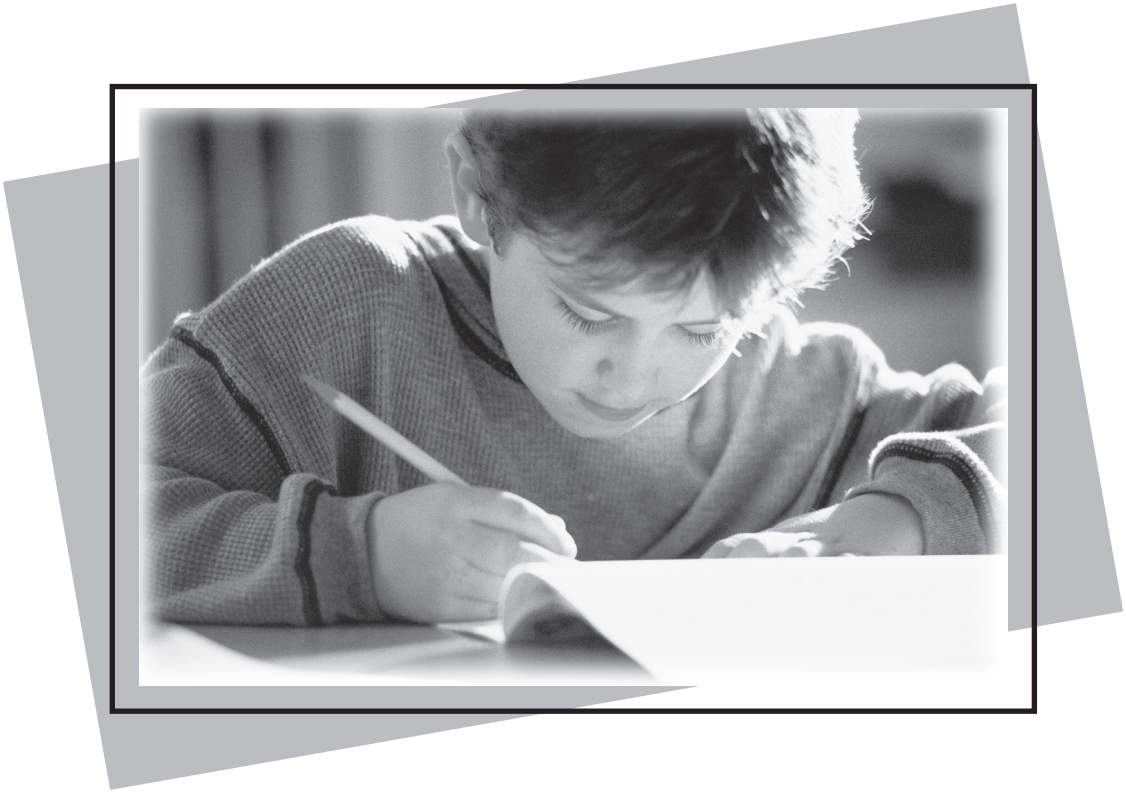
Project Coordinator: Dennis McCarthy
Preview/Review Publishing Coordinating Team: Nina Johnson, Laura Renkema, and Donna Silgard

The Alberta Distance Learning Centre has an Internet site that you may find useful. The address is as follows: **http://www.adlc.ca**

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

Preview/Review Concepts for Grade Four Mathematics

TEACHER KEY



W2 - Lesson 3: Division 1

OBJECTIVES

By the end of this lesson, you should

- think of division as sharing equally or making smaller groups
- show that division and multiplication are inverse or opposite operations
- write the related multiplication and division facts for each fact family
- recall the basic division facts to 81
- think of division as repeated subtraction or skip-counting backwards
- identify by name the parts of a division question (dividend, divisor, quotient, remainder)
- divide by 1
- divide when 0 is the dividend
- solve simple story problems by using division number facts
- use the *Make-A-List* strategy to solve problems

GLOSSARY

dividend - the total number of items to be divided; for example, in $28 \div 4 = 7$, **28** is the dividend

divisor - the number that you are dividing by; for example, in $28 \div 4 = 7$, **4** is the divisor

quotient - the answer obtained by dividing one number by another; for example, in $28 \div 4 = 7$, **7** is the quotient

remainder - the number left over when a number cannot be divided evenly; for example, in $32 \div 5$, the answer is 6 with a **remainder of 2**

W2 - Lesson 3: Division 1

A. INTRODUCTION

What is Division?

You can think about division in three different ways:

- sharing
- grouping
- repeated subtraction

Division is **sharing** any group of things equally with others.

Example:

To share $32 equally among 4 friends, you **divide** the money evenly.

$32 \div 4 = 8$

Each person gets $8.

1. You have 36 candies that you want to share among yourself and three friends. How many candies will each person get?

Calculation: ***36 ÷ 4 = 9***

Write your answer in a sentence.

Each person gets 9 candies.

Division is **making smaller equal groups** from a larger number of things.

Example:

If you had 54 players in a soccer club, and wanted to find how many teams of 6 players you could make, you **divide**.

$54 \div 6 = 9$

You could make 9 teams.

2. There are 28 students in your class. Your teacher wants to divide the class into groups of 4. How many groups will there be in your class?

   Calculation: ***28 ÷ 4 = 7***

   Write your answer in a sentence.

   There will be 7 groups in my class.

Division is **repeated subtraction**.

Multiplication is a process of repeated addition of equal amounts.
Division is the opposite. It is the repeated subtraction of equal amounts.

Example:

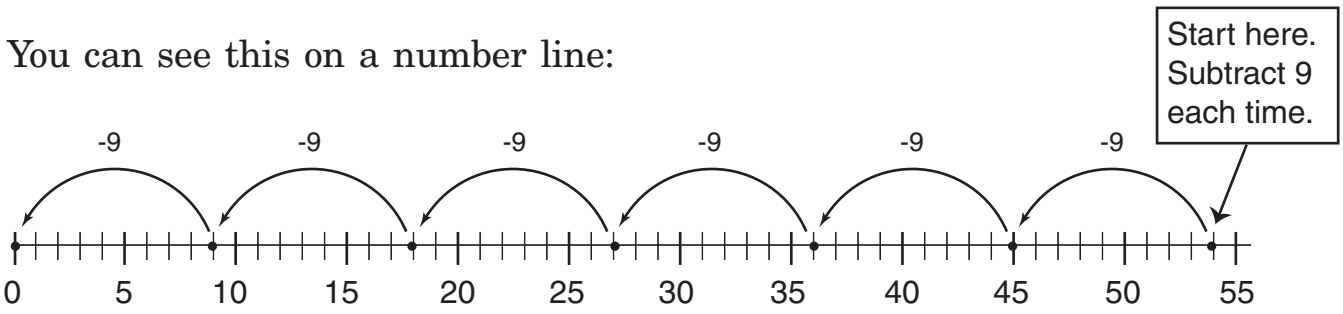
54 ÷ 9 is the same as asking how many times can we subtract 9 until we reach zero.

54 – 9 – 9 – 9 – 9 – 9 – 9 = 0

We subtract 9 six times.

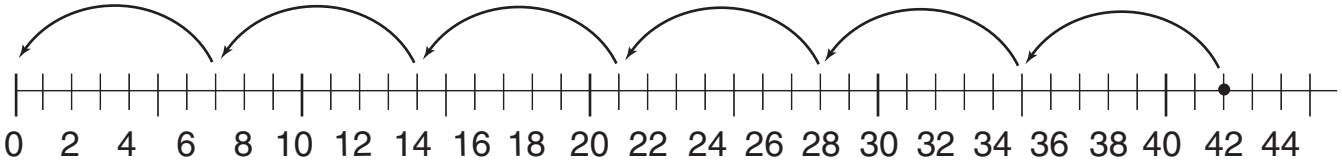
So, 54 ÷ 9 = 6

You can see this on a number line:



On this number line, you are skip-counting backwards by 9 starting from 54.
How many jumps are there from 54 back to 0?

3. Divide 42 by 7. Use the skip-counting method to find your answer. Start at 42 and skip-count backwards by 7. Use arrows to show the number of jumps. How many jumps does it take to reach 0?



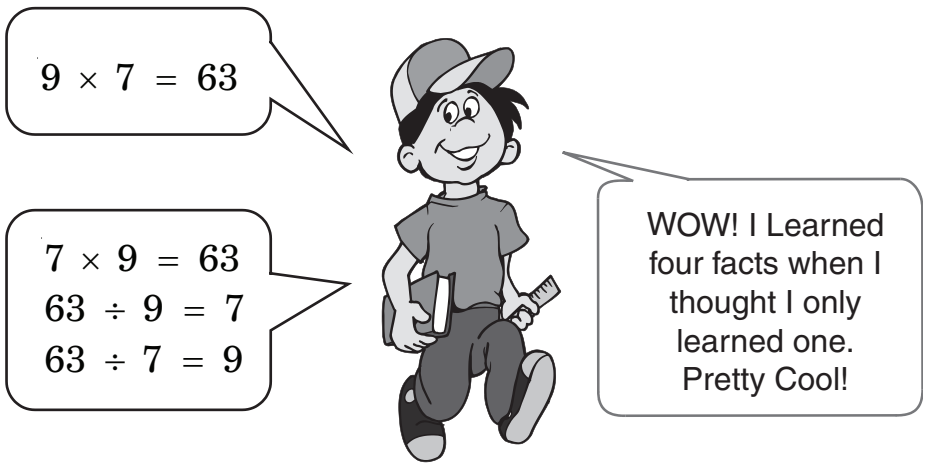
Answer: 42 ÷ 7 = ***6*** jumps

B. Relating Division to Multiplication

Perhaps you've already discovered the secret of learning the basic facts. The basic division facts are the **opposite** of the basic multiplication facts. Remember, two division facts and two multiplication facts make up a family. All four facts in each family use the same four numbers.

3 × 4 = 12	**12 ÷ 4 = 3**
4 × 3 = 12	**12 ÷ 3 = 4**

Every time you learn a new basic multiplication fact, you also learn a new division fact. That is why it is so important to learn your basic multiplication facts well.

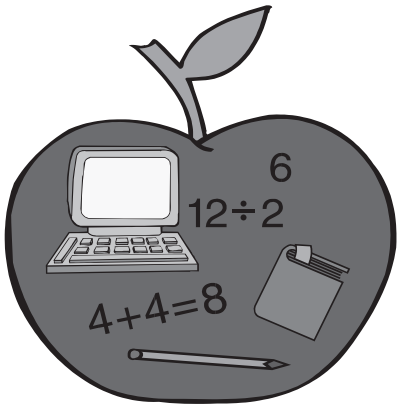


Let's review the basic multiplication facts first.

Remember: *If you are learning the multiplication facts, you are learning the division fact at the same time.*

1. Complete the times table below.

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



2. For each of the following, write the two related division facts. An example has been done for you.

Example:

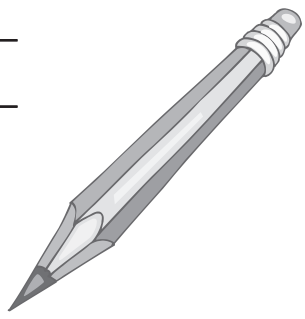
	Related division facts
$6 \times 3 = 18$	$18 \div 3 = 6$ and $18 \div 6 = 3$

Related Division Facts

a.	$4 \times 5 = 20$	***20 ÷ 5 = 4***	and	***20 ÷ 4 = 5***
b.	$9 \times 6 = 54$	***54 ÷ 6 = 9***	and	***54 ÷ 9 = 6***
c.	$9 \times 9 = 81$	***81 ÷ 9 = 9***	and	***(81 ÷ 9 = 9)***
d.	$7 \times 8 = 56$	***56 ÷ 8 = 7***	and	***56 ÷ 7 = 8***
e.	$5 \times 5 = 25$	***25 ÷ 5 = 5***	and	***(25 ÷ 5 = 5)***
f.	$7 \times 6 = 42$	***42 ÷ 6 = 7***	and	***42 ÷ 7 = 6***
g.	$8 \times 9 = 72$	***72 ÷ 9 = 8***	and	***72 ÷ 8 = 9***
h.	$7 \times 7 = 49$	***49 ÷ 7 = 7***	and	***(49 ÷ 7 = 7)***
i.	$8 \times 4 = 32$	***32 ÷ 4 = 8***	and	***32 ÷ 8 = 4***

3. Complete each of the following. If necessary, use the multiplication table to solve each equation.

a. $32 \div 4 =$ ***8***
b. $64 \div 8 =$ ***8***
c. $54 \div 9 =$ ***6***
d. $72 \div 8 =$ ***9***
e. $63 \div 9 =$ ***7***
f. $49 \div 7 =$ ***7***
g. $48 \div 8 =$ ***6***
h. $45 \div 5 =$ ***9***
i. $81 \div 9 =$ ***9***



C. Repeated Subraction and Skip Counting

In the Introduction, you learned that one way of looking at division is to think of it as **repeated subtraction**.

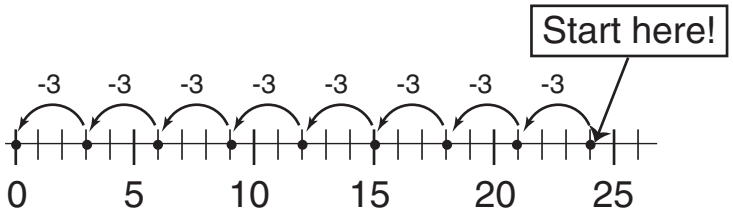
Example: Use repeated subtraction to solve the following question.

$24 \div 3 =$ ____

Put 24 counters in a straight line on your desk. Take away 3 counters. Then take away another 3 counters. Continue taking away 3 counters at a time until none is left.

How many times did you take away 3 counters? You should have repeated the subtracting action 8 times. $24 \div 3 = 8$

You can also use a number line to show what happened.



You took 8 jumps backward before you arrived at zero.

What you did was jump backward, or subtract 3 from 24 eight times.

$24 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 = 0$

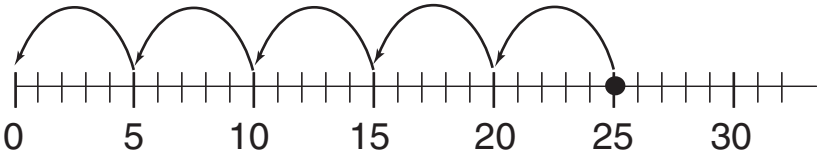
You subtracted 8 threes. There are 8 threes in 24.
This is called **repeated subtraction**.

Dividing by 3 gives you the same answer.

$24 \div 3 = 8$

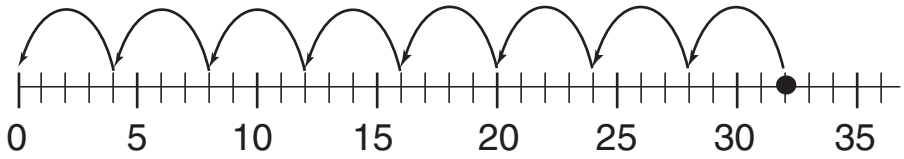
Jumping backwards is another way of saying that you are skip counting backwards.

1. Show $25 \div 5$ by skip counting backwards on the number line below. Then, complete the division sentence.



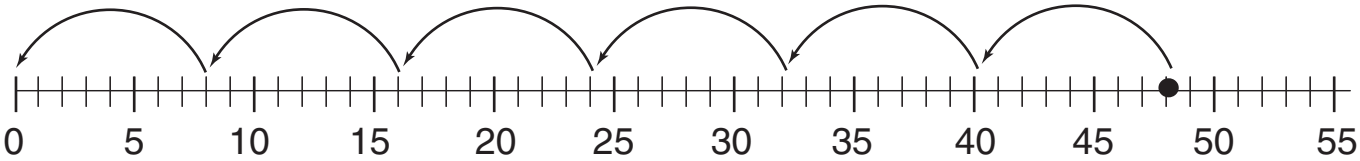
$25 \div 5 =$ ***5***

2. Show $32 \div 4$ by skip counting backwards on the number line below. Then, complete the division sentence.



$32 \div 4 =$ ***8***

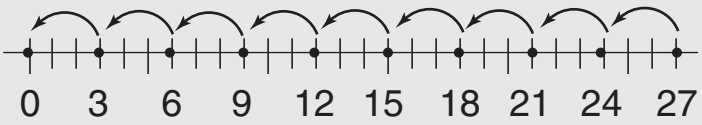
3. Show $48 \div 8$ by skip counting backwards on the number line below. Then, complete the division sentence.



$48 \div 8 =$ ***6***

Skip counting backwards is really another way to do division. If you skip count back to zero and count the jumps, you will have calculated the answer.

$27 \div 3 = ?$



9 jumps
27 ÷ 3 = 9

Your Turn!

4. Complete the following questions by skip counting backwards from the first number. Count the jumps. Then write the division sentence for each question.

Example:

21, 18, 15, 12 , 9 , 6 , 3 , 0 .

Division sentence: 21 ÷ 3 = 7

a. 24, 20, 16, ***12*** , ***8*** , ***4*** , ***0*** .

Division sentence: ***24 ÷ 4 = 6***

b. 63, 54, 45, ***36*** , ***27*** , ***18*** , ***9*** , ***0*** .

.

Division sentence: ***63 ÷ 9 = 7***

c. 35, 28, 21, ***14*** , ***7*** , ***0*** .

Division sentence: ***35 ÷ 7 = 5***

d. 50, 45, 40, ***35*** , ***30*** , ***25*** , ***20*** , ***15***, ***10*** , ***5*** , ***0*** .

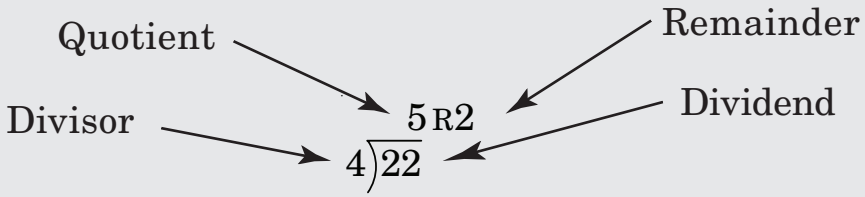
Division sentence: ***50 ÷ 5 = 10***

D. Dividends, Divisors, Quotients, and Remainders

There are **THREE** parts to a division question:

- the **dividend**—the number that is being divided (the largest number)
- the **divisor**—the number that you are dividing into the dividend
- the **quotient**—the answer in a dividing problem
  - ✸ The **remainder** is whatever is leftover if the dividend cannot be divided evenly by the divisor. The remainder is part of the quotient.

There are two ways to write division questions:



OR

$22 \div 4 = 5 \text{ R}2$

Dividend Divisor Quotient Remainder

When 22 (the dividend) is divided by 4 (the divisor), the quotient is 5. The 2 that is left over is called the remainder.

1. Write the quotient for each question.

a. $72 \div 8 =$ ***9***

b. $20 \div 4 =$ ***5***

c. $49 \div 7 =$ ***7***

d. $35 \div 5 =$ ***7***

e. $64 \div 8 =$ ***8***

f. $42 \div 6 =$ ***7***

2. Complete these questions by writing a divisor and a quotient.

a. $56 \div$ ***8*** ***or*** ***7*** $=$ ***7*** ***or*** ***8***

b. $36 \div$ ***9*** ***or*** ***4*** $=$ ***6*** ***or*** ***6*** ***4*** ***9***

c. $63 \div$ ***9*** ***or*** ***7*** $=$ ***7*** ***or*** ***9***

d. $48 \div$ ***8*** ***or*** ***6*** $=$ ***6*** ***or*** ***8***

e. $18 \div$ ***3*** ***or*** ***6*** $=$ ***6*** ***or*** ***3***

f. $81 \div$ ***9*** $=$ ***9***

3. Solve the following questions that have remainders left over.

Example: $4\overline{)22}$ = 5 R2

a. $4\overline{)34}$ = ***8*** R ***2***

-32

2

b. $8\overline{)36}$ = ***4*** R ***4***

-32

4

c. $9\overline{)34}$ = ***3*** R ***7***

-27

7

d. $2\overline{)15}$ = ***7*** R ***1***

-14

1

e. $6\overline{)40}$ = ***6*** R ***4***

-36

4

f. $7\overline{)45}$ = ***6*** R ***3***

-42

3

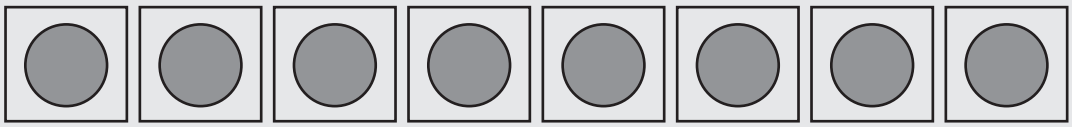
Dividing by One

First, let's review what you already know about multiplying by 1. Multiplying any number by 1 results in the number itself. In other words, any number multiplied by 1 stays the same.

Example:

$8 \times 1 = 8$

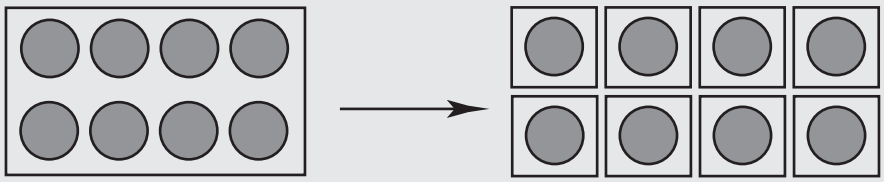
8 groups of 1 object each equals 8 objects.



OR

$1 \times 8 = 8$

1 group of 8 objects equals 8 objects.

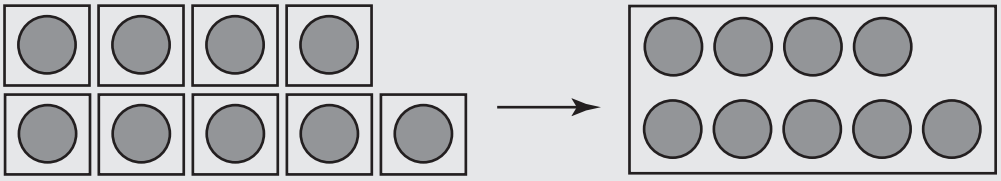


The number 1 is also special when it is used to **divide** other numbers.

Dividing any number by 1 results in the number itself. In other words, any number divided by 1 stays the same.

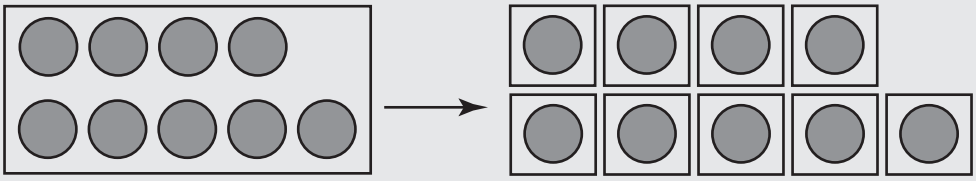
Example:

9 ÷ 1 = 9 9 objects divided into 1 group equals a group of 9 objects.



OR

9 ÷ 1 = 9 9 objects put into groups of 1 equals 9 groups of one.

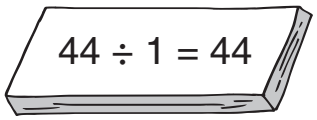


4. Write the answers to the following questions as quickly as you can:

a. 7 ÷ 1 = ***7*** b. 15 ÷ 1 = ***15*** c. 32 ÷ 1 = ***32***

d. 18 ÷ 1 = ***18*** e. 81 ÷ 1 = ***81*** f. 63 ÷ 1 = ***63***

g. 256 ÷ 1 = ***256*** h. 587 ÷ 1 = ***587*** i. 999 ÷ 1 = ***999***



Dividing Into Zero

You have already learned that zero times any number equals zero.

Example:

$8 \times 0 = 0$ $\quad$ $999 \times 0 = 0$
$0 \times 8 = 0$ $\quad$ $0 \times 999 = 0$

Because multiplication and division are related, you know

$8 \times 0 = 0 \longrightarrow 0 \div 8 = 0$

$999 \times 0 = 0 \longrightarrow 0 \div 999 = 0$

Zero objects divided into 8 groups (or 999 groups) equals zero objects in each group. In other words, if you have nothing and try to make a group of 8, you still have nothing.

5. Answer the following questions as quickly as you can.

a. $0 \div 6 =$ ***0*** b. $0 \div 9 =$ ***0*** c. $0 \div 15 =$ ***0***

d. $0 \div 23 =$ ***0*** e. $0 \div 321 =$ ***0*** f. $0 \div 999 =$ ***0***

E. Problem Solving

In W2 - Lesson 1, you were introduced to the *Make-A-List* problem solving strategy. This strategy is very useful for solving problems where you are asked to find all the possible answers. The list should be made in an organized way so that you are sure that all the answers have been found, and none has been recorded twice.

Four-Step Process for Problem Solving
Step 1 Understand the problem
Step 2 Make a plan
Step 3 Try the plan
Step 4 Look back

Use the *Make-A-List* strategy to solve the following problems. Follow the four-step method.

1. Julie decided to buy some large wooden beads for a wall hanging. The round beads are 2¢ each, the oval beads are 3¢ each, and the square beads are 5¢ each. If Julie spends exactly 15¢, how many different combinations of beads can she buy? Make a list of all the combinations.

Square Beads 5¢	*Oval Beads 3¢*	*Round Beads 2¢*
3 (3x5 = 15¢)	*0*	*0*
2 (2x5 = 10¢)	*1 (1x3 = 3¢)*	*1 (1x2 = 2¢)*
1 (1x5 = 5¢)	*2 (2x3 = 6¢)*	*2 (2x2 = 4¢)*
1 (1x5 = 5¢)	*0*	*5 (5x2 = 10¢)*
0	*5 (5x3 = 15¢)*	*0*
0	*3 (3x3 = 9¢)*	*3 (3x2 = 6¢)*
0	*1 (1x3 = 3¢)*	*6 (6x2 = 12¢)*

Answer to the Problem: ***Julie can buy 7 combinations of beads.***

2. Mike wants to make a phone call using a pay phone. Each local call costs 35 cents. Mike has lots of nickels, dimes, and quarters in his pocket. How many different ways can he make 35¢? Make a list of all the ways.

Nickels 5¢	***Dimes 10¢***	***Quarters 25¢***
0	***1 (1x10=10¢)***	***1 (2x25=25¢)***
2 (2x5=10¢)	***0***	***1 (1x25=25¢)***
1 (1x5=5¢)	***3 (3x10=30¢)***	***0***
3 (3x5=15¢)	***2 (2x10=20¢)***	***0***
5 (5x5=25¢)	***1 (1x10=10¢)***	***0***
7 (7x5=35¢)	***0***	***0***

Answer to the Problem: ***Mike can make 35¢ is six different ways.***

Homework

1. Write the two related division facts for each multiplication fact given.

a. $9 \times 8 = 72$ ***72 ÷ 8 = 9*** ***72 ÷ 9 = 8***

b. $7 \times 9 = 63$ ***63 ÷ 9 = 7*** ***63 ÷ 7 = 9***

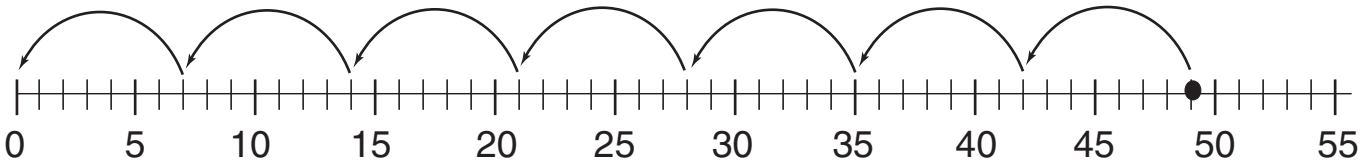
c. $8 \times 4 = 32$ ***32 ÷ 4 = 8*** ***32 ÷ 8 = 4***

d. $7 \times 8 = 56$ ***56 ÷ 8 = 7*** ***56 ÷ 7 = 8***

e. $6 \times 9 = 54$ ***54 ÷ 9 = 6*** ***54 ÷ 6 = 9***

2. Skip count backwards on each number line to find the answer. Use arrows to show the jumps.

a. $49 \div 7 =$ ***7***



b. $54 \div 6 =$ ***9***