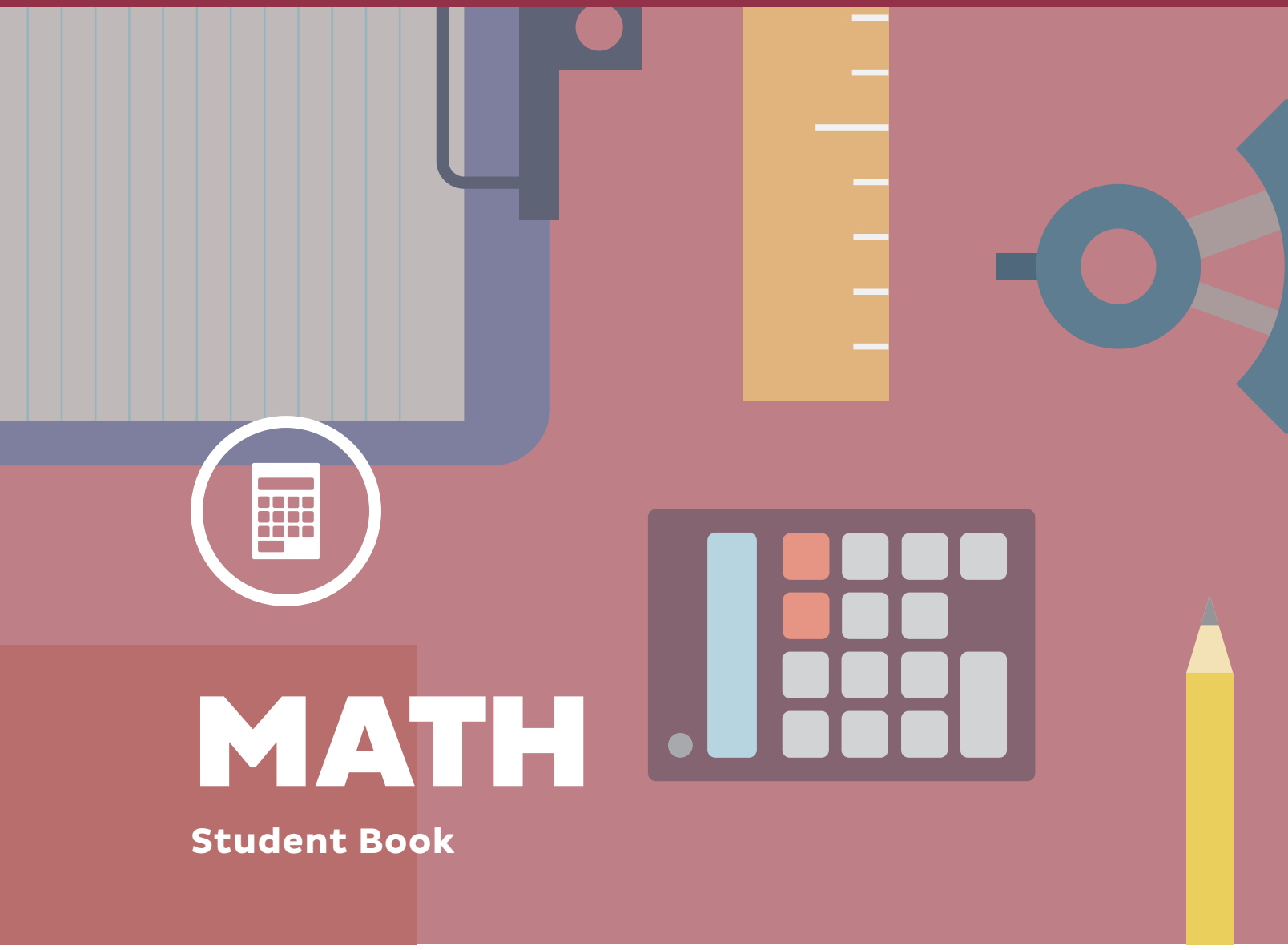
LIFEPAC®



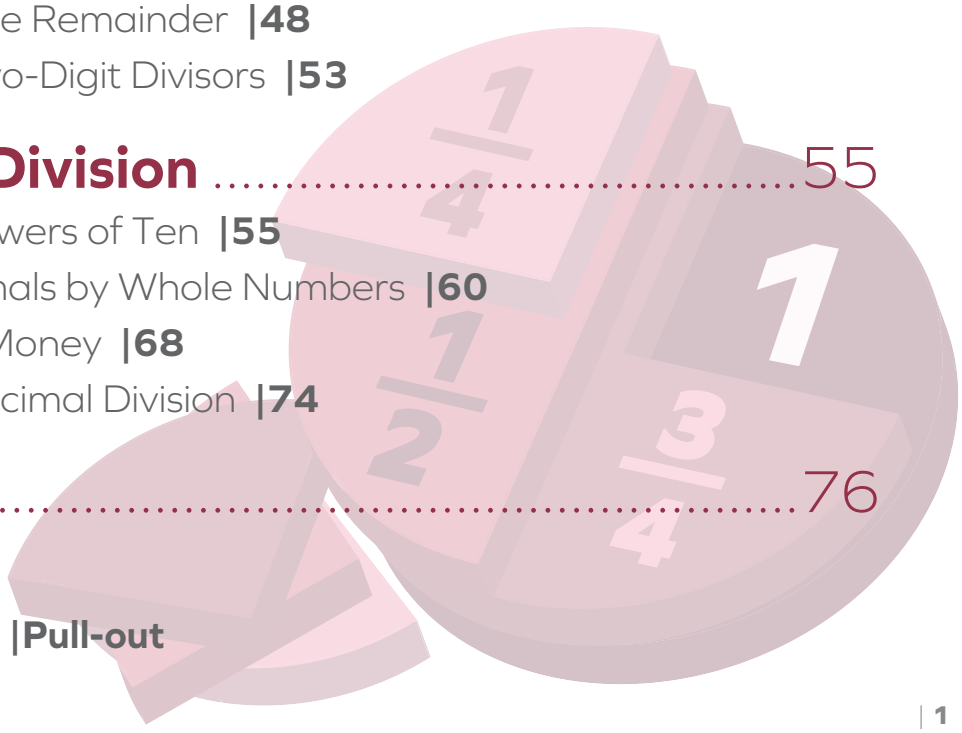
MATH

Student Book

5th Grade | Unit 3

Alpha Omega
PUBLICATIONS

MATH 503
DIVIDING WHOLE NUMBERS AND DECIMALS



Author:
Glynlyon Staff

Editor:
Alan Christopherson, M.S.

Media Credits:
Page 3: © mrhighsky, iStock, Thinkstock; **4:** © Ingram Publishing, Thinkstock; **5:** © Mike Elliott, iStock, Thinkstock; **16:** © Tony Link Design, iStock, Thinkstock; **32:** © SoberP, iStock, Thinkstock; **55:** © Stockbyte, Thinkstock; **71:** © wissanu99, iStock, Thinkstock; **76:** © Andreas Guskos, iStock, Thinkstock.

Alpha Omega
PUBLICATIONS

804 N. 2nd Ave. E.
Rock Rapids, IA 51246-1759

DIVIDING WHOLE NUMBERS AND DECIMALS

In this unit, you will explore division of whole numbers and decimals. You will extend your knowledge from one-digit divisors to two-digit divisors and use an algorithm to divide with whole numbers. You will solve real life problems using division and interpret the remainder within context. In addition, you will be briefly introduced to dividing decimals by whole numbers, using models to find the quotient.

Objectives

Read these objectives. The objectives tell you what you will be able to do when you have successfully completed this LIFEPAC. When you have finished this LIFEPAC, you should be able to:

- Model division problems.
- Estimate quotients.
- Divide whole numbers and decimals by powers of ten.
- Solve division problems using long division.
- Solve division problems that have remainders.
- Solve real life problems.

1. ONE-DIGIT DIVISORS

In this lesson, we'll help Nutmeg teach Pepper about division. We'll look at what it means to divide two numbers, and we'll use models to represent division problems. We'll also learn how division is related to multiplication.

Objectives

Review these objectives. When you have completed this section, you should be able to:

- Understand division as regrouping.
- Understand division as repeated subtraction.
- Understand division as the opposite of multiplication.
- Divide large numbers that end in zero(s).
- Estimate quotients using compatible numbers.
- Know the steps of long division.
- Use long division to find a quotient.
- Solve division problems that have remainders.
- Check division problems that have remainders.

Vocabulary

Study these new words. Learning the meanings of these words is a good study habit and will improve your understanding of this LIFEPAC.

compatible numbers. Numbers that are easy to compute with.

dividend. The number being divided.

divisor. The number of parts that the dividend is being divided into.

inverse operations. Opposite operations that undo one another.

long division. A method for dividing with larger numbers that breaks the process into smaller steps.

quotient. The result of dividing two numbers.

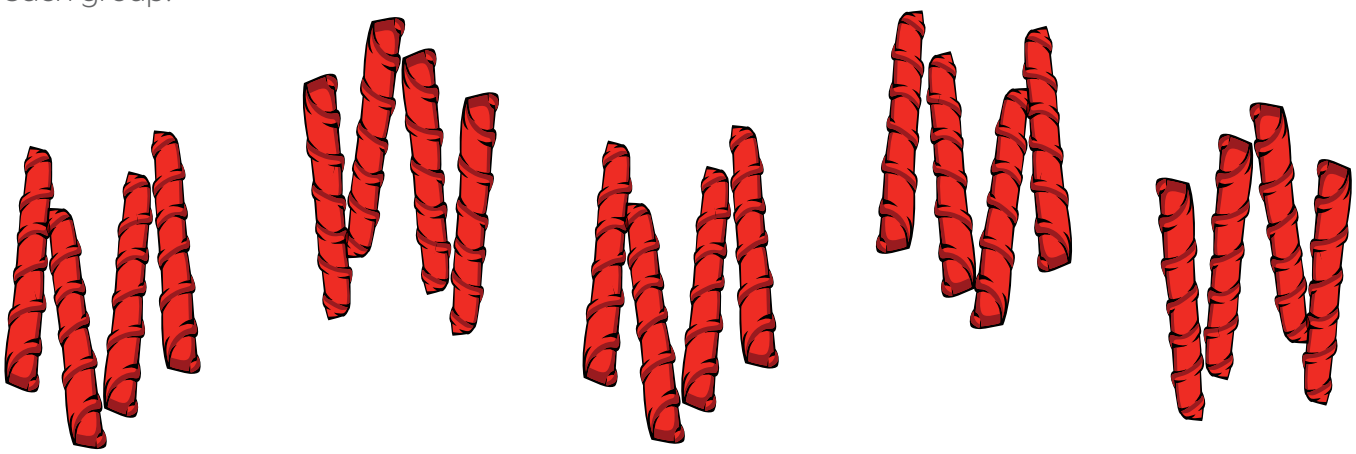
remainder. The amount left over after dividing two numbers.

Note: *All vocabulary words in this LIFEPAC appear in* **boldface** *print the first time they are used. If you are unsure of the meaning when you are reading, study the definitions given.*

Understanding Division as Regrouping

Division splits a quantity evenly into a given number of groups. For example, in the cartoon, Nutmeg needs to split her bag of licorice evenly between her five cousins. If there are twenty pieces of licorice in the bag, how many will each squirrel get?

We need to divide 20 pieces of licorice evenly into 5 groups, and figure out how many pieces will be in each group. 20 licorice pieces divided in to 5 groups results in 4 pieces in each group.

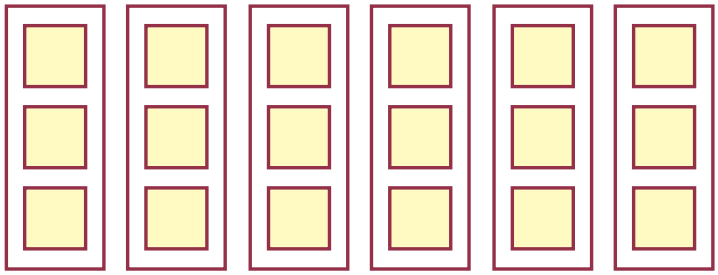


So, each squirrel should get four pieces of licorice. The division problem we just did can be written as 20 ÷ 5 = 4. The symbol for division is ÷. The first number (20) is called the **dividend**. It is the amount being divided. The second number (5) is the **divisor**. The divisor is the number of parts that the dividend is being evenly divided into. The last number (4) is called the **quotient**. The quotient is the result of dividing two numbers. It represents the quantity that will be in each group.

quotient
dividend) divisor

Example:

What division problem is modeled?

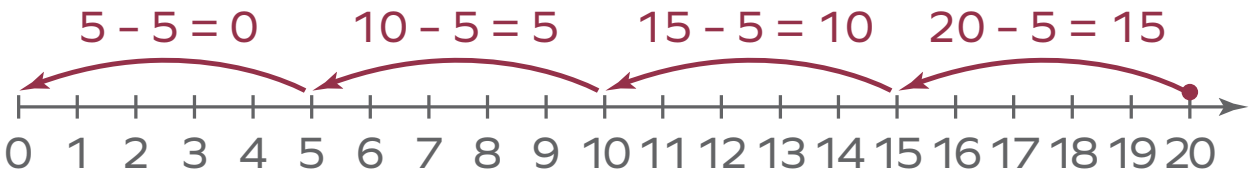


Solution:

The model shows 18 total yellow squares. These yellow squares are divided into six equal groups. In each group, there are three squares. So, the division problem is 18 ÷ 6 = 3. The dividend is 18, the divisor is 6, and the quotient is 3.

Division as Repeated Subtraction

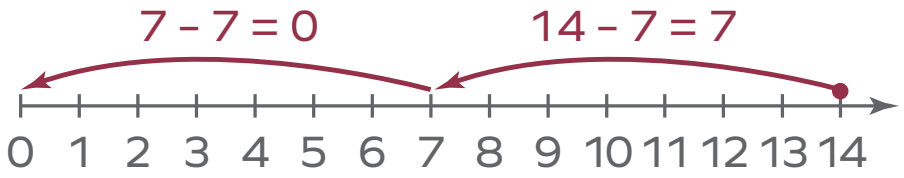
Another way to think of division is as repeated subtraction. For example, we could solve the division problem 20 ÷ 5 by seeing how many times we would have to subtract 5 from 20 in order to end up with nothing left. This can be shown on a number line:



In order to get from 20 to 0 on the number line, we have to subtract 5, four times.

Example:

What division problem is modeled?



Solution:

The model shows repeated subtraction on a number line. Seven is subtracted from 14, two times. So, the division problem is $14 \div 7 = 2$. The dividend is 14, the divisor is 7, and the quotient is 2.

Division as the Opposite of Multiplication

Still another way to think about division is as the opposite of multiplication. Multiplication and division are opposite operations that undo each other. They are called **inverse operations**.

Let's review the division problems we've looked at so far. Each division fact also has a multiplication fact. The quotient can be multiplied by the divisor to get the dividend:

Keep in mind...

Addition and subtraction is another example of inverse operations.

DIVISION FACT	MULTIPLICATION FACT
$20 \div 5 = 4$	$4 \times 5 = 20$
$18 \div 6 = 3$	$3 \times 6 = 18$
$14 \div 7 = 2$	$2 \times 7 = 14$

Because multiplication and division are opposites, we can use multiplication to help us solve division problems and check our answers.

Example:

Divide.

$72 \div 9$

Solution:

$72 \div 9 = 8$

Since $8 \times 9 = 72$, our quotient is correct.

Key point!

One way to divide is to use multiplication facts. Ask yourself: "What number can be multiplied by the divisor to get the dividend?" The number answering that question is the quotient.

Example:

Divide. $12 \div 1$

Solution:

Again, let's use our multiplication facts to solve this problem. What number can be multiplied by 1 to get 12? The answer is 12. So, $12 \div 1 = 12$.

Since $12 \times 1 = 12$, our quotient is correct.

Think about it!

Any number divided by 1 is equal to itself. And, any number divided by itself is equal to 1.

Example:

Find the quotient.

$85 \div 5 = n$

Solution:

Let's use repeated subtraction to solve this problem. Start with 85 and subtract 5. Keep subtracting 5 until you get to 0. The quotient is equal to the number of times we had to subtract.

$85 - 5 = 80$	$80 - 5 = 75$	$75 - 5 = 70$	$70 - 5 = 65$	$65 - 5 = 60$
$60 - 5 = 55$	$55 - 5 = 50$	$50 - 5 = 45$	$45 - 5 = 40$	$40 - 5 = 35$
$35 - 5 = 30$	$30 - 5 = 25$	$25 - 5 = 20$	$20 - 5 = 15$	$15 - 5 = 10$
$10 - 5 = 5$	$5 - 5 = 0$			

We had to subtract 17 times. So, $85 \div 5 = 17$ and $n = 17$. To check, try multiplying.

$$\begin{array}{r} {\scriptstyle 3} \\ 17 \\ \times\ 5 \\ \hline 85 \end{array}$$

Since $17 \times 5 = 85$, our quotient is correct.

This might help!

The letter *n* is called a variable. It is used to represent an unknown number. In this example, the unknown number that we have to find is the quotient.

Example:

Divide. $28 \div n = 7$

Solution:

Remember that if the quotient (7) is multiplied by the divisor (n), we should get the dividend (28). So, what number when multiplied by 7 is equal to 28? The answer is 4. So, $n = 4$. Let's check our answer in the original problem to see if it makes sense.

$$28 \div 4 = 7$$

Since $7 \times 4 = 28$, our value for n is correct

Let's Review!

Before going on to the practice problems, make sure you understand the main points of this lesson.

- ✓ Division splits an amount evenly into a given number of parts.
- ✓ The dividend is the amount being split up, the divisor is the number of parts the amount is being split into, and the quotient is the amount in each part.
- ✓ Models, repeated subtraction, and multiplication facts can be used to help find a quotient.
- ✓ Division is the opposite of multiplication.

Complete this activity.

1.1 Match the terms with their definitions.

a. _____ dividend

b. _____ divisor

c. _____ inverse operations

d. _____ quotient

1. the number of parts that the dividend is being divided into
2. the number being divided
3. the result of dividing two numbers
4. opposite operations that undo one another

Circle the correct letter and answer.

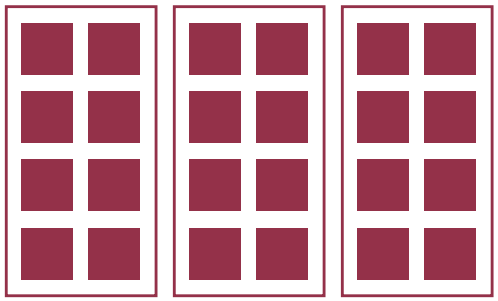
1.2 In 35 ÷ 5 = 7, the _____ is 5.

a. divisor b. quotient c. dividend

1.3 In 54 ÷ 6 = 9, the _____ is 54.

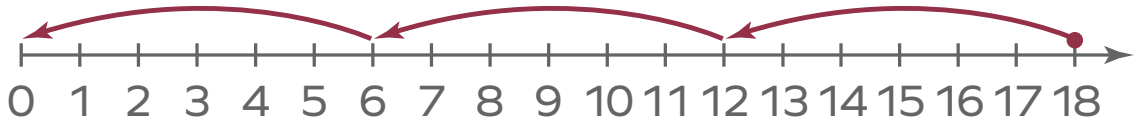
a. divisor b. quotient c. dividend

1.4 What division problem is modeled by this diagram?



a. 24 ÷ 3 = 8 b. 24 ÷ 6 = 4 c. 24 ÷ 8 = 3 d. 24 ÷ 12 = 2

1.5 What division problem is modeled?



a. 18 ÷ 6 = 3 b. 16 ÷ 4 = 4 c. 12 ÷ 3 = 4 d. 18 ÷ 3 = 6

Complete these activities.

1.6 36 ÷ 3 = *n* *n* = _____

1.7 27 ÷ 9 = *n* *n* = _____

1.8 40 ÷ 8 = *n* *n* = _____

1.9 72 ÷ *n* = 8 *n* = _____

1.10 54 ÷ *n* = 9 *n* = _____

1.11 42 ÷ *n* = 6 *n* = _____

1.12 Write a multiplication fact that goes with this division fact.

30 ÷ 5 = 6 _____

1.13 Write a multiplication fact that goes with this division fact.

33 ÷ 11 = 3 _____

1.14 Match each division problem with its correct answer.

a. _____	$8 \div 8 = n$	1. $n = 3$
b. _____	$49 \div n = 7$	2. $n = 7$
c. _____	$48 \div n = 8$	3. $n = 11$
d. _____	$50 \div n = 5$	4. $n = 5$
e. _____	$18 \div 2 = n$	5. $n = 1$
f. _____	$60 \div 12 = n$	6. $n = 2$
g. _____	$16 \div n = 8$	7. $n = 4$
h. _____	$88 \div 8 = n$	8. $n = 9$
i. _____	$12 \div n = 4$	9. $n = 6$
j. _____	$36 \div 9 = n$	10. $n = 10$

Estimating Quotients

Division is used to split an amount evenly into a given number of pieces. Because division is the opposite of multiplication, multiplication and division are called inverse operations. And, multiplication facts can be used to help solve division problems. For example, $36 \div 4 = 9$, *because* $9 \times 4 = 36$.

In this section, we'll continue to explore division. We'll learn how to divide with numbers that end in zero. We'll also learn how to estimate quotients.

Dividing Large Numbers That End in Zero(s)

Remember that multiplying with a number that ends in zeros is very easy. Multiply the nonzero digits at the front by the other factor. Then, the same number of zeros that are in the first factor will also be in the product. Take a look:

$8 \times 3 = 24$

$80 \times 3 = 240$

$800 \times 3 = 2{,}400$

$8{,}000 \times 3 = 24{,}000$

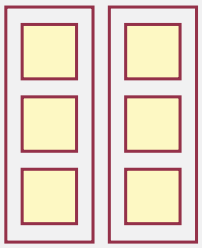
SELF TEST 1: ONE-DIGIT DIVISORS

Each numbered question = 6 points

Write *true* or *false*.

1.01 _____ To check a quotient that doesn't have a remainder, multiply the quotient by the dividend. The product should be the divisor.

1.02 _____ The following model represents the division problem 6 ÷ 2 = 3.



Circle the correct letter and answer.

1.03 In the division problem 18 ÷ 3 = 6, the _____ is 18.

a. divisor b. remainder c. quotient d. dividend

1.04 Find the quotient. 800 ÷ 4

a. 20 b. 200 c. 3,200 d. 400

1.05 Find the quotient. 420 ÷ 6

a. 17 b. 700 c. 70 d. 60

1.06 Estimate the quotient using compatible numbers. 340 ÷ 5

a. 70 b. 60 c. 34 d. 600

1.07 Use long division to divide. 340 ÷ 5

a. 72 b. 70 c. 1,700 d. 68

1.08 Estimate the quotient using compatible numbers. 2,252 ÷ 7

a. 300 b. 400 c. 30 d. 40

1.09 Use long division to divide. 2,252 ÷ 7

a. 322 R2 b. 321 R5 c. 321 R7 d. 320 R12

1.010 Use long division to divide. 6,552 ÷ 3

a. 2,184 b. 2,250 R3 c. 2,164 d. 2,252

1.011 Divide. $93 \div 4$ What is the remainder?

a. No remainder b. 1 c. 2 d. 3

1.012 Use long division to divide. $691 \div 9$

a. 77 R2 b. 76 R6 c. 76 R7 d. 83 R4

Complete these activities.

1.013 Find n. $60 \div 5 = n$ _____

1.014 Find n. $64 \div n = 8$ _____

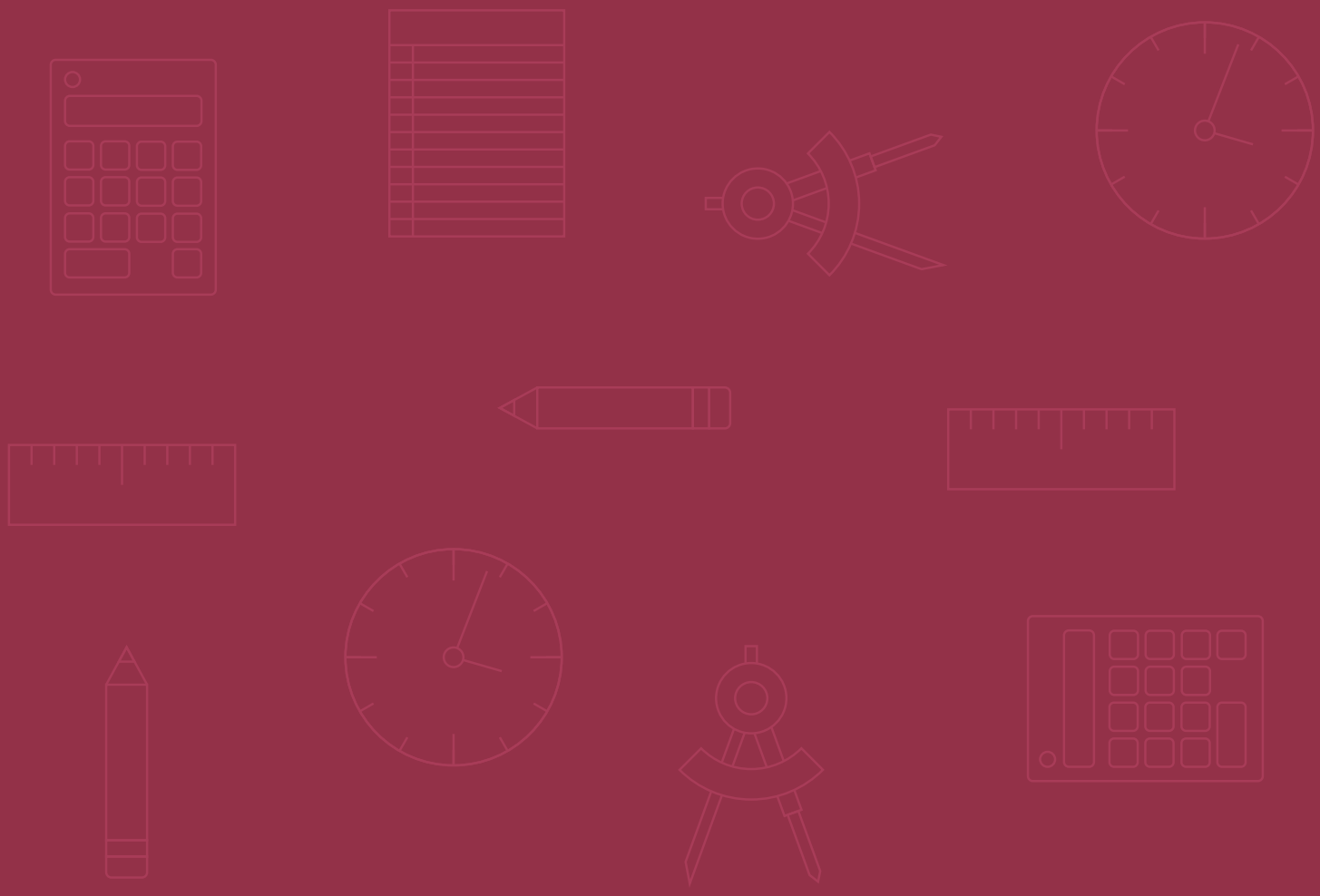
1.015 Write a multiplication fact that goes with this division fact. $24 \div 4 = 6$

_____

Teacher check: Initials _____

Score _____ Date _____

72/90



Alpha Omega
PUBLICATIONS

804 N. 2nd Ave. E.
Rock Rapids, IA 51246-1759

800-622-3070
www.aop.com

MAT0503 – Jan '16 Printing

ISBN 978-0-7403-3483-2