

# Math Term 1

Copyright © 2023 by Discovery Education, Inc. All rights reserved. No part of this work may be reproduced, distributed, or transmitted in any form or by any means, or stored in a retrieval or database system, without the prior written permission of Discovery Education, Inc.

To obtain permission(s) or for inquiries, submit a request to:

Discovery Education, Inc. 4350 Congress Street, Suite 700 Charlotte, NC 28209 800-323-9084 Education\_Info@DiscoveryEd.com

ISBN 13: 978-1-61708-831-5

1 2 3 4 5 6 7 8 9 10 CJK 25 24 23 22 21 A

#### **Acknowledgments**

Acknowledgment is given to photographers, artists, and agents for permission to feature their copyrighted material.

Cover and inside cover art: Nae84 / Shutterstock.com

# **Table of Contents**

& Technical Education	viii ×
Letter to the Parent/Guardian	Х
Theme 1   Number Sense and Operations	_
Unit 1 Decimal Place Value and Computation	
Concept 1.1 Decimals to the Thousandths Place	2
Lesson 1 The Journey Begins	3
Lesson 2 Decimals to the Thousandths Place	6
Lesson 3 Place Value Shuffle	10
Lesson 4 Composing and Decomposing Decimals	14
Lesson 5 Comparing Decimals	18
Lesson 6 Rounding Decimals	20
Concept 1.2 Adding and Subtracting Decimals	24
Lesson 7 Estimating Decimal Sums	25
Lesson 8 Modeling Decimal Addition	29
Lesson 9 Thinking Like a Mathematician	37
Lesson 10 Subtracting Decimals	40
Lesson 11 Estimating Decimal Differences	46
Lesson 12 Subtracting to the Thousandths Place	50
Lancon 42 Decimal Stary Problems	г 4

# **Unit 2 Number Relationships**

Concept 2.1	Expressions, Equations, and the Real World	60
Lesson 1	Expressions, Equations, and Variables	61
Lesson 2	Variables in Equations	65
Lesson 3	Finding the Unknown	67
Lesson 4	Telling Stories with Numbers	70
Concept 2.2	Factors and Multiples	72
Lesson 5	Finding Factors	73
Lesson 6	Prime Factorization	77
Lesson 7	Greatest Common Factors	80
Lesson 8	Identifying Multiples	83
Lesson 9	Least Common Multiple	87
Lesson 10	Factors or Multiples?	92
Unit 3 Mu	Iltiplication with Whole Numbers	
Concept 3.1	Models for Multiplication	98
Lesson 1	The Power of Ten	99
Lesson 2	Using the Area Model to Multiply	102
Lesson 3	The Distributive Property of Multiplication	106
Lesson 4	Using the Partial Products Model to Multiply	112
Concept 3.2	Multiplying 4-Digit Numbers by 2-Digit Numbers	116
Lesson 5	What Is an Algorithm?	117
Lesson 6	Multiplying Multi-Digit Numbers	122
Loccon 7	Multiplication Problems in the Peal World	125

# **Unit 4 Division with Whole Numbers**

Concept 4.1	Models for Division	130
Lesson 1	Understanding Division	131
Lesson 2	Using the Area Model to Divide	133
Lesson 3	Using the Partial Quotients Model to Divide	137
Lesson 4	Estimating Quotients	140
Concept 4.2	Dividing by 2-Digit Divisors	142
Lesson 5	Using the Standard Algorithm to Divide	143
Lesson 6	Checking Division with Multiplication	145
Lesson 7	Multistep Story Problems	148
Unit 5 Mı	ultiplication and Division with Decimals	
	ultiplication and Division with Decimals  Multiplying Decimals	152
Concept 5.1		
Concept 5.1 Lesson 1	Multiplying Decimals	153
Concept 5.1 Lesson 1 Lesson 2	Multiplying Decimals	153 157
Concept 5.1 Lesson 1 Lesson 2 Lesson 3	Multiplying Decimals  Multiplying by Powers of Ten  Multiplying Decimals by Whole Numbers	153 157 160
Concept 5.1 Lesson 1 Lesson 2 Lesson 3 Lesson 4	Multiplying Decimals  Multiplying by Powers of Ten  Multiplying Decimals by Whole Numbers  Multiplying Tenths by Tenths.	153 157 160 163
Concept 5.1 Lesson 1 Lesson 2 Lesson 3 Lesson 4 Lesson 5	Multiplying Decimals  Multiplying by Powers of Ten  Multiplying Decimals by Whole Numbers  Multiplying Tenths by Tenths  Estimating Decimal Products	153 157 160 163 167
Concept 5.1 Lesson 1 Lesson 2 Lesson 3 Lesson 4 Lesson 5 Lesson 6	Multiplying Decimals  Multiplying by Powers of Ten.  Multiplying Decimals by Whole Numbers  Multiplying Tenths by Tenths.  Estimating Decimal Products  Using the Area Model to Multiply Decimals	153 157 160 163 167 170
Concept 5.1 Lesson 1 Lesson 2 Lesson 3 Lesson 4 Lesson 5 Lesson 6 Lesson 7	Multiplying Decimals  Multiplying by Powers of Ten.  Multiplying Decimals by Whole Numbers  Multiplying Tenths by Tenths.  Estimating Decimal Products  Using the Area Model to Multiply Decimals  Multiplying Decimals through the Hundredths Place.	153 157 160 163 167 170
Concept 5.1 Lesson 1 Lesson 2 Lesson 3 Lesson 4 Lesson 5 Lesson 6 Lesson 7 Lesson 8	Multiplying Decimals  Multiplying by Powers of Ten.  Multiplying Decimals by Whole Numbers  Multiplying Tenths by Tenths.  Estimating Decimal Products  Using the Area Model to Multiply Decimals  Multiplying Decimals through the Hundredths Place  Multiplying Decimals through the Thousandths Place.	153 157 160 163 167 170 173

Concept 5.2 Dividing Decimals
Lesson 11 Dividing by Powers of Ten
Lesson 12 Patterns and Relationships in Powers of Ten 188
Lesson 13 Modeling Decimal Division
Lesson 14 Estimating Decimal Quotients
Lesson 15 Dividing Decimals by Whole Numbers
Lesson 16 Dividing Decimals by Decimals
Lesson 17 Solving Challenging Multistep Story Problems
Unit 6 Numerical Expressions and Patterns
Concept 6.1 Evaluating Numerical Expressions
Lesson 1 Numerical Expressions
Lesson 2 Numerical Expressions with Grouping Symbols209
Lesson 3 Placing Grouping Symbols
Lesson 4 Writing Expressions to Represent Scenarios
Concept 6.2 Analyzing Numerical Patterns
Lesson 5 Identifying Numerical Patterns
Lesson 6 Extending and Creating Numerical Patterns223
Lesson 7 Solving Problems with Numerical Patterns
Additional Resources
Glossary R
Indov

#### **FOREWORD**

This is a pivotal time in the history of the Ministry of Education and Technical Education (MOETE) in Egypt. We are embarking on the transformation of Egypt's K-12 education system. We started in September 2018 with the rollout of KG1, KG2, and Primary 1. In 2021 we rolled out Primary 4, and we will continue with the rollout until 2030. We are transforming the way in which students learn to prepare Egypt's youth to succeed in a future world that we cannot entirely imagine.

MOETE is very proud to present this new series of textbooks, with the accompanying digital learning materials that captures its vision of the transformation journey. This is the result of much consultation, much thought and a lot of work. We have drawn on the best expertise and experience from national and international organizations and education professionals to support us in translating our vision into an innovative national curriculum framework and exciting and inspiring print and digital learning materials.

The MOETE extends its deep appreciation to its own "Center for Curriculum and Instructional Materials Development" (CCIMD) and specifically, the CCIMD Director and her amazing team. MOETE is also very grateful to the minister's senior advisors and to our partners including "Discovery Education," "National Geographic Learning" "Nahdet Masr," "Longman Egypt," UNICEF, UNESCO, and WB, who, collectively, supported the development of Egypt's national curriculum framework. I also thank the Egyptian Faculty of Education professors who participated in reviewing the national curriculum framework. Finally, I thank each and every MOETE administrator in all MOETE sectors as well as the MOETE subject counselors who participated in the process.

This transformation of Egypt's education system would not have been possible without the significant support of Egypt's current president, His Excellency President Abdel Fattah el-Sisi. Overhauling the education system is part of the president's vision of "rebuilding the Egyptian citizen" and it is closely coordinated with the ministries of Higher Education & Scientific Research, Culture, and Youth & Sports. Education 2.0 is only a part in a bigger national effort to propel Egypt to the ranks of developed countries and to ensure a great future to all of its citizens.

# WORDS FROM THE MINISTER OF EDUCATION & TECHNICAL EDUCATION

It is my great pleasure to celebrate this extraordinary moment in the history of Egypt where we continue to launch a new education system designed to prepare a new Egyptian citizen proud of his Egyptian, Arab, and African roots—a new citizen who is innovative, a critical thinker, able to understand and accept differences, competent in knowledge and life skills, able to learn for life and able to compete globally.

Egypt chose to invest in its new generations through building a transformative and modern education system consistent with international quality benchmarks. The new education system is designed to help our children and grandchildren enjoy a better future and to propel Egypt to the ranks of advanced countries in the near future.

The fulfillment of the Egyptian dream of transformation is indeed a joint responsibility among all of us; governmental institutions, parents, civil society, private sector and media. Here, I would like to acknowledge the critical role of our beloved teachers who are the role models for our children and who are the cornerstone of the intended transformation.

I ask every one of us to join hands towards this noble goal of transforming Egypt through education in order to restore Egyptian excellence, leadership and great civilization.

My warmest regards to our children who will begin this journey and my deepest respect and gratitude to our great teachers.

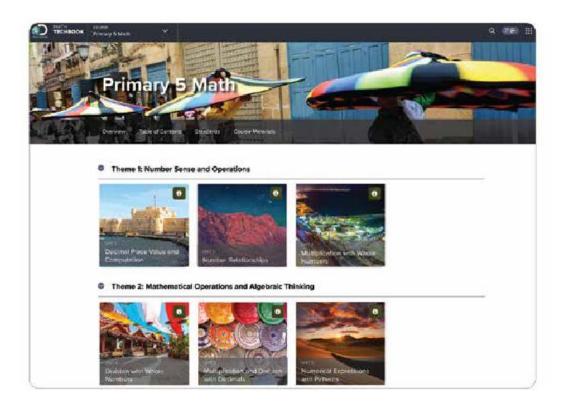
Dr. Tarek Galal Shawki

Minister of Education & Technical Education



#### Dear Parent/Guardian,

Welcome to Primary 5 Mathematics Techbook<sup>™</sup>! This comprehensive program inspires students to make sense of the world around them and to think and act like mathematicians. Throughout the digital and print program, students learn to reason mathematically, communicate using mathematical language, ask meaningful questions, solve complex problems, and work collaboratively with peers.



Primary 5 Mathematics Techbook was designed and written to teach to the Ministry of Education and Technical Education (MOETE) Primary 5 mathematics standards. The structure of Primary 5 Mathematics Techbook represents the Ministry's shifts in the Framework for Education 2.0, specifically focusing on accessing new and prior knowledge, building contextual understanding and procedural fluency, and making connections across mathematics to support application of skills and concepts. To help students make sense of mathematical content, the program also integrates a thematic approach and a variety of real-world scenarios.

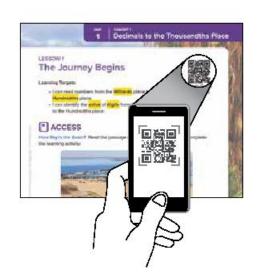
#### Dear Parent/Guardian, continued

Primary 5 Mathematics Techbook challenges students to build on what they learned in previous grades, applying concepts and skills in new ways. Students also learn new and complex concepts and skills that prepare them for the challenges of Primary 6 and beyond. Primary 5 students assume greater responsibility for their own learning and are encouraged to seek opportunities to apply the mathematics they are learning in the world around them.

The major work of Primary 5 includes multiplication and division of whole numbers, fractions, mixed numbers, and decimals, as well as numerical expressions. Students also explore patterns, coordinate planes, and pie charts. Although these may seem like separate topics, students investigate and apply patterns and relationships among the topics to build a deeper understanding of each. They explore relationships between fractions and decimals, connect their understanding of two-dimensional figures to coordinate grids, apply the inverse relationship between multiplication and division, and draw parallels between fractions, decimals, and pie charts. Students learn to think like mathematicians as they notice patterns and rules, persevere to solve challenging problems, represent and explain their thinking, model their solutions, and strive for accuracy.

To inspire and motivate learning and curiosity, Primary 5 Mathematics Techbook features clear and engaging text, videos, digital tools, and Hands-On Activities. Hands-On Activities require students to investigate patterns

and rules in mathematics and challenge them to communicate using mathematical language and models. The program also engages students in many kinds of writing and asks them to explain their reasoning and support their thinking using words, numbers, pictures, and symbols. When students engage in rich tasks that access prior knowledge and build reasoning, it is easier for them to make connections to the real world and to other mathematical learning.



Primary 5 Mathematics Techbook is divided into units. Each unit is divided into concepts, and each concept is divided into lessons. Each lesson has three main sections: ACCESS, BUILD, and CONNECT.

ACCESS Students activate their prior knowledge and begin to develop and express mathematical language.

BUILD Students focus on communicating their understanding, reasoning, evidence, and mathematical strategies.

**CONNECT** Students build deep conceptual understanding and a strong foundation for accessing knowledge in future lessons.

In addition, WRAP-UP, PRACTICE, and CHECK YOUR UNDERSTANDING features allow students to demonstrate their learning either verbally or in writing.

Within this Student Edition, you will find QR codes and Quick Codes that take you and your student to a corresponding section of Primary 5 Mathematics Techbook online.

We encourage you to support your student in using the print and online interactive materials on any device. Together, may you and your student enjoy a fantastic year of mathematics.

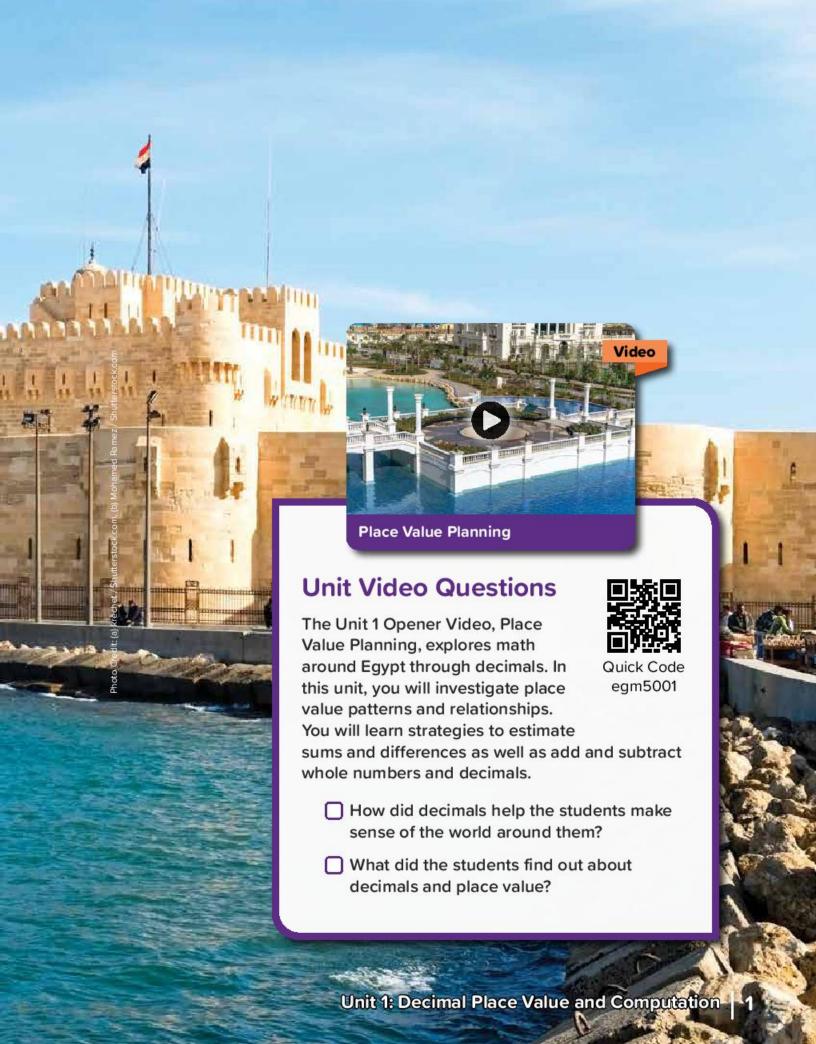
Sincerely,
The Math Team

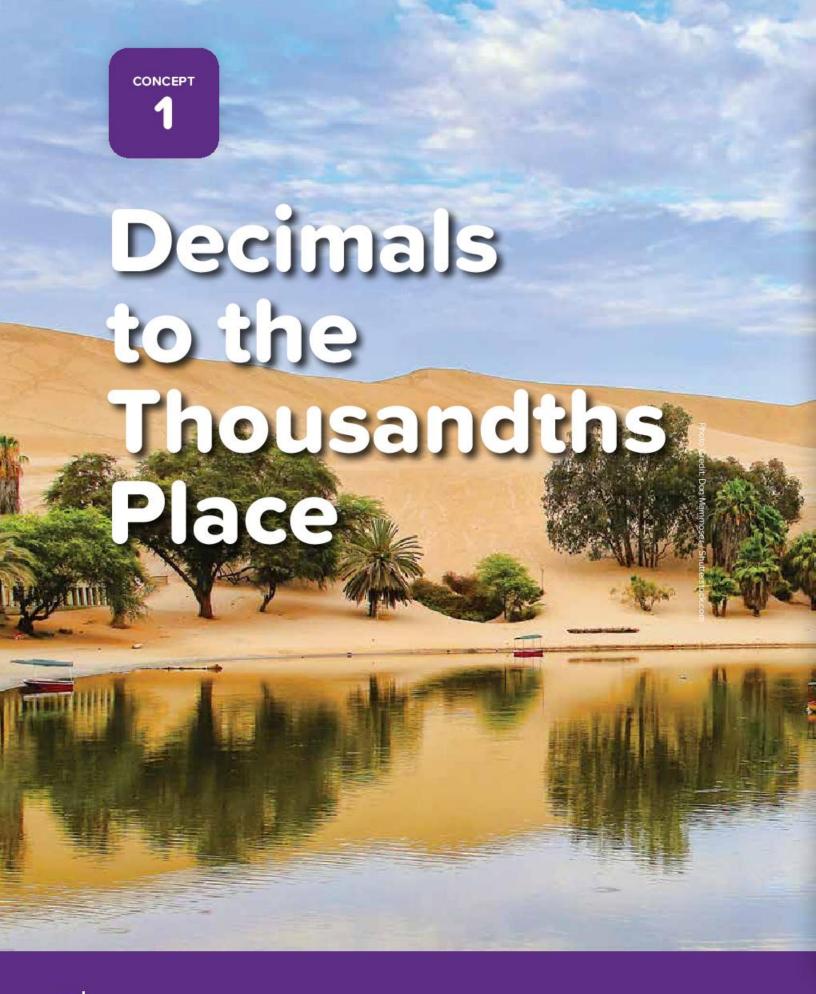
UNIT

Theme 1 | Number Sense and Operations

# Desimal Place Value and Computation







# The Journey Begins

#### **Learning Targets**

- I can read numbers from the Milliards place to the Hundredths place.
- I can identify the value of digits from the Milliards place to the Hundredths place.



Quick Code

# **ACCESS**

How Big Is the Basin? Read the passage and follow the directions to complete the learning activity.



For our first journey, we visit Fayoum. It is located south of Cairo and west of the Nile. It is a large basin, or low-lying area, estimated to have an area of about 6,069 square kilometers.

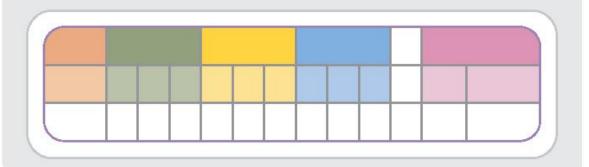
Using the information in the paragraph, write three other numbers that could be given as the approximate area of the basin. Remember to label the units.

## BUILD

The Value of Place Follow the directions to complete each problem.

Whiteboard: 1. Use the terms in the word bank to fill in the place values in the chart. You can abbreviate Ones (O), Tens (T), and Hundreds (H) so they fit in the boxes.

Hundreds	Hundreds	Hundreds	Hundredths
Milliards	Millions	Ones	Ones
Ones	Ones	Ones	Tens
Tens	Tens	Tenths	Thousands



- 2. In 734.28 the digit 8 is in the \_\_\_\_\_\_ place. Its value is \_\_\_\_\_.
- 3. In 452.09 the digit 5 is in the \_\_\_\_\_\_ place. Its value is \_\_\_\_\_
  - Whiteboard: 4. Write the following number in the place value chart: six hundred forty-two thousand, five hundred one, and fifty-one hundredths.

Milliards	N	lillior	าร	The	ousa	nds		Ones	5	•	Decimals
0	н	Т	0	н	Т	0	н	Т	0	•	Tenths Hundredths

Whiteboard: 5. Use the digits to create the greatest possible number. Record it in the place value chart.

Milliards	M	lillior	ıs	The	ousa	nds		Ones	5	٠	De	ecimals
0	н	т	0	н	т	0	н	т	o	•	Tenths	Hundredths

Whiteboard: 6. Use the digits to create the smallest possible number. Record it in the place value chart.

Milliards	N	lillior	ıs	The	ousa	nds		Ones		•	De	ecimals
0	н	т	0	н	т	0	н	т	o	•	Tenths	Hundredths

# CONNECT

Math around Egypt: the Fayoum Basin Review the passage about the Fayoum Basin and then answer the question.

How else could you use whole numbers or decimal numbers to describe the Fayoum Basin? You may use example numbers in your answer even if the numbers are not accurate in real life.

#### LESSON 2

# Decimals to the Thousandths Place



Quick Code egm5005

#### **Learning Targets**

- I can read decimal numbers to the Thousandths place.
- I can write decimal numbers to the Thousandths place.

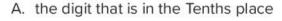
# **ACCESS**

Birds of the Fayoum Basin Read the passage, and then solve the problem.

Fayoum is a very popular birdwatching destination in Egypt. Birds migrate to the basin for the plants and waters of Qarun Lake. Qarun Lake is the largest saltwater lake in Egypt and one of the oldest natural lakes in the world. Some of the birds that can be seen at Qarun Lake are little grebes, grey herons, purple herons, little egrets, and great egrets.

The Purple Heron is the smaller of the two herons. It is tall at

70–90 centimeters, but it weighs only 0.50–1.35 kilograms. Below are the weights of three purple herons. For each number, record the following:



B. the digit that is in the Ones place

C. the digit that is in the Hundredths place

Bird One: 0.65 kilogram
Bird Two: 1.27 kilograms
Bird Three: 0.875 kilogram

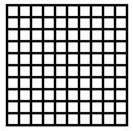


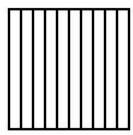
Photo Credit: (a) Don Mammoser / Shutterstock.com, (b) Hany Gewily / Shutterstock.com

#### BUILD

**Plotting Out a City for a Thousand** Read the problem and share your thinking with a Shoulder Partner.

Akram, a city planner, has two large square plots of land that were the same size. The first plot is divided into 10 equal plots of land for residents. The second one is divided into 100 equal plots of land. Then, Akram learns he must plan another square plot that has 1,000 equal pieces. How can he use the plot that is divided into 10 or the plot divided into 100 to make sure he has 1,000 equal parts? On which plot of land would you rather live? Why?



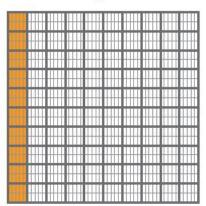


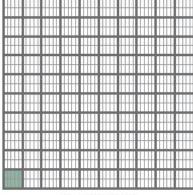
**Spin a Decimal** Practice modeling, reading, and writing decimals to the Thousandths.

#### Directions:

- Select three colors: one for Tenths, one for Hundredths, and one for Thousandths.
- Your teacher will spin a number for each decimal place. Shade in a grid to model the numbers your teacher spins. Be sure each decimal value is a different color.
- 3. Record the final decimal that the model represents. Compare your work with a partner and practice saying the decimal.

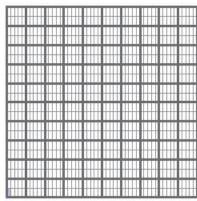
4. Repeat with a new grid.



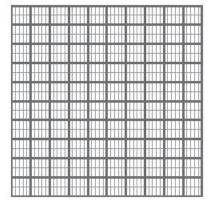


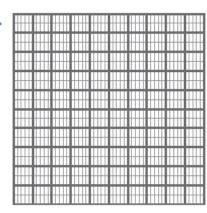
1 Tenth

1 Hundredth



1 Thousandth



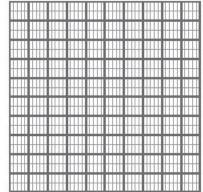


\_\_\_\_\_ Tenths \_\_\_\_\_ Hundredths \_\_\_\_\_ Thousandths.

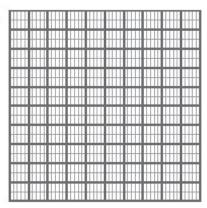
\_\_\_\_\_\_ Tenths \_\_\_\_\_ Hundredths \_\_\_\_\_ Thousandths

0. \_\_\_\_\_0. \_\_\_\_

3.



4.



 Tenths	Hundredths	Thousandths

\_\_\_\_\_\_ Tenths \_\_\_\_\_ Hundredths \_\_\_\_\_ Thousandths

0. \_\_\_\_\_ 0. \_\_\_\_



Math around Egypt: Gas Price Decimals Look at the list of different petrol prices in Egypt. Take turns with your Shoulder Partner reading each of the petrol prices aloud.

#### Gas Prices per Liter, April 2021

80 Octane petrol: 6.75 LE 92 Octane petrol: 8.00 LE 95 Octane petrol: 9.00 LE

- 1. Which type of petrol is the least expensive?
- 2. Which type of petrol is the most expensive?



## **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

#### LESSON 3

# Place Value Shuffle

#### **Learning Target**

 I can explain how a digit changes value as it moves to the left or right in a decimal or whole number.



egm5007

# **ACCESS**

Which Number Fits Which? Read the categories describing data about Fayoum. Decide which value best represents each category.

Categories	Values
1. Population	A. 112
Approximate square kilometers of Wadi El Rayan, a protected National Park	B. 30
3. Kilometers from Cairo	C. 3,615
4. Average Temperature in Celsius in the summer	D. 1,800

#### BUILD

Place Value Shuffle Talk with a partner about the questions. Be prepared to discuss your ideas with the class.

- 1. What would 3,615 become if it were increased by a factor of 10?
- 2. What expression could we write to represent this?
- 3. What is the relationship between the whole number 3,615 increasing by a factor of 10 (3,615  $\times$  10) and each digit within that number?

Ten Is a Powerful Number Use the place value charts to solve each problem. Fill in the blanks to show how the value of each digit also changed. An example is shown.

Example:  $57 \times 10 =$ 

Thousands		Ones		•	D	ecimals
o	н	Т	0	•	Tenths	Hundredths
		5	7	•	0	0
	5	7	0		0	0

The value of the whole number increased by a factor of 10.

The value of the <u>5 increased</u> by a factor of 10 from <u>50</u> to <u>500</u>.

The value of the  $\frac{7 \text{ increased}}{7 \text{ or } 70}$  by a factor of 10 from  $\frac{7}{10}$  to  $\frac{70}{10}$ .

1. 57 ÷ 10 =

Thousands		Ones		•	D	ecimals
o	н	т	o	•	Tenths	Hundredths

2. The value of the whole number \_\_\_\_\_ (increased/decreased)

by a factor of 10.

The value of the \_\_\_\_\_ (first digit) \_\_\_\_\_

(increased/decreased) by a factor of 10 from \_\_\_\_\_\_ to

The value of the \_\_\_\_\_ (second digit) \_\_\_\_\_

(increased/decreased) by a factor of 10 from \_\_\_\_\_\_ to

3. 6.5 × 10 =

Thousands	Ones		housands Ones		•	D	ecimals
0	н	T	0		Tenths	Hundredths	

4. The value of the whole number \_\_\_\_\_ (increased/decreased)

by a factor of 10.

The value of the \_\_\_\_\_ (first digit) \_\_\_\_\_

(increased/decreased) by a factor of 10 from \_\_\_\_\_\_ to

The value of the \_\_\_\_\_ (second digit) \_\_\_\_\_

(increased/decreased) by a factor of 10 from \_\_\_\_\_\_ to

**5.** 345 ÷ 10 =

Thousands	Ones			•	Decimals	
o	н	т	0		Tenths	Hundredths
	$\dagger$					

6. The value of the whole number \_\_\_\_\_ (increased/decreased)

by a factor of 10.

The value of the \_\_\_\_\_ (first digit) \_\_\_\_\_

(increased/decreased) by a factor of 10 from \_\_\_\_\_\_ to

The value of the	(second digit)	
	factor of 10 from	to
The value of the	(third digit)	<u></u>
(increased/decreased) by a	factor of 10 from	to

# **CONNECT**

Writing About Math Respond to the questions.

- 1. What did you notice about the relationship between the value of the entire number and the value of each digit as you multiplied and divided by 10?
- 2. What patterns exist in our place value number system?
- 3. What do you think happens if you move a number two places to the left? Use examples to show what you mean.



# **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

#### LESSON 4

# Composing and Decomposing Decimals



Quick Code egm5009

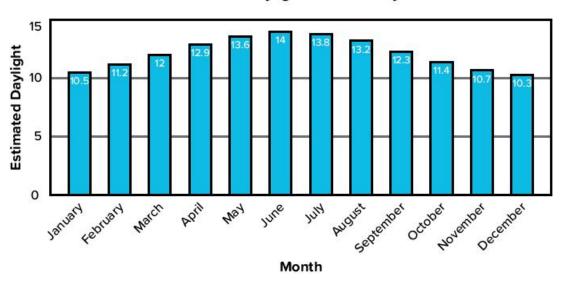
#### **Learning Target**

I can compose and decompose decimals in multiple ways.

# **ACCESS**

Daylight in Fayoum Use the bar graph to help you answer the questions.

#### **Estimated Daylight Hours in Fayoum**



- 1. You want to visit Fayoum for 5 months to gather data to create a map. Which five months have the most daylight?
- 2. Which month has a 5 in the Tenths place?
- 3. Which month has the most daylight?
- 4. Which months have 3s in the Ones place?
- 5. Which month has the least daylight?

#### BUILD

Decomposing Decimal Numbers Work with your teacher to find multiple ways to compose and decompose 12.42.

Thousands		Ones		•	Decimals	
o	н	T	0		Tenths	Hundredths
		1	2		4	2

$$10 + 2 + 0.4 + 0.02$$

How else could 12.42 be decomposed? Record your ideas.

Partner Practice For each problem, record the number in the place value chart. Work with your partner to decompose the number in expanded form and then in two other ways.

1. 34.527

Thousands	Ones			•		Decima	Is
o	н	Т	o	•	Tenths Hundredths Thou		Thousandths

2. 1<sup>st</sup> way (expanded form): \_\_\_\_\_

2<sup>nd</sup> way:

## **Decimals to the Thousandths Place**

3. 21.045

Thousands		Ones			Decima		ils	
o	н	Т	0	•	Tenths	Hundredths	Thousandths	

4. 1st way (expanded form): \_\_\_\_\_

2<sup>nd</sup> way:

3<sup>rd</sup> way: \_\_\_\_\_

**5.** 14.932

Thousands		Ones				,	
o	н	Т	0	•	Tenths	Hundredths	Thousandths

6. 1<sup>st</sup> way (expanded form): \_\_\_\_\_

2<sup>nd</sup> way: \_\_\_\_\_

3<sup>rd</sup> way: \_\_\_\_\_

7. 231.128

Thousands		Ones		•	Decima		als	
o	н	т	0	•	Tenths	Hundredths	Thousandths	
1								

3<sup>rd</sup> way: \_\_\_\_\_

9. 508.17

Thousands		Ones		•	Decima		ls	
o	н	Т	0		Tenths	Hundredths	Thousandths	

10. 1st way (expanded form):

2<sup>nd</sup> way:

3<sup>rd</sup> way:

# **CONNECT**

Record the Weather Read and respond to the questions.

Samir and Tahani recorded January's daily temperature in Fayoum. Their data said the approximate temperature for the month of January was 16.3°C.

Tahani said this temperature was "Sixteen and three tenths degrees Celsius." Samir read this temperature as "Sixteen and thirty hundredths degrees Celsius."

Who is correct? How do you know? What other ways could you write 16.3°C in standard form using what you know about decimal place value?



#### **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

#### **LESSON 5**

# **Comparing Decimals**

#### **Learning Target**

• I can compare decimals to the Thousandths place.



# []

# ACCESS

Comparing Temperatures at the Basin At the Fayoum Basin temperatures vary greatly. The numbers are the temperatures recorded on one day in May. All numbers are in degrees Celsius. Compare each set of numbers using the symbols for greater than (>), less than (<), or equal to (=).

1. 29.9° 30.2°

4. 35.2° \_\_\_ 34.7°

2. 36.5°\_\_\_\_35.6°

5. 38.80° \_\_\_\_ 38.8°

- 3. 40.5°\_\_\_\_41.0°
- 6. What strategy did you use to compare the temperatures?

### BUILD

Comparing Decimals Compare the decimal numbers using the symbols for greater than (>), less than (<), or equal to (=). Draw a place value table to help you, if needed.

- 1. 45.057 \_\_\_\_ 45.100
- 2. 98.013 \_\_\_\_ 98.101
- **3.** 50.009 \_\_\_\_ 50.100
- 4. 10.1 \_\_\_\_\_ 10.011
- **5.** 2.01 \_\_\_\_ 2.099
- 6. 34.5 \_\_\_\_ 34.500

1.401 1.341 1.440 1.055 1.3 1.30 1.28 1.49

8. Select the smallest number:

20.09 20.1 20.001 20.011 20.10 20.010 20.9 20.21

# **CONNECT**

Writing About Math Reflect on your learning about comparing decimals and answer the questions.

- Give an example of two decimal numbers where the number with more decimal digits is smaller than the other number.
- Give an example of two decimal numbers where the number with more decimal digits is equal to the other number.
- 3. What rule or rules could you create to help other students compare decimal numbers?





# **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

#### **LESSON 6**

# **Rounding Decimals**

#### **Learning Target**

 I can round numbers to the nearest Tenth, Hundredth, or Thousandth.



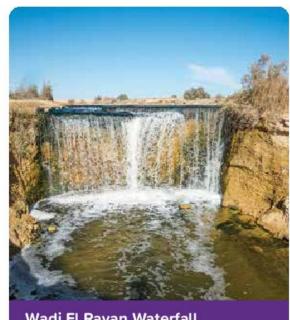
# ACCESS

Waterfall Region: Error Analysis Read about the Wadi El Rayan lakes and waterfalls. Then, complete the error analysis problem.

Southwest of Fayoum City is a region called the Valley of Wadi El Rayan. This region has two man-made lakes.

Water first reached the upper lake, which had an area of 50.90 square kilometers. Then, a stream flowed from the lake down through a deeper part of the basin and formed another lake with an area of 62.00 square kilometers.

A student wants to round the area of the upper lake to the nearest whole number. He rounds 50.90 square kilometers to 50.00 square kilometers.

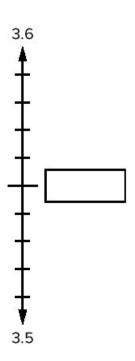


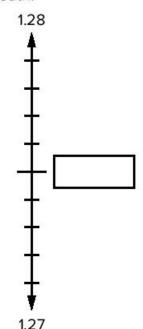
Wadi El Rayan Waterfall

- What did the student do correctly?
- 2. What did the student do incorrectly? Why do you think he made this error?
- 3. Try to solve the problem correctly. Explain your thinking.

Round and Round Label the midpoint of the number lines. Place the given decimal number at its proper location.

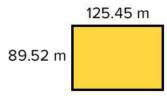
- 1. Round 3.54 to the nearest Tenth.
- 2. Round 1.277 to the nearest Hundredth.





**Strategic Rounding** Solve these problems using either the midpoint or Rounding Rule strategy.

 A farmer is building a new fence for her sheep field. She wants to build a fence around the whole field. Estimate how much fencing you think she will need by rounding each dimension to the nearest Tenth. Explain your thinking.



- 2. Mazen is planning a trip from Cairo to the waterfall region in Wadi El Rayan. He will travel 147.72 kilometers. Round the distance to the nearest Tenth.
- 3. Mazen stops to have a snack and stretch after driving 73.255 kilometers. Round the distance to the nearest Hundredth.

## **Decimals to the Thousandths Place**

4. Fill in the chart as you round the decimal to the stated place value.

Number	Round to the nearest whole number	Round to the nearest Tenth	Round to the nearest Hundredth
56.284			

# CONNECT

Math around Egypt: Waterfalls Read the passage, and then answer the question.

There are several cascades along the stream between the two lakes in Wadi El Rayan. The distance between the falls is approximately 30–35 meters, and the width of the island dividing the cascades is between 20 and 50 meters.

A geologist measured the exact distance between two of the falls at 31.45 meters and between two others at 36.921 meters. If both distances were rounded to the nearest whole number, would they fall into the range given in the passage? Explain your thinking.

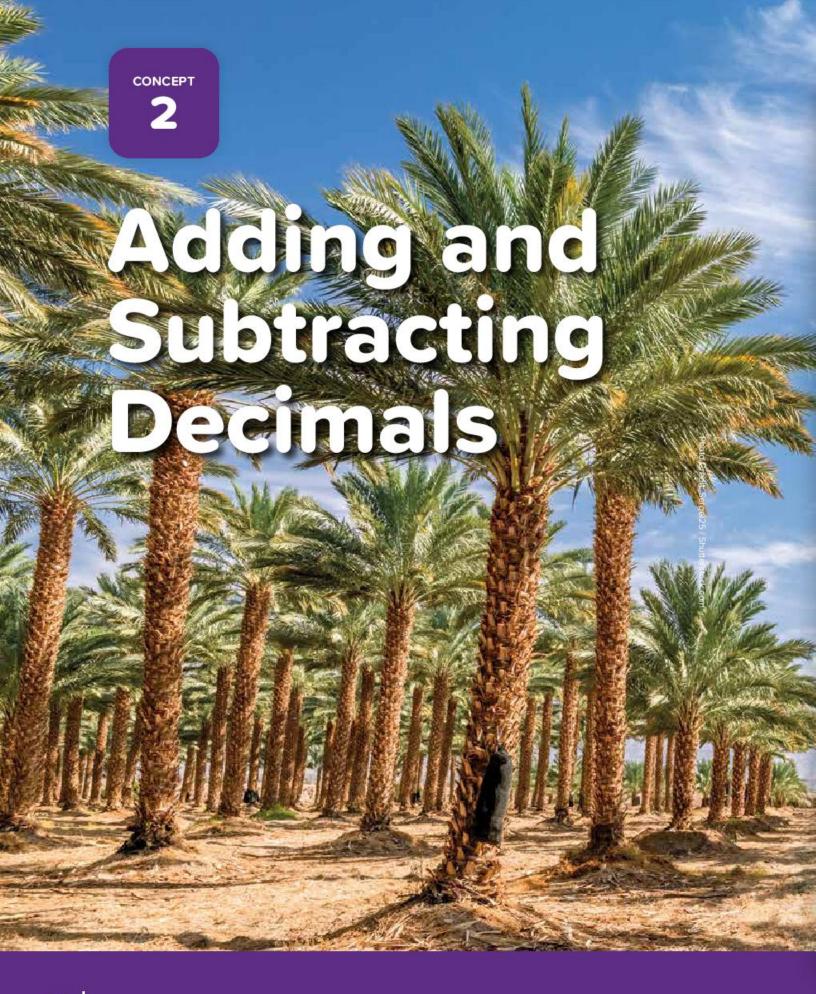




## **Check Your Understanding**

Follow your teacher's instructions to complete this activity.





#### **LESSON 7**

## **Estimating Decimal Sums**

#### **Learning Target**

• I can estimate sums of decimal numbers.



Quick Code egm5016



**Getting Close to a Whole** Respond to the prompts with as many ideas as you can. Be prepared to share your ideas.

- 1. List some numbers that are close to one, but less than a whole.
- 2. List some numbers that are not close to one and are less than a whole.

#### BUILD

**Easy Numbers** Work with your teacher to practice using benchmark numbers to estimate.

**Estimate Amounts** Estimate the sum. Be prepared to share how you estimated and why you chose that way.

2.361 + 3.783

Estimate: \_\_\_\_\_

Partner Practice You and your partner will work on estimating one problem at a time. Do not tell your partner your estimation strategy. When you are each done, compare and discuss your strategies and estimates.

## Estimation Strategies (Try to use as many as you can.)

Front-End Estimation Round to Ones Benchmark Decimals Round to Tenths Separate Wholes and Parts Round to Hundredths

1. 3.451 + 8.091

Estimate: \_\_\_\_\_

2.9.98 + 4.56

Estimate: \_\_\_\_\_

**3.** 4.981 + 5.019

Estimate: \_\_\_\_\_

4. Samar wanted to ride her bike 40 kilometers this week. By Thursday she had ridden 34.99 kilometers. On Friday she rode 4.01 kilometers. Estimate to see if she has met her goal.

Estimate: \_\_\_\_\_

Taha has 54.20 LE. His brother has 45.75 LE. They want to combine their money to purchase a box of apples for 100 LE. Estimate to see if they have enough money.

Estimate:

More Partner Practice According to ancient texts, the fertility of the Nile River banks has allowed farmers to grow date palms since as long ago as 2500 BC. Date palms continue to be a part of the geography and economy of modern-day Egypt. Working with a partner, use the data to answer the questions.



Governorate	Number of Date Palm Trees	Typical Mass of Date Palm Trees (kg)
Alexandria	25,062	97.16
Giza	456,939	134.76
Qena	285,825	60.99
New Valley	692,491	51.66

- Estimate the typical mass of date palms in the governorates of Alexandria and New Valley.
- 2. Would the combined typical mass of date palms in New Valley and Qena be greater than or less than the typical mass of the date palms in Giza?

## CONNECT

Math around Egypt: The Shadoof Read the passage and respond to the question.

The shadoof is an ancient tool that has been used by farmers along the Nile. With this tool, farmers can get water for the crops in their fields. A shadoof is made of a pole with a bucket attached to one end. The farmer submerses the bucket and a counterbalance then pulls it up. Although this device was created in ancient times, it is still used today in Egypt and in other areas.

If a farmer can lift 94.635 liters of water a minute in his shadoof, about how many liters can he lift in 4 minutes?





## **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

# hoto Credit: Serael25 / Shutterstock.com

## Modeling Decimal Addition

#### **Learning Target**

I can model decimal addition.

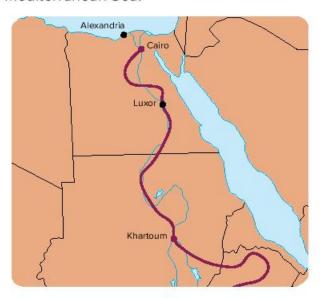


Quick Code egm5018



The Nile River Read the passage and respond to the question.

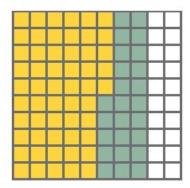
The Nile is the largest river system in the world. The Nile flows north more than 6,650 kilometers into the Mediterranean Sea, and 95 percent of Egyptians live within a few kilometers of the river. The Nile has two main tributaries: The White Nile and the Blue Nile that flow into the river. The confluence of these rivers is in Khartoum, Sudan, where they join to form the Nile. The river then flows north where it meets the Mediterranean Sea.



You are traveling from where the Nile River meets the Mediterranean Sea to the confluence of the Blue and White Nile in Khartoum. This is a distance of 2,406.69 kilometers.

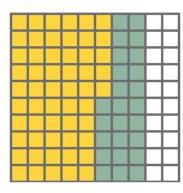
- 1. Round 2,406.69 to the nearest Thousand.
- 2. Round 2,406.69 to the nearest Hundred.
- 3. Round 2,406.69 to the nearest One.
- Round 2,406.69 to the nearest Tenth.

A Model Decimal There are two decimal numbers in the decimal model. One number is represented in yellow and the other is represented in green. Record the decimal numbers in the place value chart.

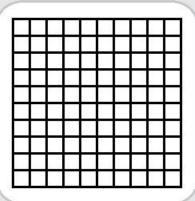


Thousands	Ones			housands Ones		•	D	ecimals
o	н	т	o	•	Tenths	Hundredths		
	†							

Express the Model Write an expression to match the model.



\_\_\_\_\_+\_



Record Decimals Record the two decimal numbers in the place value chart.

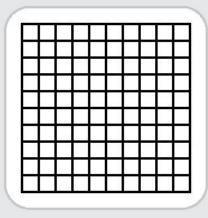
Thousands		Ones			Decimals		
0	н	Т	0	•	Tenths	Hundredths	
				-			

Decimal Addition Write an addition sentence using the decimal numbers chosen by you and your partner.

Model Makers Follow the directions to complete the problem.

Estimate: 0.13 + 0.23 \_\_\_\_\_

Whiteboard: Modeling Use two different colors to create a model of the expression 0.13 + 0.23.



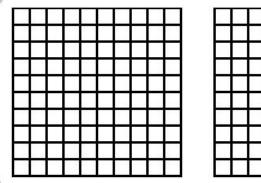
More Model Makers Follow the directions to complete the problems.

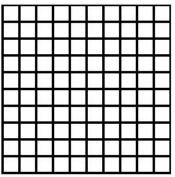
1. Record 0.13 and 0.23 in the place value chart.

Thousands	Ones			Ones •	•	D	ecimals
o	н	Т	0	•	Tenths	Hundredths	
	+-				7		

2. Evaluate: 0.13 + 0.23 = \_\_\_\_\_

3. Estimate: 0.97 + 0.42 \_\_\_\_\_



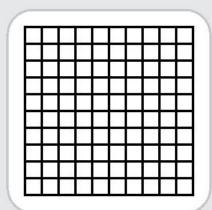


Evaluate More Follow the directions to complete the problems.

1. Record 0.97 and 0.42 in the place value chart.

Thousands	Ones			•	Decimals			
o	н	T	o	٠	Tenths	Hundredths		

- 2. Evaluate: 0.97 + 0.42 = \_\_\_\_\_
- 3. Estimate: 0.05 + 0.05 \_\_\_\_\_
  - Whiteboard: Model the Expression Use two different colors to create a model of the expression 0.05 + 0.05.



Solve Follow the directions to complete the problems.

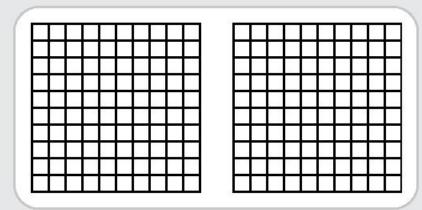
1. Record 0.05 and 0.05 in the place value chart.

Thousands	Ones			housands Ones		•	D	ecimals
o	н	Т	0	٠	Tenths	Hundredths		

2. Evaluate: 0.05 + 0.05 = \_\_\_\_\_

3. Estimate: 0.45 + 0.84 \_\_\_\_\_

Whiteboard: Model Another Expression Use two different colors to create a model of the expression 0.45 + 0.84.

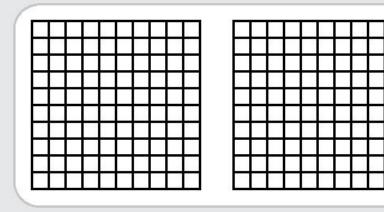


**Evaluate and Estimate** Follow the directions to complete the problems.

1. Record 0.45 and 0.84 in the place value chart.

Thousands	S Ones •		Ones			Decimals		
o	н	Т	0	•	Tenths	Hundredths		

- 2. Evaluate: 0.45 + 0.84 = \_\_\_\_\_
- 3. Estimate the sum: 0.92 + 0.89 \_\_\_\_\_
  - Whiteboard: Model the Expression Again Use two different colors to create a model of the expression 0.92 + 0.89.



Evaluate Again Follow the directions to complete the problems.

1. Record 0.92 and 0.89 in the place value chart.

Thousands	Ones			٠	Decimals		
o	Н	T	0	•1	Tenths	Hundredths	

Evaluate: 0.92 + 0.89 = \_\_\_\_\_

## **CONNECT**

Math around Egypt: The Source of the White Nile Read the passage, and then respond to the questions.



You will now travel from Khartoum to Juba in South Sudan to see the source of the White Nile. This trip is 1,941.2 kilometers. Juba is also on the bank of the White Nile. From Juba, you will travel on to Jinja, Uganda. It is a distance of 687.9 kilometers. Jinga is located near the source of the White Nile. How long is your journey from Khartoum to Jinja?

1. Copy the place value chart and record the addends.

Thousands		Ones		٠		Decima	Is
0	н	Т	0	•	Tenths	Hundredths	Thousandths

Write and solve an addition equation using the two decimal numbers.

# rgei25 / Shutterstock.com

#### LESSON 9

## Thinking Like a Mathematician

Quick Code egm5020

#### **Learning Targets**

- I can apply strategies to add decimals to the Thousandths place.
- · I can check the reasonableness of my answers.



Blue Nile versus White Nile Read the passage and then answer the question.

Compared to the White Nile, the Blue Nile is narrow and gets its name from the black sediment that it picks up as it travels. It is 1,450.02 kilometers long. The White Nile carries light gray sediment and is therefore lighter in color. The White Nile, including its tributaries, is 720 kilometers long.



Ali and Zeina want to find the length of both tributaries together. Ali wants to mentally find the sum of the two rivers. He rounds each number to the nearest Thousands place and says the length is about 5,000 kilometers. Zeina rounds each number to the Hundreds place and says the length is about 5,200 kilometers.

Find the actual answer to the total length of both rivers. Talk to a partner about who was closer to the actual sum and why.

#### BUILD

Regroup or Not Evaluate each sum. Identify each digit's place value. Finally, compare answers with a partner.

1. 4 Thousandths + 3 Thousandths = \_\_\_\_\_ Thousandths

Place value: \_\_\_\_\_ Hundredth(s) \_\_\_\_\_ Thousandth(s)

2. 7 Thousandths + 4 Thousandths = \_\_\_\_\_ Thousandth(s)

Place value: \_\_\_\_\_ Hundredth(s) \_\_\_\_\_ Thousandth(s)

3. 39 Thousandths + 5 Thousandths = \_\_\_\_\_ Thousandth(s)

Place value: \_\_\_\_\_ Hundredth(s) \_\_\_\_\_ Thousandth(s)

4. 3 Hundredths + 85 Thousandths = \_\_\_\_\_ Thousandth(s)

Place value: \_\_\_\_\_ Tenth(s) \_\_\_\_\_ Hundredth(s) \_\_\_\_\_ Thousandth(s)

**Spin a Sum** Play with a partner to practice estimating and adding decimals to the Thousandths. For each round, copy the place value table and recording sheet into your Math Notebook, and record your results.

#### Directions:

- 1. Each player spins all three spinners to create two decimal numbers and records their numbers in the place value chart.
- 2. Players use any strategy to estimate their sums and record their estimates.
- 3. Players find the actual sum of their problems.
- 4. Players record all of the sums and compare them using >, <, or =.
- The player with the highest sum wins.
- Players discuss how estimation helped them check the reasonableness of their answers.

Round: \_\_\_\_\_

Thousands		Ones		•		Decima	als		
o	Н	Т	o	•	Tenths	Hundredths	Thousandths		

My Estimated Sum: \_\_\_\_\_

My Actual Sum: \_\_\_\_\_

My Partner's Sum: \_\_\_\_\_

Compare the Sums: \_\_\_\_\_

## **CONNECT**

Writing About Math Reflect on your learning and respond to the questions.

- 1. How is adding decimals the same as adding whole numbers?
- 2. How is adding decimals different from whole numbers?



### **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

## Subtracting Decimals

#### **Learning Target**

· I can model decimal subtraction.





## **ACCESS**

**Fishing in the Nile Valley: Error Analysis** Read the paragraph and complete the error analysis.

Egyptians have been fishing since the beginning of civilization along the Nile and its tributaries. Today, many people still fish along the banks and in lakes like Lake Nassar. Tilapia and their predators—the Nile perch, tiger fish, and big catfish—live in Lake Nassar. Some even go on fishing safaris to catch the incredibly large fish that have thrived in this freshwater lake environment.

This Nile perch is 110 centimeters long and more than 5 years old. It weighs 113.39 kilograms.



This vundu catfish weighs 38.1 kilograms and is 188 centimeters long.

Wafaa wants to know the total mass of both the vundu catfish and the Nile perch example from the article. She decides to use the algorithm for addition. Here is Wafaa's work:

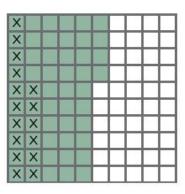


- 1. What did Wafaa do correctly?
- 2. What did Wafaa do incorrectly? Why do you think she made this error?
- 3. Try to solve the problem correctly.

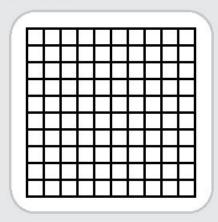
#### BUILD

Model Subtraction Follow the directions to solve the problems.

1. The shaded minuend is a decimal number. The x's represent the subtrahend, the number that is subtracted from the minuend. Use the model to solve the subtraction problem.



Whiteboard: 2. Shade a model to represent the minuend and add x's to represent the subtrahend.

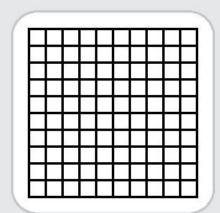


3. Write an expression to match the model. Then, use the model to evaluate the expression.

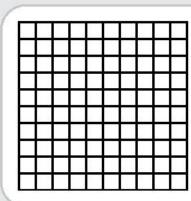
	X	X	X				
	X	X	X				Г
	X	X	X	П	$\Box$		Г
	X	X	X				Г
	X	X	X				Г
	X	X	X			A A	Г
	X	X	X		П		Г
	X	X					
	X	X					
X	X	X			П		Г

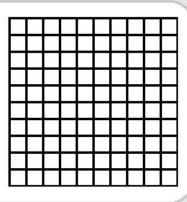
X						
X						
X					0, 8	Г
X	X					Г
X	X					
X	X					
X	X				0 0	
X	X	2 5				
X	X					
X	X					

Whiteboard: 5. Create a model to match the expression, and then evaluate:

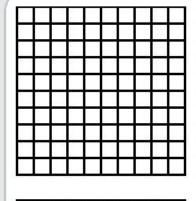


Whiteboard: 6. Create a model to match the expression, and then evaluate:

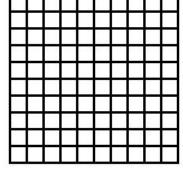


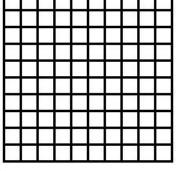


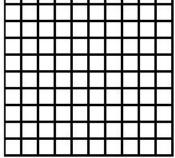
Whiteboard: 7. Create a model to match the expression, and then evaluate:



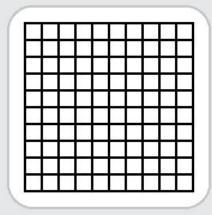
V 8	100	3 0		20 0		6 8
8 8	5 8			3 - 3		8 8
8 8	:= 3			S = 5		8 8
	- (0					
DE 90	8 .97	00 8	37 50	(9. :9	3	De - 50







Whiteboard: 1. Create a model for the expression: 0.2 - 0.05 =



Record the problem in the place value chart: 0.2 – 0.05 = \_

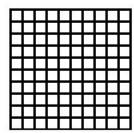
Thousands	Ones			•	Decimals		
o	н	Т	0	•	Tenths	Hundredths	Thousandths
0							

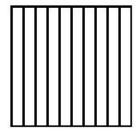
Use the model or place value chart to evaluate the expression:



#### **Writing About Math**

Explain why adding zeros to the right of the last non-zero digit in a decimal does not change its value. Use the models to help you write your explanation.





## **Estimating Decimal Differences**

#### **Learning Target**

I can estimate differences of decimal numbers.







The Nile Delta Read the passage and respond to the question.

As a river begins to descend into another body of water, it sometimes creates a wetland called a delta. Delta is the uppercase Greek letter written as  $\Delta$ . If you look at the map, you can see how the shape of the letter delta matches the green wetland at the mouth of the river Nile. The Nile Delta begins approximately 20 kilometers north of Cairo and continues 150 kilometers further north until it meets the Mediterranean Sea. About 45 million people live in the Nile Delta region. Al Sharqia is on the eastern edge of the delta. Approximately 7.78 million people live in Al Sharqia.

About how many people live in the Nile Delta, but do not live in Al Sharqia?



#### BUILD

A Closer Look at Close Numbers For Problems 1 and 2, use your assigned strategy to estimate the difference. For Problems 3 through 10, use the estimation strategy of your choice. Then, calculate the actual difference.

- 1. 2.419 1.240 Estimate: \_\_\_\_\_
- **2.** 35.9 10.8 Estimate: \_\_\_\_\_
- Estimate: 29.98 11.99 \_\_\_\_\_
- 4. Evaluate: 29.98 11.99 = \_\_\_\_\_
- Estimate: 0.97 0.82 \_\_\_\_\_
- Evaluate: 0.97 0.82 = \_\_\_



7. Papyrus once flourished along the banks of the Nile. The plant grows in shallow water marshlands in the Nile Delta and along the Nile Valley in low-lying areas. Maha and Ola are botanists studying the plants along the river Nile. They compare the height of papyrus in different study plots. Use their data table to answer the following questions.

	Height of	Papyrus in Diffe	rent Plots	
	Study Plot A	Study Plot B	Study Plot C	Study Plot D
Height in Meters	4.45 meters	4.15 meters	4.32 meters	5.05 meters

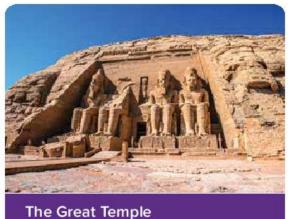
Estimate the difference between the heights of papyrus in Study Plot D and Study Plot B. \_\_\_\_\_

- 8. Evaluate: 5.05 4.15 = \_\_\_\_\_
- Estimate the difference between the height of the papyrus in Study Plot A and Study Plot C.
- 10. Evaluate: 4.45 4.32 = \_\_\_\_\_.

#### A Reason to Subtract

- Think of an example from real life where you would need to estimate the difference between 45.30 and 30.20. Write a story problem using the numbers.
- 2. Estimate: 45.30 30.20 \_\_\_\_\_
- 3. Evaluate: 45.30 30.20 = \_\_\_\_\_

Math around Egypt: Abu Simbel Read the passage and respond to the questions.





The Small Temple

Abu Simbel is a world-renowned archaeological site that has two temples, The Great Temple and The Small Temple. The temples were carved into the side of a mountain. Each statue at the Great Temple is about 21 meters tall. The Small Temple houses many statues that are each about 12 meters high. To protect them from flooding, the temples were cut into pieces weighing between 2.72 to 18.14 metric tons and moved. After being moved, they were put back together exactly as they had been. The project took almost 5 years and involved about 3,000 workers.

- Which word(s) indicate that an estimated number was used?
  - A. built in

C. might have been

B. about

D. weighing between

2. How much taller are the Great Temple statues than the Small Temple statues?



#### **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

#### LESSON 12

# **Subtracting to the Thousandths Place**



Quick Code egm5026

#### **Learning Targets**

- I can apply strategies to subtract decimals to the Thousandths place.
- I can check the reasonableness of my answers.

## **ACCESS**

A Deeper Dive into Deltas Read to learn more about deltas and then answer the question.

A delta is a landform created by sediment (sand, dirt, and rocks) carried along with the flow of a river until it reaches its mouth. River deltas are important in human civilization because they are major agricultural and population centers. They can provide defense for towns along the shore and impact drinking water supply. They also provide wetland habitats for a variety of species.

The Nile Delta was created by deposits and clay brought from the Ethiopian Plateau. It varies in thickness from 15.24 meters to 22.9 meters and makes up the most fertile soil in Africa. The delta plain extends 160.934 kilometers from north to south, and its widest east—west point is 249.448 kilometers between Damietta and Port Said.



Diaa and Ezz were looking at the different levels of thickness of the Nile Delta. They wanted to find the difference between the thickest part and the thinnest part. Ezz rounded and gave an estimate of 8 meters. Diaa solved the problem using the algorithm and found the actual answer to be 7.66 meters. Using Ezz's estimate as a benchmark, do you think Diaa's answer is reasonable? Why or why not?

#### BUILD

Taking Away Parts Evaluate each difference. Then identify each digit's place value when instructed. Finally, compare answers with a partner.

- 1. 8 Thousandths 5 Thousandths = \_\_\_\_\_ Thousandths
- 2. 57 Thousandths 12 Thousandths = \_\_\_\_\_ Thousandths

Place value: \_\_\_\_\_ Hundredths and \_\_\_\_\_ Thousandths

3. 32 Thousandths – 15 Thousandths = \_\_\_\_\_ Thousandths

Place value: \_\_\_\_\_ Hundredths and \_\_\_\_\_ Thousandths

4. 5 Hundredths – 24 Thousandths = \_\_\_\_\_ Thousandths

Place value: \_\_\_\_\_ Hundredths and \_\_\_\_\_ Thousandths

**Is It Reasonable?** Work with your teacher to estimate differences and check the reasonableness of answers.

**Spin a Difference** Play with a partner to practice estimating and subtracting decimals to the Thousandths. For each round, copy the place value table and recording sheet into your Math Notebook and record your results.

#### Directions:

- Each player spins all three spinners to create two decimal numbers and records their numbers in the place value chart. (The larger number must go on top.)
- Players use any strategy to estimate their differences and record their estimates.

- 3. Players find the actual differences.
- 4. Players record all of the differences and compare them using >, <, or =.
- 5. The player with the lowest difference wins.
- 6. Players discuss how estimation helped them check the reasonableness of their answers.

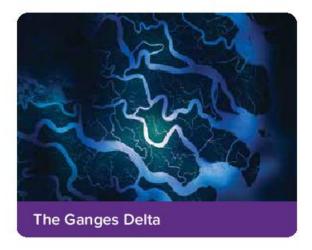
Recor	dina	Sheet
	- 3	

Round: \_\_\_\_\_

Thousands		Ones		٠		Decima	Is
o	н	Т	o	•	Tenths	Hundredths	Thousandths

My Estimated	Difference:	
--------------	-------------	--

Math around the World: River Deltas Read about two other famous deltas in the world and then answer the questions.





The Ganges Delta is another famous river delta. It is in the South Asia area of Bangladesh and India. The delta plain is about 350 kilometers wide along the Bay of Bengal. This delta is formed by sediment that washes down from the Himalayan mountains.

In North America, the Mississippi River flows south 3,778.74 kilometers from the state of Minnesota to the Gulf of Mexico. At its widest, the Mississippi Delta is 140.01 kilometers.

- Order the widths of the three deltas from narrowest to widest. (Nile = 249.448 kilometers wide)
- Find the difference between the width of the Ganges Delta and the width of the Nile Delta.



### **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

#### LESSON 13

## **Decimal Story Problems**

#### **Learning Target**

 I can add and subtract decimal numbers to the Thousandths place to solve story problems.



Quick Code egm5028

## **ACCESS**

Tahya Misr Bridge Read the passage and answer the questions.



The Tahya Misr Bridge was built in 2016 in Cairo. It serves as a connector across the Nile from northern and eastern Cairo to western Cairo. The bridge is 540 meters long and 67.3 meters wide. It holds the world record for the widest cable-stayed bridge in the world.

The longest cable-stayed bridge is the Jiaxing-Shaoxing Sea Bridge in Japan. Although it is the longest, it is 11.7 meters thinner than the Tahya Misr Bridge. How wide is the Jiaxing-Shaoxing Sea Bridge?

# ioto Credit: Sergei 25 / Shutterstock com

#### BUILD

**Bridges and Fish** Read the two problems and think about what the question is asking you to do. Do not solve yet but be prepared to share your thinking.

- 1. The Tahya Misr Bridge was built using 200 cranes. The cranes varied in size and weighed between 6.44 and 544.3 tons (1 ton = 1,000 kilograms). What is the difference between the lightest crane and the heaviest crane?
  - · What is this problem asking you to do?
  - What numbers will you need to solve this problem?
- 2. Rashad and his father went on a fishing trip to Lake Nassar. They each caught a huge vundu catfish. The first one weighed 53.25 kilograms and the smaller one weighed 46.8 kilograms. How much did the fish weigh in all?
  - What is this problem asking you to do?
  - What numbers will you need to solve this problem?

#### Decimal Story Problems For each problem,

- · read carefully and determine what is being asked
- write an equation to solve the word problem
- solve the problem and be sure to include units in your answer
- check the reasonableness of your answers
- The total length of the Tahya Misr Bridge is 16.7 kilometers and consists of five bridges that connect several areas. The longest of these bridges is the Shobra neighborhood bridge, followed by the Ring Road intersection bridge.
  - If Rami travels the length of the Tahya Misr Bridge and then returns, how many kilometers in total did he travel? Write an equation and your answer.
- 2. The total length of the Tahya Misr Bridge is 16.7 kilometers. Salem rode his bike along the pedestrian section of the bridge. He rode 3.25 kilometers before he had a flat tire. How many more kilometers does he need to travel?

#### More Decimal Story Problems For each problem, use the chart to help you

- read carefully and determine what is being asked
- write an equation to solve the word problem
- solve the problem and be sure to include units in your answer
- check the reasonableness of your answers

Nile River Fish				
Name	Length			
African Tigerfish	104.902 cm			
Eel Catfish (Mudfish)	32.7 cm			
Marbled Lungfish	201.168 cm			
African Knifefish	30.2 cm			

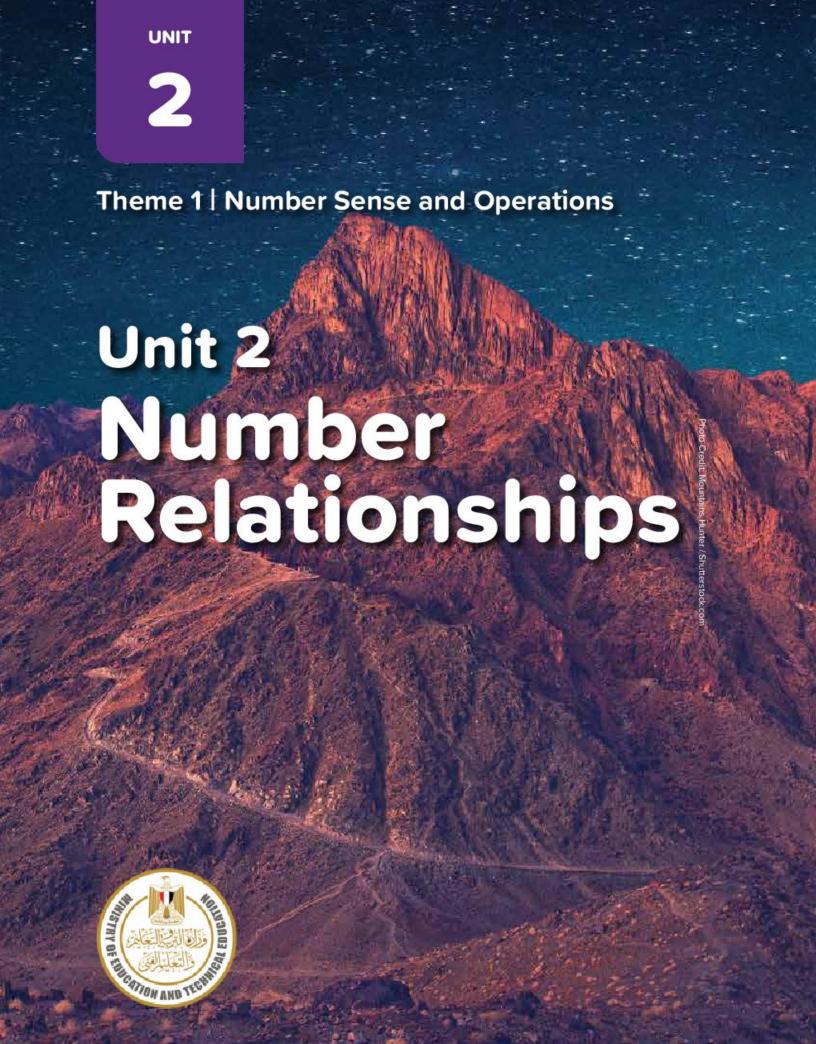
- 1. Ehab and his brother went fishing for 2 days. On the first day, they each caught an African tigerfish. On the second day, Ehab managed to catch a marbled lungfish. What is the total length of 2 tigerfishes and 1 marbled lungfish?
- 2. Basem is an ichthyologist. He was comparing the longest length of fish in the table to the shortest length of fish. What is the difference in length?
- 3. Basem collected a sample of three African knifefish. The first one was 29.28 centimeters, the second was 29.255 centimeters, and the third was 35.17 centimeters. What is the difference between the longest and the shortest fish in the sample?

## **CONNECT**

Math around the World: Famous Bridges Look at the data. Use the numbers from the chart to write a story problem. Swap problems with a partner and solve each other's story problems.

Bridge Name	Location	Width (in meters)	
Tahya Misr	Egypt	67.3	
Pont de Normandie	France	23.6	
Tatara Bridge	Japan	30.6	
Queensferry Crossing	United Kingdom	32.918	







**Grand Egyptian Multiples** 

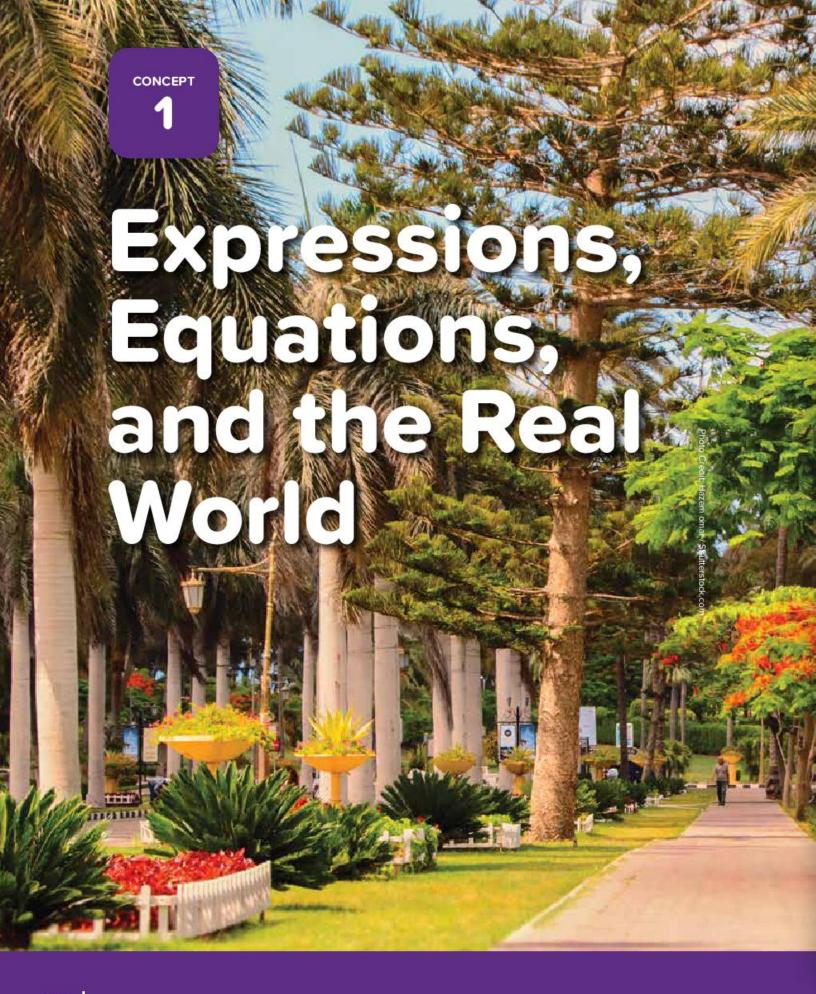
#### **Unit Video Questions**

The Unit 2 Opener Video, Grand
Egyptian Multiples, explores math
around Egypt through number
relationships. In this unit, you will
learn how numbers tell stories
about the world around you
through expressions and equations.
You will also explore relationships between
factors and multiples.

- How did the students use number relationships to make sense of the world around them?
- What did the students find out about factors and multiples?



Quick Code egm5031



# Expressions, Equations, and Variables



Quick Code egm5033

#### **Learning Targets**

- I can explain the difference between expressions and equations.
- I can explain why there might be an unknown in an expression or equation.
- I can use letters or symbols to represent unknowns in expressions and equations.



**East of Cairo** Work with your teacher to read the passage. Then, respond to the questions.



One of the major geographical regions in Egypt is Sinai Peninsula. A peninsula is a large area of land that is almost surrounded by water. Sinai Peninsula is triangular and has an area of about 60,000 square kilometers. It is connected to Africa on the west by the Gulf of Suez, which is approximately 275 kilometers long. On the east it is connected to Asia by Aqaba Gulf that is approximately 180 km long. There are approximately 600,000 people living on Sinai Peninsula.

- Mariam wrote two equations to compare the lengths of the two gulfs. Here are her equations.
  - 180 + x = 275
  - $\cdot$  275 180 = x

What does the letter x represent in these equations?

- A. the length in kilometers of one gulf
- B. the difference in kilometers between the two lengths
- C. the width of Sinai Peninsula
- D. the distance in kilometers between the gulfs
- If Mariam were to solve both of these equations correctly, what would be true? Select the two correct answers.
  - A. The value of x would be the same.
  - B. The answer to 275 180 would be 85 km.
  - C. The difference between the two lengths would be 95 km.
  - D. The distance in kilometers between the gulfs would be 95 km.

### BUILD

What Does the Variable Mean? Read each problem and determine what the variable represents.

- Basma wanted to write an equation with a variable to represent "12.5 plus a number equals 15." Which of the following would be correct?
  - A. 12.5 + 15 = x
  - B. 12.5 + x = 15
  - C. 15 + x = 12.5
  - D. 15 x = 12.5

- 2. Adham was comparing the heights of sand dunes in the northern part of Sinai Peninsula in meters. He wrote the equation 27 m 18 m = x. What does the x represent?
  - A. the height of one of the dunes in Sinai
  - B. the sum of the heights of two dunes in Sinai
  - C. the difference between the tallest and shortest sand dunes
  - D. the distance between the tallest and shortest sand dunes
- 3. If Farha knew that the sum of the heights of two sand dunes is 46 meters and one of the dunes is 18.25 m high, which equation could she write to find the unknown height? Select the two correct answers.

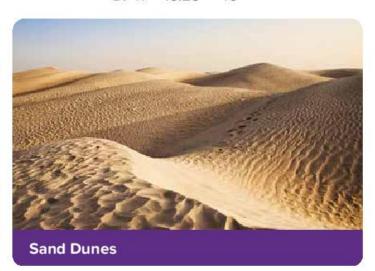
A. 
$$18.25 + x = 46$$

C. 
$$46 - 18.25 = x$$

B. 
$$18.25 + 46 = x$$

D. 
$$x - 18.25 = 46$$

- 4. Ehab wrote the equation 42.7 + 38.3 = x. If each of the numbers represents the height of one of the dunes, what does x represent?
  - A. the height difference between the dunes
  - B. the sum of the heights of both dunes
  - C. the height of the taller dune
  - D. the distance between the dunes



**Equations and Expressions** Work with your teacher and classmates to compare the problems. Look at the problems. How are they similar? How are they different?

$$3.6 + 1.6 = x$$

$$14.78 - 3.4$$

$$7.5 + 3.65$$

$$25.6 - 9$$

$$14 \times 7 = x$$

$$9 - x = 3.5$$

## Expressions, Equations, and the Real World

Equation or Expression? Check your understanding of equations and expressions.

1. Read the mathematical phrases. Sort them into Equations, Expressions, or Neither.

$$4.7 + 3.6 = M$$

$$\bullet$$
 6.4 + 3.2 + 8

$$\cdot$$
 125  $-$  27.3

• 
$$56 - x = 47.5$$

- 3.4 + L
- Aya ran a total of 8 km last week. She ran 3.75 km on Monday. How much did she run the rest of the week?
- 345.45 123.8 = x

$$\cdot$$
 3.5 + 2.456 = 2.5 + 3.456

· Amir had 3.5 kg of apples and 2.7 kg of figs.

$$\cdot$$
 7.3 + 4.5 + 2.3 = A

Equations	Expressions	Neither

# **CONNECT**

Writing About Math Read and respond to the questions. Be prepared to share your thinking.

1. Is 
$$4.5 + 6.25 = x$$
 the same as  $4.5 + 6.25 = M$ ? Why or why not?

2. Is 
$$2.34 + 6 = 1.34 + 7$$
? Why or why not?



### **Check Your Understanding**

## **Variables in Equations**

Quick Code egm5035

#### **Learning Target**

 I can apply the relationship between addition and subtraction to find the value of the unknown in an equation.

## **ACCESS**

**Number Talk** Use mental math to solve the problems provided by your teacher. Be prepared to share how you solved them.

### BUILD

**Into the Unknown** First, use mental math to estimate and then solve the equations. Use a place value chart, if needed.

1. 
$$8.23 + p = 10.24$$

**2.** 
$$T - 2.45 = 0.26$$

3. 
$$2.45 + n = 5.24$$

4. 
$$V + 42.89 = 100.01$$

5. 
$$h - 6.82 = 1.23$$

**6.** 
$$j - 12.40 = 3.01$$

7. 
$$5.52 + 2.01 + m = 9.21$$

8. 
$$2.30 + 3.10 = 1.50 + v$$

Lesson 2: Variables in Equations

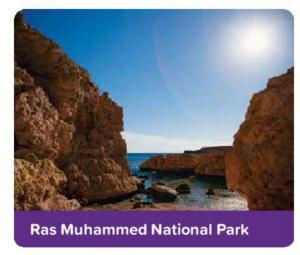
- 9. Faten wants to fill a bag with 0.50 kilogram of lettuce. Her bag weighs 0.38 kg. How many more kilograms of lettuce does she need?
  - What would the variable in the problem represent? Solve the problem.
- 10. Ezz ran three days last week. He ran 5.24 kilometers on Monday and 6.50 km on Wednesday. If he ran a total of 15 km for the week, how much did he run on Friday?

What would the variable in the problem represent? Solve the problem.

## CONNECT

Math around Egypt: Ras Muhammad National Park Work with your teacher to read the passage. Then, respond to the question.

The Ras Muhammad National Park is located in the south of Sinai Peninsula. The park has acacia trees, doum palms, and grasses. The area of the Red Sea inside the park has over 1,000 species of fish. It also has 220



both sea life and humans. The total area

species of coral reefs that are important to both sea life and humans. The total area of the park, including its marine and land surface area is 480 square kilometers. If the marine area is 345 km<sup>2</sup>, how large is the surface area of the land in the park?

- 1. What would the variable represent in this equation?
- Estimate the answer.
- Solve the problem.

## Finding the Unknown

#### **Learning Targets**

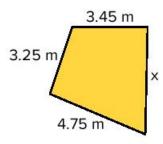
- I can solve equations involving decimal numbers to the Thousandths place.
- I can write equations to represent story problems with unknown quantities.



Quick Code

## **ACCESS**

**Variables in Perimeter** If the perimeter of this shape is 16.70 meters, what does x equal?



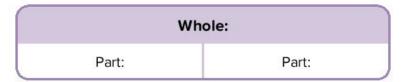
### BUILD

#### Variables in the Thousandths

- 1. 2.342 + n = 3.418
- 2. w 4.143 = 6.150
- 3. 5.253 + p = 10.420
- 4. c 3.425 = 2.520
- 5. 23.024 + k = 25.130
- **6.** x 1.241 = 0.213
- 7. 3.41 c = 1.782

## Expressions, Equations, and the Real World

**Writing Equations to Match** Write an equation to represent the story problems using *x* as the variable. Use a part-to-whole bar model (as shown) to help you. (You are not solving the equations at this time.)



1. Basem is taking a bus from Cairo to Ras Muhammad National Park to visit the coral reefs. The total journey is 492.64 kilometers. After 396.48 km, the bus stops in El Tor to pick up more passengers. How far is El Tor from Ras Muhammad National Park?

2. Basem and his friend Jana were snorkeling in Ras Muhammad National Park on the coral reef. Basem saw a hawksbill sea turtle that was 0.78 meter long. Jana saw a green turtle that was 0.58 m longer. How long was the green turtle?

3. In Jana's backpack she has a water bottle that weighs 1.5 kilograms, books that weigh 2.451 kg, and a snack. Her filled backpack weighs 4.535 kg. How much does her snack weigh?

4. At the market, Basem bought two melons for a total weight of 2.64 kilogram. If one melon weighed 1.36 kg, what was the weight of the other melon?



Math around Egypt: Coral Reefs Work with your teacher to read the passage. Then, answer the questions.



Coral reefs, like those in Ras Muhammad National Park, are very important to the planet. Like the rain forests in the Amazon, coral reefs are responsible for much of Earth's biodiversity, or variety of life. It is estimated that reefs contain 25 percent of all marine animals.

Can this problem be solved with addition, subtraction, or both?

Jana and Basem are taking a boat to dive the reefs. Their entire trip will last 3.5 hours. If it takes them 1.25 hr to prepare and get to the reef, how long will they have to dive?



## **Check Your Understanding**

## **Telling Stories with Numbers**

#### **Learning Targets**

- I can write story problems involving addition and subtraction of decimal numbers.
- I can solve equations involving decimal numbers to the Thousandths place.



Quick Code egm5039

## **ACCESS**

Error Analysis Read the problem and complete the error analysis.

Most years, the northern region of Sinai Peninsula gets 12.5 centimeters of precipitation in the winter. Last year it received only 9.17 cm. What is the difference between the two amounts?

Taha read this problem, wrote the following equation, and solved it. Analyze Taha's work. Identify what he did correctly and incorrectly, then try to solve the problem.

$$12.5 + 9.17 = x$$

$$x = 21.67 \text{ cm}$$

- 1. What did the student do correctly?
- 2. What did the student do incorrectly? Why do you think he made this error?
- 3. Try to solve the equation 12.5 + 9.17 = x. Is this the correct equation to solve the problem? Explain your thinking.

### BUILD

What Is the Equation? Read the story problems and follow the directions given by your teacher.

- A. Ola needed 10 meters of wood to build a garden bed. She found 3.5 m in her garage. How many more meters of wood does she need for the bed?
- B. Nagi is training for a race. Each day of the week he runs 3.5 kilometers. If he runs for 10 days, how far will he have run?

Work with a partner to write a story problem that is modeled by this equation: 2.8 + 1.5 = C.

- 1. Write a story problem for the equation and then solve: x + 2.75 = 12.5.
- 2. Write a story problem for the equation and then solve: 124.6 72.25 = m.
- 3. Write a story problem for the equation and then solve: 34.750 s = 15.25.

## CONNECT

#### Math around Egypt: Mount Sinai

Work with your teacher to read the passage. Then, answer the questions.

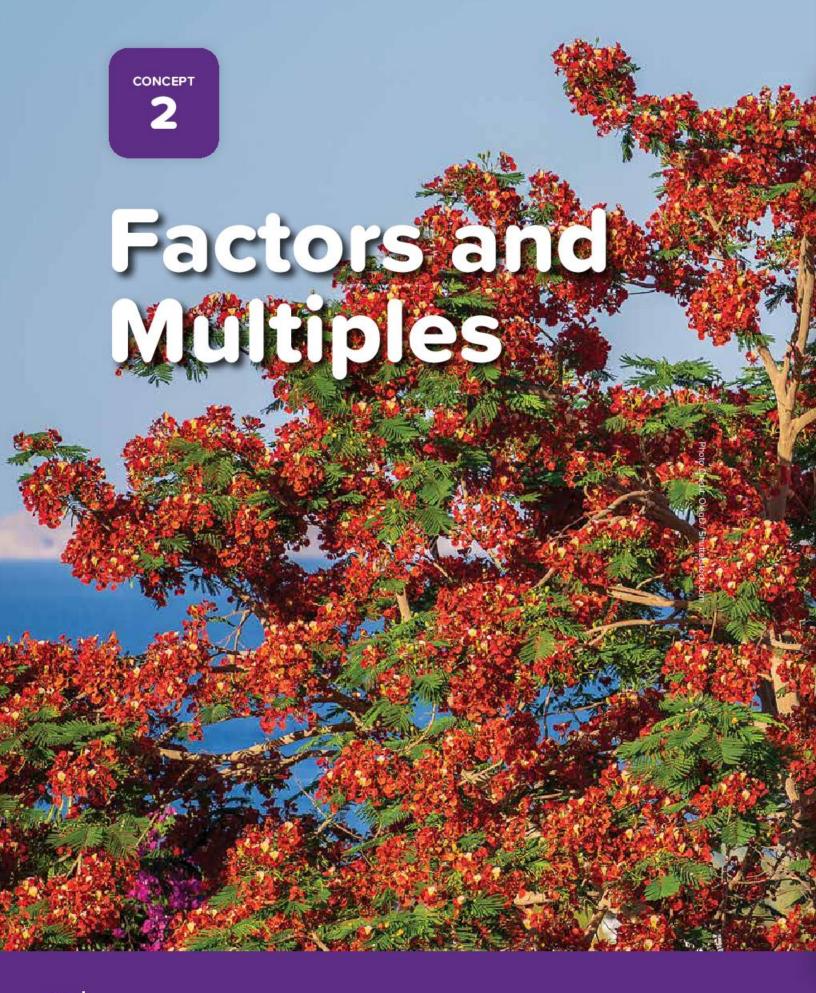
Tens of thousands of visitors travel each year to climb Jebel Mūsā, or Mount Sinai. There are two paths to reach the summit. The first path can take anywhere from  $\frac{3}{4}$  of an hour to 3 hours to climb. The second path usually takes about 2.5 hr to walk.



Use the information in the passage to write a story problem to match the equation, and then solve: 1.25 + x = 2.5.



## **Check Your Understanding**





## **LESSON 5 Finding Factors**

#### **Learning Targets**

- I can explain the meaning of factors.
- I can identify the factors of a given number.



egm5042



Crossing Sinai Read the passage and respond to the questions.



**Beach Resort** 

Most cities in Sinai are along the coast of Sinai Peninsula. Some of the cities are popular holiday destinations.



- 1. A bicycle race was planned from Sharm El Sheikh to Taba along the Gulf of Aqaba. The distance by road is about 220 kilometers. The riders wanted to break up the ride into equal, whole-kilometer portions for rest and water stops. Which of the following distances would divide the entire ride into equal, whole-kilometer distances? Choose the two distances that the riders could use.
  - A. 10 km
  - B. 12 km
  - C. 20 km
  - D. 25 km
  - E. 50 km
- 2. What other ways could the distance be divided into equal parts?

### BUILD

What Is a Factor? Follow your teacher's directions to complete the problems.

 Look at the chart and talk to a partner about what you notice. What patterns do you see? Record your thinking.

91	92	93	94	95	96	97	98	99	<u>@</u>
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	<b>62</b>	53	54	55	<u>56</u>	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	39	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Number	Is 2 a factor?	Is 5 a factor?	Is 4 a factor?
A. 40	Yes No	Yes No	Yes No
B. 12	Yes No	Yes No	Yes No
C. 35	Yes No	Yes No	Yes No
D. 17	Yes No	Yes No	Yes No

- 3. List all of the factors of 15.
- 4. Fill in the missing factors represented by the variables.

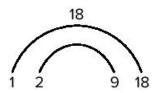
$$4 \times m = 16$$

$$v \times 15 = 45$$

$$6 \times t = 42$$

$$p \times 9 = 72$$

5. Ahmed created this factor rainbow for 18. What factors did he forget?



- A. 8 and 10
- B. 5 and 3
- C. 4 and 4
- D. 3 and 6



- 6. Azza was traveling from St. Katerine to El Tor on the coast. She made 24 cookies for the trip and wants to put them into bags for her siblings. Choose the set that lists ways she could divide the cookies into bags without any leftovers.
  - A. 2, 4, 5, 6, and 8 bags
  - B. 3, 5, 7, 10, and 12 bags
  - C. 2, 3, 4, 6, 8, and 12 bags
  - D. 3, 4, 6, 10, and 12 bags
- 7. Osman was trying to determine all of the factors of 17. The only factor pair he could find was 1 and 17. Did he find all the factors? How do you know?



Math around Egypt: Gulf of Suez Work with your teacher to read the passage. Then, answer the questions.

The Gulf of Suez is the northwest arm of the Red Sea between Africa and Sinai Peninsula. The approximate length of the Gulf of Suez from its mouth at the Strait of Jubal to its head at the city of Suez is 314 kilometers. It



varies in width from 19 km to 32 km and is linked to the Mediterranean Sea by the Suez Canal. The gulf is an important shipping route.

- 1. Could you divide the width of 19 kilometers into smaller equal distances? What would the length of each distance be?
- 2. Could you divide the width of 32 kilometers into smaller equal distances? What would the lengths of some of the distances be?
- 3. How is finding factors similar to dividing numbers into equal parts?



### **Check Your Understanding**



## **Prime Factorization**

#### **Learning Target**

I can use a factor tree to identify the prime factors of a given number.



Quick Code egm5044



**Prime versus Composite** Read the question and choose the answer from the options given.

What is the best explanation for the difference between prime and composite numbers?

- A. A prime number has only 2 factors: 1 and itself. A composite number has more than two factors.
- B. A prime number has only 1 as a factor and a composite number has two factors.
- C. A prime number has only 2 factors. A composite number has 4 or more factors.
- D. A prime number can be factored in more than one way. A composite number can be factored in only one way.

Prime or Composite Pop Up Play the game as directed.

#### Directions:

- Your teacher will say a number.
- If it is a prime number, pop up (stand).
- If the number is composite, stay seated and then share a factor pair other than 1 and the number with a partner.



### BUILD

Whiteboard: Exploring Factor Trees Work with your teacher to complete the factor trees.

Complete the factor trees by filling in the missing factors in your journal or using the digital tool.





### Whiteboard: Prime Factorization

- · Complete each of the factor trees (one of the factors is already listed).
- · Decompose the composite factors until only prime numbers remain.
- · Circle the prime factors. Draw a square around the composite factors.
- Record the prime factorization for each factor tree. (Example:  $24 = 2 \times 2 \times 2 \times 3$ )

1. 18

2. 20

3. 75

**Products of Prime Factors** Find the product of the prime factorization listed. Then, list all other factors of the product.

1. 2 × 2 × 5 = \_\_\_\_\_

Other factors:

2. 2×3×7 = \_\_\_\_\_

Other factors:

3. 2×2×2×7 = \_\_\_\_\_

Other factors:



Math around Egypt: The Suez Canal Work with your teacher to read the passage. Then, answer the questions.



At the northern edge of the Gulf of Suez lies the Suez Canal. The Suez Canal extends 193 kilometers and cuts thousands of miles from the shipping routes between Europe and Asia. Before the canal was built, ships had to sail all the way around the southern tip of Africa. Now, they can pass directly from the Red Sea to the Mediterranean Sea.

- 1. It takes 12 to 16 hours for a ship to go through the canal. Akram was curious. If a ship takes 12 hr and travels 193 kilometers, can it go an equal distance each hour? To solve the problem, he needs to know if 12 is a factor of 193. He makes a factor tree starting with 1 and 193. Basem told him the factor tree would not help him answer his question. Is Basem correct or incorrect? Why?
- 2. Is 193 prime or composite?
- 3. Is 12 a factor of 193? How do you know?
- 4. Is 1 prime or composite or neither? Why?



### **Check Your Understanding**



## **Greatest Common Factors**

#### **Learning Targets**

- I can use factor trees to identify common factors of two whole numbers.
- I can use factor trees to identify the greatest common factor of two whole numbers.



Quick Code egm5046

## **ACCESS**

**Diving in the Red Sea** Work with your teacher to read the passage and respond to the questions.



Scuba diving is a popular tourist attraction in the Red Sea. One of the more popular dives is to an 80-meter-long steamship that sank in 1876 when it got stuck on a reef south of Sharm El Sheikh. The crew worked for 14 hours to dislodge the boat, but it capsized and sank to the seabed 30 meters below. The interior of the ship is filled with soft corals, black corals, and a variety of fish. The outside of the ship is covered with hard corals, and a variety of fish can be found swimming inside and outside the ship.



- A. 2 m, 3 m, 5 m
- B. 2 m, 3 m, 5 m, 6 m
- C. 2 m, 3 m, 5 m, 6 m, 10 m, 15 m
- D. 2 m, 3 m, 5 m, 6 m, 10 m, 12 m
- Taha dove to the hull at a depth of 15 meters. What are the options of intervals he could take? (Stopping every 1 m is not practical, nor is going the entire distance.)
  - A. 3 m, 5 m
  - B. 2 m, 3 m, 5 m
  - C. 2 m, 3 m, 5 m, 6 m
  - D. 2 m, 3 m, 5 m, 6 m, 10 m

**Challenge** If both divers stop at equivalent equal intervals, what is the greatest distance they can both dive before stopping?

- A. 2 m
- B. 3 m
- C. 5 m
- D. 10 m

### BUILD

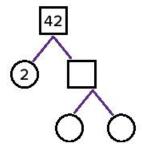
What Do They Have in Common? Read and complete each problem.

- List the factors of 20.
- 2. List the factors of 28.
- 3. What is the product of the following prime numbers?  $2 \times 3 \times 3 =$
- **4.** What is the product of the following prime numbers?  $3 \times 3 \times 5 =$



Greatest Common Factors Work independently to complete the problems.

- 1. List the factors of 42.
- 2. Complete the factor tree for 42 and write out the prime factorization.



- 3. Find the value of  $n: n = 2 \times 2 \times 7$
- 4. What are common factors of 42 and n?
- **5.** What is the greatest common factor of 42 and *n*?
- 6. Two groups took public transportation in Sharm El Sheik. Each ticket costs the same amount of money. One group spends 16 LE and the other group spends 12 LE. At most, how much does each ticket cost? (Hint: Use the GCF.)
  - A. 2 LE
  - B. 4LE
  - C. 6 LE
  - D. 8 LE

## CONNECT

Writing About Math Explain in your own words what you know about prime factorization and how it helps you find the greatest common factor of two numbers. What relationships are revealed by breaking numbers into factors?



### **Check Your Understanding**



# Identifying Multiples

Quick Code egm5048

#### **Learning Targets**

- I can explain the meaning of multiples.
- I can identify common multiples of two whole numbers up to 12.

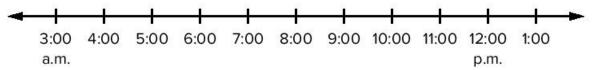
## <sup>o</sup> ACCESS

Ras Abu Galum Work with your teacher to read the passage. Then, answer the questions.



In the northeast corner of Sinai, along the Gulf of Aqaba, is the Ras Abu Galum Protectorate. This part of Sinai is unique because it has a variety of terrain and habitats. There are mountains, coral reefs, lagoons, deserts, and mangrove trees.

1. Omar wants to take the bus to visit this region. During the week, a bus leaves for Ras Abu Galum at 3 a.m. Additional buses leave every 3 hours. The last bus leaves at 12 p.m. What times can Omar catch the bus?





2. On the weekend, the first bus leaves for Ras Abu Galum at 6 a.m. Additional buses leave every 2 hours until 12 p.m. What times can Omar catch the weekend bus?



3. What times can Omar always catch a bus, whether it is a weekday or the weekend?

### BUILD

Skipping Along Complete the following.

- 1. List the first five multiples of 6.
- 2. List the first six multiples of 7.
- 3. List eight multiples of 10.
- 4. Adel is buying cartons of eggs and bottles of juice at the supermarket to make breakfast for friends. Each carton contains 12 eggs. Complete the chart for Adel.

Cartons	1	2	3	4	5	6
Eggs	12					

5. The juice comes in packs of 9. Complete the chart for Adel.

Packs	1	2	3	4	5	6
Juice	9					

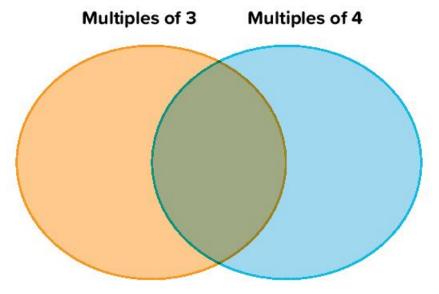
6. If Adel is buying enough eggs and juice for 36 people, how many cartons of eggs and packs of juice will he need to buy for each guest to have 1 egg and 1 juice?

Common Multiples Complete the following.

1. List the first five multiples of 5.



- 2. List the first ten multiples of 2.
- 3. What common multiples of 2 and 5 did you list?
- 4. List the first five multiples of 8.
- 5. List the first six multiples of 4.
- 6. List the first five multiples of 6.
- 7. What common multiples of 8, 4, and 6 did you list?
- 8. List the first twelve multiples of 3.
- 9. List the first twelve multiples of 4.
- 10. What common multiples of 3 and 4 did you list?
- 11. Use this information to fill in the Venn Diagram for the first 12 multiples of 3 and 4, placing the common multiples in the shared center.





- 12. Select the three numbers that are NOT common multiples of 5 and 7.
  - A. 14

C. 35

E. 70

B. 21

D. 55

- F. 105
- 13. Select the three numbers for which 24 and 32 are common multiples.
  - A. 2

C. 4

E. 7

B. 3

D. 6

- F. 8
- **14.** Doha and her little brother are laying out train tracks. Each train track is 12 centimeters long. How long are the first 5 pieces of track laid end to end?
- **15.** How many pieces of track would Doha and her brother need to make the same distance from Problem 14 if the track pieces were 4 centimeters long?

## CONNECT



Writing About Math Read the question and respond in your math notebook. Be prepared to share your thinking with the class.

Aya thinks a number can have unlimited multiples but a limited number of factors. Do you agree or disagree? Explain your thinking.



### **Check Your Understanding**



## **Least Common Multiple**

Quick Code egm5050

#### **Learning Targets**

- I can explain the meaning of least common multiple.
- I can identify the least common multiple of two whole numbers up to 12.

## **ACCESS**

**Vocabulary Check-In** Fill in the blanks with the vocabulary terms from the word bank. You may use a term more than once.

prime	factor	one
composite number	product	multiples

- 1. A \_\_\_\_\_ is a number with more than one set of factor pairs.
- 2. A \_\_\_\_\_ is a number multiplied by another number to find a product.
- 3. Skip counting is a way to find \_\_\_\_\_ of a number.
- 4. \_\_\_\_\_ is a factor of all numbers.
- 5. A \_\_\_\_\_ number's only factor pair is one and itself.
- 6. A \_\_\_\_\_ is the answer to a multiplication problem.



Using Vocabulary Complete the following.

- 1. Give an example of a prime number.
- 2. Write a multiplication equation. Label the factors and the product.
- Give an example of a composite number with at least two factor pairs. Write the factor pairs for the number.

### BUILD

1. 6 and 9

Least Common Multiple List at least three multiples of each number, then find the least common multiple (LCM) for each pair of numbers. If you do not find the LCM in the first three multiples, continue to list multiples until you find one.


2. 2 and 3

Multiples of 6: \_\_\_\_\_

Multiples of 2: \_\_\_\_\_

Multiples of 9: \_\_\_\_\_

Multiples of 3: \_\_\_\_\_

LCM: \_\_\_\_\_

LCM: \_\_\_\_\_



2	10	and	-

Multiples of 10:

Multiples of 5: \_\_\_\_\_

LCM: \_\_\_\_\_

5. 5 and 11

Multiples of 5: \_\_\_\_\_

Multiples of 11: \_\_\_\_\_

LCM: \_\_\_\_\_

#### 4. 3 and 8

Multiples of 3:

Multiples of 8: \_\_\_\_\_

LCM: \_\_\_\_\_

#### 6. 5 and 6

Multiples of 5: \_\_\_\_\_

Multiples of 6: \_\_\_\_\_

LCM: \_\_\_\_\_

Challenge Find the LCM of 7, 6, and 12.

## 2



**LCMs in the Real World** List multiples to solve the problems. Fill in the charts and use the information to help you solve the problems.

1. Badr is buying kofta and aish baladi for his birthday party. The kofta is sold in packages of 3. The bakery sells the aish baladi in packages of 12. Badr wants to have exactly the same number of each. What is the minimum number of kofta and aish baladi he should buy?

Package	1	
Kofta	3	
_		
Package	1	

2. Hend and Jana are biking around a small lake. Hend makes a complete lap around the lake in 6 minutes. It takes her younger sister, Jana, 8 minutes to finish one lap. If Hend and Jana continue to bike around the lake at the same rate, how many minutes will it take for them to come together at the starting point again?

Lap	1		
Hend	6		
Lap	1		
Jana	8		



#### Math around Egypt: Mangroves

Work with your teacher to read the passage. Then, answer the question.

Mangrove trees grow in the Ras Abu
Galum Protectorate and other areas of
Egypt. Mangrove trees are important
to our environment. The trees help
filter out pollutants from water, protect
coastlines, and act as breeding
grounds for many different types of
sea life.



In one garden, Nada digs a hole to plant a mangrove seedling every 4 days. In a second garden, she plants a seedling every 6 days. If she plants seedlings in both gardens today, in how many days will she plant seeds again in both gardens on the same day?

Use the tables as needed.

Garden 1			
Day			
Garden 2			
Day			



### **Check Your Understanding**



## Factors or Multiples?

#### **Learning Targets**

- I can explain the difference between factors and multiples.
- I can identify the greatest common factor and least common multiple of two given numbers.



Quick Code

## **ACCESS**

**Sinai Trail** Work with your teacher to read the passage. Then, answer the questions.



Construction began on Sinai Trail in 2015. It is the first long distance hiking trail in Egypt. The original plan was a 220-kilometer route. The project's construction employed members of three Bedouin tribes. However, the Bedouin wanted the trail to encompass more of Sinai. So, after two more years of trail development, the trail was extended to a length of 550 km. The trail winds from the Gulf of Aqaba to the top of Mount Saint Catherine. The mountain is the highest in Egypt. Many Egyptians and visitors from around the world have hiked the trail.

Mohamed is training to hike Sinai Trail. For part of his training, he goes hiking every 7 days and lifts weights every 4 days. He did both types of exercise today. How many days from now will he both go hiking and lift weights?



### BUILD

Factors and Multiples Discuss the questions with your Shoulder Partner and then solve.

What are two factors that 12 and 8 share? What are two multiples that they share? What do you notice? Find their LCM and GCF.

Greatest and Least Find the GCF and LCM for each number pair.

	1.	12 and 10	
		GCF:	LCM:
	2.	9 and 5	
		GCF:	LCM:
	3.	11 and 2	
n		GCF:	LCM:
	4.	8 and 4	
		GCF:	LCM:
	5.	9 and 12	
		GCF:	LCM:

GCF or LCM? Follow your teacher's directions to discuss and solve each problem.

1. Omnia has two strips of cloth. One is 35 centimeters wide, and the other is 75 cm wide. She wants to cut both pieces into strips of equal width that are as wide as possible. How wide should she cut the strips? Do you have to find the GCF or the LCM? What is the answer?



- 2. Omar exercises every 12 days. Rana exercises every 8 days. Both friends exercised together today. How many days will it be until they exercise together again? Do you have to find the GCF or the LCM? What is the answer?
- 3. Menna is giving her friends pencils and special erasers. The store sells pencils in boxes of 8 and erasers in boxes of 10. If Menna wants the same number of each, what is the minimum number of pencils that she will have to buy? Do you have to find the GCF or the LCM? What is the answer?
- 4. Nour is making snack bags for an upcoming trip. He has 6 oranges and 12 pieces of dried fruit. He wants the snack bags to be identical without any food left over. What is the greatest number of snack bags Nour can make? Do you have to find the GCF or the LCM? What is the answer?
- 5. Malak baked 30 servings of cakes and 48 servings of baklava for her family. She wants to divide the desserts into containers so that each person receives the same number of servings. How many containers will she need? Do you have to find the GCF or the LCM? What is the answer?
- 6. Ola sells baskets of figs that each hold 9. She also sells bags of pomegranates that each hold 7. If she sells the same number of each, what is the smallest quantity of each type of fruit that she sold? Do you have to find the GCF or the LCM? What is the answer?



## **CONNECT**

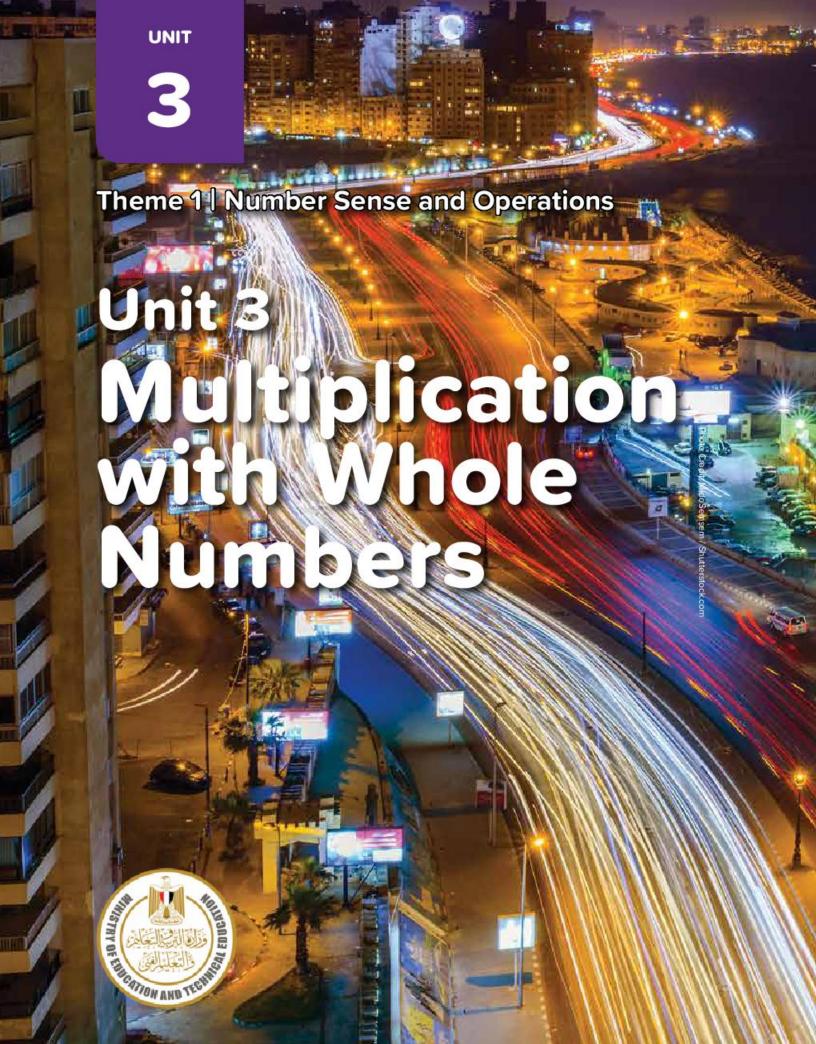
**Writing About Math** Read and respond to the Essential Question: *How are all numbers related through factors and multiples?* 



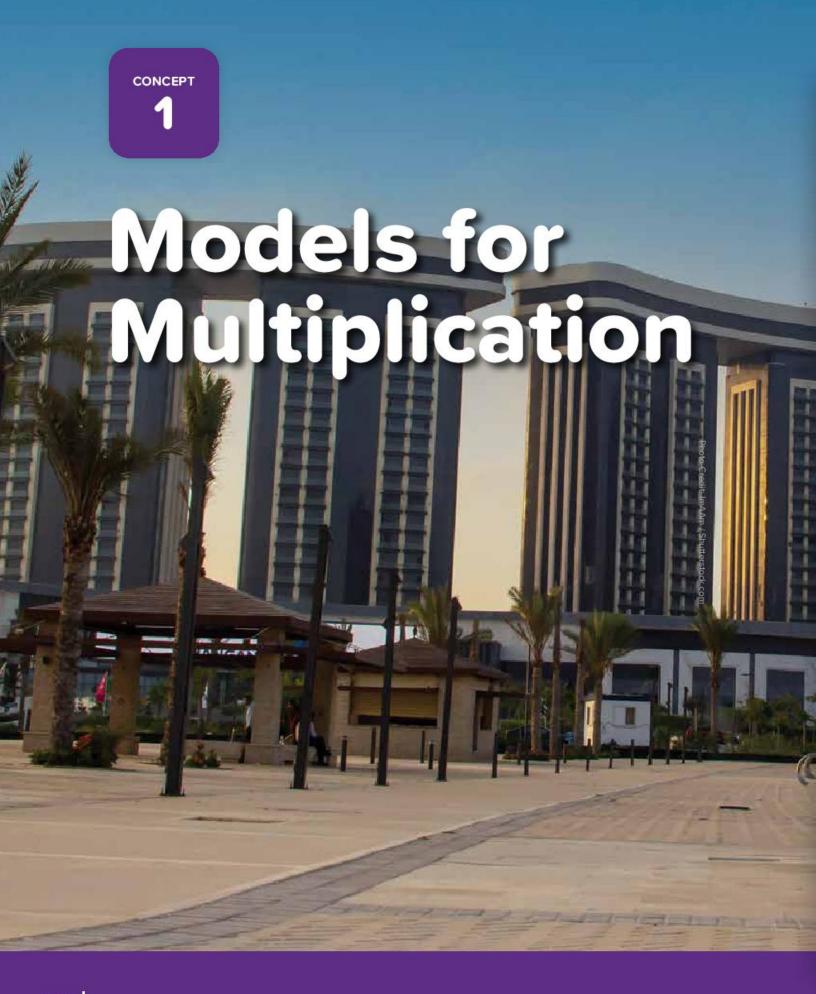
Photo Credit (a) OlegD / Shutterstock.com, (b) Sergey Shirov / Shutterstock.com



## **Check Your Understanding**







# The Power of Ten

egm5057

### **Learning Targets**

- I can identify powers of ten.
- I can multiply single digits by powers of ten.
- I can explain the patterns I observe when multiplying by powers of ten.

# **ACCESS**

Powers of Ten Patterns Look at the equations. Discuss with your partner any patterns you see.

$$10 \times 1 = 10$$
  
 $10 \times 10 = 100$   
 $10 \times 100 = 1,000$   
 $10 \times 1,000 = 10,000$ 

### BUILD

Jumping by Powers of Ten Solve.

# **Models for Multiplication**

**Matching Expressions** Choose from the given expressions to enter the one that is equal to the number.

$$5 \times 10,000$$

Multiplying by Powers of Ten Solve.

 A crate of mangoes weighs 9 kilograms. How many kilograms would 1,000 crates weigh?

2. If 10 millimeters makes 1 centimeter, how many millimeters are in 7 centimeters?

3. There are 1,000 milliliters in 1 liter. Omar bought a 2-liter bottle of juice. How many milliliters are in the bottle?

4. Aya ran a 5-kilometer race on Saturday. If there are 1,000 meters in 1 kilometer, how many meters did she run?

# CONNECT

Writing About Math Explain the difference between powers of ten and multiples of ten. Use examples to support your thinking.





# **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

# Using the Area Model to Multiply



# egm5059

### **Learning Target**

I can multiply using the area model.

# ACCESS

Fast Fact Check-In Complete as many equations as possible in the time provided.

1. 
$$5 \times 1,000 =$$

2. 
$$4 \times 10 =$$

3. 
$$1,000 \times 7 =$$

Writing Expressions Write an expression to complete each equation using powers of ten for each given number.

Multiplying Tens How many times will 10 need to be multiplied by itself to equal each given number?

- 1. 100
- 2. 1,000
- 3. 10,000
- 4. 100,000

# BUILD

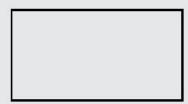
Expanding an Equation Look at the area model example.

Area Model Example: 234 × 27 = \_\_\_\_\_

				1 1 4,000
				1,400
62	200	30	4	600
20	4,000	600	80	210
20	4,000	000		80
7	1,400	210	28	+ 28
	2000 SSS	*	, , , , , , , , , , , , , , , , , , , ,	6,318

Whiteboard: Expanding Equations Work with your teacher and classmates to create area models and find each product.

2



3. Create your own area model for 732 × 16 = \_\_\_\_\_

Using an Area Model Solve the problems using an area model.

- 5. Ali walks 6 kilometers each day. If he walked 187 days a year, how many kilometers would he walk?
- 6. What if Ali were to drive 60 kilometers each day? How many kilometers would he drive in 187 days?

Decompose with Area Model Eman is planting a garden. She wants to find the area of the garden to know how much topsoil she will need. The garden is 46 meters long and 24 m wide. How many different ways can you decompose the numbers to help her find the area?

Example:

34	20	20	6
20			
4	i		2

Area Model Decomposed Solve the problems. Use an area model other than expanded form. Do not just break it down with place value.

# CONNECT

Math around Egypt: Red Sea Hills Range Work with your teacher to read the passage. Then, answer the question.

Within the Eastern Desert is a mountain range that runs parallel to the Red Sea coast. Mountain heights in this range are between 1,700 and 2,000 meters.

Omar owns a travel company that takes visitors throughout the mountains of the Eastern Desert. He has 12 buses. Each bus can hold 25 passengers. How many passengers can Omar take each day if every bus is full?





# **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

# The Distributive Property of Multiplication



egm5061

### **Learning Target**

 I can explain the relationship between the area model of multiplication and the Distributive Property of Multiplication.



Error Analysis Read the problem and complete the error analysis.

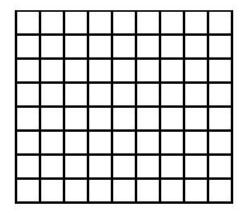
Badir thinks  $206 \times 45 = 11,700$ . Identify what Badir did correctly and incorrectly and then solve the problem.

8,000	0	60	200	52-2
1,000	0	2,400	8,000	40
2,400	0	2,400	8,000	
+ 300	0	300	1,000	5
11,700	- 50	3530 8		

- 1. What did the student do correctly?
- 2. What did the student do incorrectly? Why do you think they made this error?
- 3. Try to solve the problem correctly. Explain your thinking.

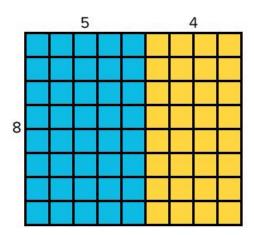
### BUILD

**Distributing Numbers** Read the information about the Distributive Property of Multiplication. Be prepared to share your thinking or questions. Then, write and solve equations to match the area models demonstrating the Distributive Property.



This problem can also be broken into two smaller rectangles.

$$8 \times (5 + 4)$$



- The rectangles show  $8 \times 5 = 40$  and  $8 \times 4 = 32$ . These numbers are then added to recompose the rectangle: 40 + 32 = 72.
- $8 \times 9$  is therefore equivalent to  $8 \times (5 + 4)$ .
- $8 \times (5 + 4)$  is an example of the Distributive Property because we are distributing, or multiplying, both numbers in the parentheses (5 and 4) by the number 8.

# **Models for Multiplication**

The Distributive Property of Multiplication allows all numbers inside parentheses to be multiplied by the number outside the parentheses.

1. 58 × 42 = \_\_\_\_\_

94	50	8
40	2,000	320
2	100	16

$$(40 \times \_\_\_) + (40 \times 8) + (\_\_\_ \times 50) + (2 \times \_\_\_) = \_\_\_$$

2.

	30	7
20	600	140
4	120	28

$$\big(20 \times 30\big) + \big( \_\_\_ \times \_\_\_ \big) + \big( \_\_\_ \times \_\_\_ \big) + \big(4 \times 7\big) = \_\_\_\_$$

3.

_	60	3	
20	1,200	60	
9	540	27	

4.

	40	7
30	1,200	210
9	360	63

5. Complete the area model and evaluate:

$$(40 \times 40) + (40 \times 8) + (9 \times 40) + (9 \times 8) =$$
 \_\_\_\_\_\_

40 1,600 9 72

Flexible Numbers Solve.

1. Mrs. Mona asked her class to find the product,  $83 \times 14$ . Here are three ways students thought about the problem. Record their work in an area model and evaluate. Remember the addends on each side must equal 83 and 14, respectively.

Mazen:  $(40 \times 10) + (40 \times 10) + (40 \times 4) + (40 \times 4) + (3 \times 10) + (3 \times 4)$ 

	40	40	3
10			
4			

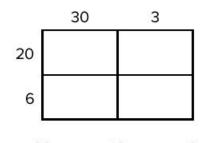
Lamiaa:  $(80 \times 7) + (80 \times 7) + (3 \times 7) + (3 \times 7)$ 

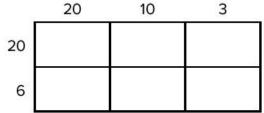
	80	3
7		
7		

Reeda:  $(80 \times 10) + (80 \times 4) + (3 \times 10) + (3 \times 4)$ 

	80	3
10		
4		

2. Mrs. Mona then asked her class to evaluate  $33 \times 26$ . Here are three ways students thought about the problem using an area model. Write an expression for each model. Then, choose one of the area models to evaluate the expression.





	11	11	11
10			
10			
6			

3. Mrs. Mona would like you to solve a problem. Create an area model and evaluate:  $42 \times 34 =$ \_\_\_\_\_\_.

# **CONNECT**

Math around Egypt: The Fennec Fox Work with your teacher to read the passage. Then, use a model to solve the problem.

The mountains of the Eastern Desert are excellent desert habitats for small mammals like the fennec fox. These foxes are small and have adapted to the harsh desert environment by having large ears to help cool them down.

When a fennec fox builds a den, it can have up to 15 different entrances. How many entrances could 32 dens have?





# **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

# **Using the Partial Products Model to Multiply**



# egm5063

### **Learning Targets**

- I can multiply using the partial products model.
- I can estimate products.

# **ACCESS**

Estimating Products Estimate the product for each problem. Then, discuss your estimation strategies with a partner. Be prepared to share your thinking with the class.

### BUILD

Partial Products Work with your teacher and classmates to solve the following using the partial products strategy.



Follow the directions to play the Partial Products Game with a partner. Record each estimate and problem in the grid.

### Directions

- Each player picks four or five cards depending on the teacher's direction.
- Each player creates two 2-digit numbers *or* one 3-digit number and one 2-digit number and records the numbers.
- Players estimate the product and record their own estimate.
- Players solve their own problems using the partial products strategy.
- The player closest to their estimate gets one point.

Estimation	Problem and Work	SCORE 1 point for person closest to estimate
Example: 45 × 82 40 × 80 = 3,200	45	1

# **Models for Multiplication**

# **CONNECT**

Math around Egypt: Red Sea Riviera Work with your teacher to read the passage. Then, answer the question.

The Red Sea Riviera is Egypt's eastern coastline along the Red Sea. It includes resort cities along the Gulf of Suez.

There are 18 hotels in a resort city. If each hotel has 135 guests, how many guests are staying in the city? Use the partial products strategy to solve.





# **Check Your Understanding**

Follow your teacher's instructions to complete this activity.



2 Multiplying 4-Digit Numbers by 2-Digit Numbers

# **LESSON 5** What Is an Algorithm?

### **Learning Target**

I can multiply using the standard algorithm.



egm5066



Mental Math Follow your teacher's directions to complete the learning activity.

1. Solve the problems mentally. You may record the products.

$$35 \times 10$$

$$25 \times 100$$

$$75 \times 1,000$$

2. Use the products from Problem 1 to find these products. You may record your results.

$$35 \times 9$$

$$25 \times 99$$

3. How did the products from Problem 1 help you find the products in Problem 2?

### BUILD

Comparing Multiplication Models Look at the three strategies and discuss the questions with a Shoulder Partner:

- · How are the strategies similar?
- · How are the strategies different?
- Which strategy seems most efficient to you?

**Partial Products Model** 

 $(30 \times 40) = 1,200$ 

 $(30 \times 5) = 150$ 

 $(7 \times 40) = 280$ 

 $(7 \times 5) = 35$ 

45

× 37

1,665

	l	
	l	
	l	
	l	
	l	
	l	
_	J	

Standard Algorithm for

Multiplication

£

45

315

× 37

+1,350

1,665

How does the standard algorithm wo	rk?

5

150

35

- · Work from bottom to top.
- · Work from right to left.

Area Model

40

1,200

280

30

7

- · Start with the Ones place.
- · Remember place value as you multiply.
- · Line up the products by place value before you add them together.

### **Standard Multiplication Algorithm**

1. Fill in the area model starting at letter A.

	20	6
30	D.	C.
3	В.	A.

E. Final product: \_\_\_\_\_

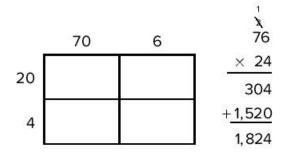
2. Record the partial products in the order listed.

Final product: \_\_\_\_\_



# **Multiplying 4-Digit Numbers by 2-Digit Numbers**

3. Fill in the area model. Then, explain which parts of the area model and the standard algorithm match.



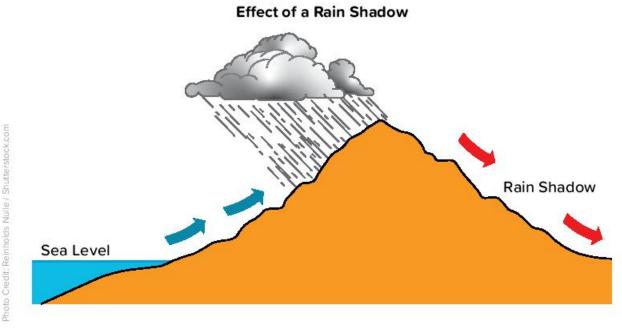
4. Determine the values of the missing digits and then find the final product.

- **5.** 76 × 82 = \_\_\_\_\_
- **6.** 234 × 53 = \_\_\_\_\_
- 7. Akram says that  $34 \times 69$  will give you the same product as  $(34 \times 70) 34$ . Do you agree or disagree? Why?

# **CONNECT**

Math around Egypt: Climate in the Eastern Desert Work with your teacher to read the passage and answer the question.

The Eastern Desert usually receives less than 25 millimeters of rain per year. The mountains can cause a rain shadow. This occurs when the moist air from the Red Sea rises and gets trapped on the eastern side of the mountains, not allowing the rain to reach the desert side of the mountains.



If you wanted to calculate the highest possible amount of rain in the Eastern Desert over a 25-year time span, how would you solve the problem? Use words and numbers to explain your thinking.



# **Multiplying Multi-Digit Numbers**

### Quick Code egm5068

### **Learning Targets**

- I can multiply 4-digit numbers by 2-digit numbers using the standard algorithm.
- I can use estimation to check the reasonableness of my answers.

# **ACCESS**

Error Analysis Read the problem and complete the error analysis.

Ashraf evaluated  $357 \times 36$  using the standard algorithm. Analyze Ashraf's work. Identify what Ashraf did correctly and incorrectly, and then solve the problem.

- What did Ashraf do correctly?
- 2. What did Ashraf do incorrectly?
- 3. Try to solve the problem correctly. Explain your thinking.

### BUILD

**More Digits, More Fun** Follow your teacher's directions to complete the learning activity.

Match the Model Solve each problem. First, estimate and record your estimate. Then, solve using the multiplication algorithm. Finally, record the letter of the matching model.

Match the Model										
Α.	3,000	500	60	7	D		8,000	200	20	2
20	60,000	10,000	1,200	140		50	400,000	10,000	1,000	100
4	12,000	2,000	240	28		3	24,000	600	60	6
B.		6,20 <u>×3</u> 2 6 18,00 27 60 +180,00	3 7 0 0 0		E	5 4	8,000 400,000 24,000	200 1,000 600	20 2 100 1 60 6	
C.	200.000 (C.5.200.000.000)			F	9	2,000	500	20	1	
	<u>× 33</u> 27			70	140,000	35,000	1,400	70		
		600 18,000				4	8,000	2,000	80	4
	<u>+</u>	270 6,000 180,000								

# **Multiplying 4-Digit Numbers by 2-Digit Numbers**

1. 3,567 × 24

Evaluate: 3.567 × 24 = \_\_\_\_\_

Evaluate: 8,222 × 53 = \_\_\_\_\_

Matching Model Letter: \_\_\_\_\_

Matching Model Letter: \_\_\_\_\_

2. 2,521 × 74

**4.**  $6,209 \times 33$ 

3. 8,222 × 53

My Estimate: \_\_\_\_\_

My Estimate: \_\_\_\_\_

My Estimate: \_\_\_\_\_

My Estimate: \_\_\_\_\_

Solve: 2,521 × 74 = \_\_\_\_\_

Evaluate: 6,209 × 33 = \_\_\_\_\_

Matching Model Letter: \_\_\_\_\_

Matching Model Letter: \_\_\_\_\_



Writing About Math Respond to the prompt.



When multiplying multi-digit numbers, what is your preferred strategy? Explain your reasoning. You may use words and numbers to express your ideas.



## **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

# Photo Cladit Rainholds Nulla / Shuttarstock.com

# Multiplication Problems in the Real World



Quick Code egm5070

### **Learning Target**

• I can solve multistep story problems involving multiplication.



Math around Egypt: Sandstorms Work with your teacher to read the passage. Then, solve the problems.

Sandstorms are caused by thunderstorms or strong air pressure. The storms can last minutes or hours. The sand and dust are transported thousands of kilometers away with winds up to 140 kilometers per hour.

If a sandstorm lasts for 120 minutes each day for 33 days in a row, how many minutes did it storm all together?

Challenge How many hours did the sandstorm last?

Mona's Restaurant Follow your teacher's directions to complete the learning activity.

A major trade route took traders from Qift along the Nile to Al-Quesyr on the coast of the Red Sea, through the Eastern Desert. From the Red Sea, this important trade route connected to the Silk Road in Asia. The coastal town of Al-Quesyr continues to be an important tourist destination to this day.

1. Mona has a restaurant in Al-Quesyr. In February, Mona sold 402 kebabs. In March, she sold 753 kebabs. She makes each kebab with 83 grams of meat. How many grams of meat did she use in February and March?



- 2. Mona's son Wael makes baklava to sell at his family's restaurant. His recipe calls for 170 grams each of pistachios, walnuts, and hazelnuts. In order to make enough for the customers, he needs to multiply his recipe by 18. How many total grams of nuts will he need?
- 3. For Wael's baklava syrup, he needs 250 milliliters of honey, 15 mL of orange extract, and 30 mL of lemon juice per recipe. How many total milliliters of liquid ingredients will he need for the sauce if he needs to make 18 batches?

4. Mona is making tahini to use in dishes at her restaurant. Her recipe uses 140 grams of sesame seeds to make 120 milliliters of tahini. She makes the recipe 20 times each week. How many grams of sesame seeds does she use each week?

How many milliliters of tahini does she make in 36 weeks?

Convert the amount in milliliters to liters.

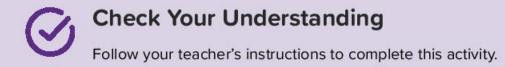
5. Mona makes freshly squeezed lemonade each day for her customers. She uses 6 lemons for each liter of lemonade. She makes 8 liters of lemonade a day. After 365 days, how many lemons has she used?

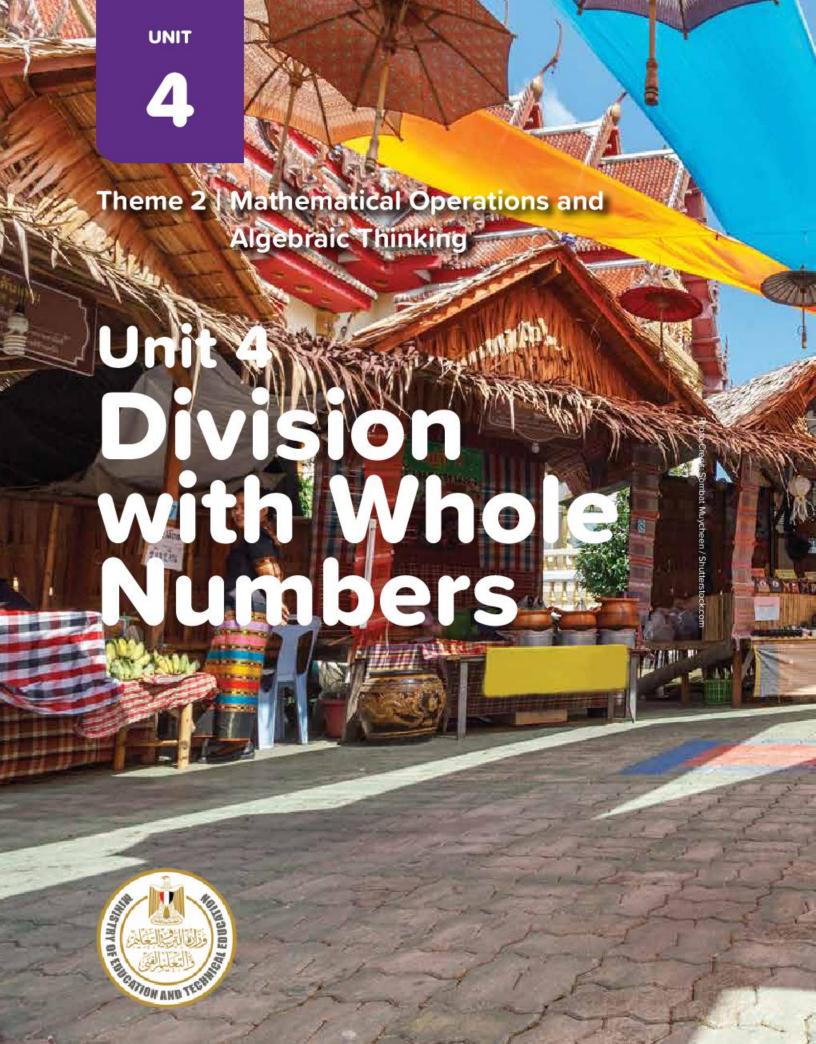
How many liters of lemonade does she make in 365 days?

Mona uses 1,133 grams of sugar daily. How many grams does she use in 30 weeks?

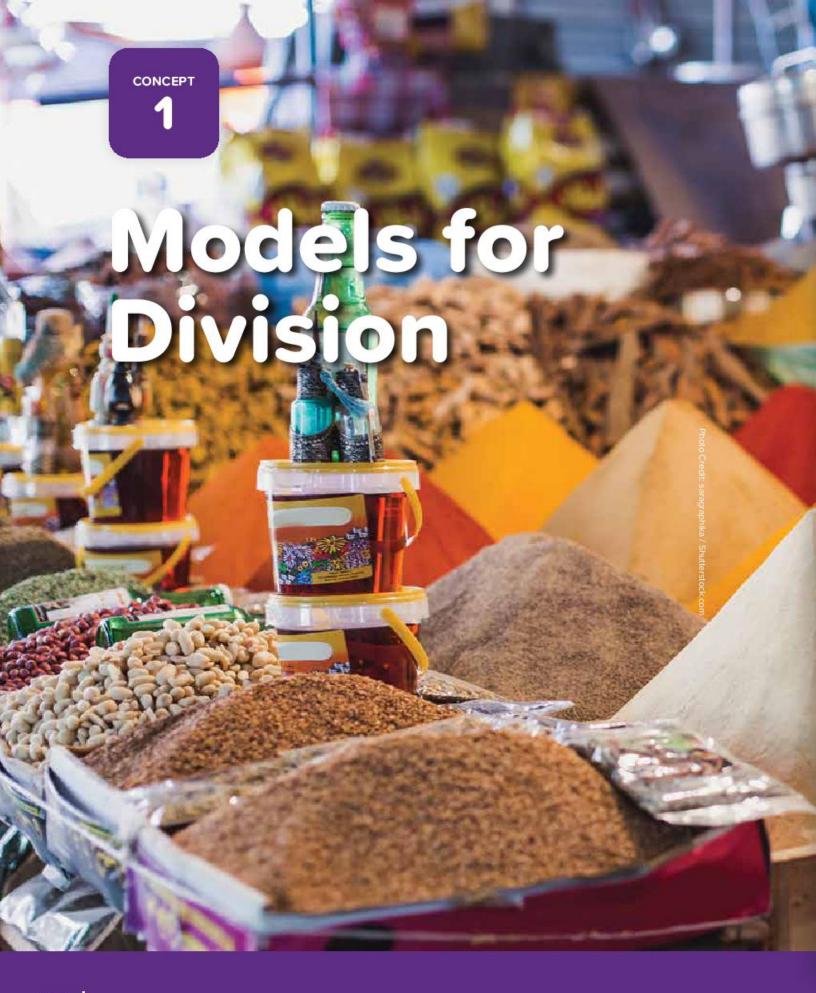


Writing About Math Write about three things you have learned about Egypt in school this year. Were you surprised to discover how much mathematics is around you in the real world? Why or why not?









# **Understanding Division**

### **Learning Target**

 I can use story problems to explain the meaning of division problems.



Quick Code

# **ACCESS**

**Write and Solve** Choose three of the numbers given and use them to create a division equation. Use words, drawings, diagrams, or numbers to prove your division equation is true.

6					
100	25	7	4	5	
35	20	14	28	2	

### BUILD

Defining Division Read each problem. Write an equation and label the dividend, divisor, quotient, and remainder. Then, draw a model of each problem.



- If 18 plums are divided equally into 3 bags, then how many plums will be in each bag?
- 2. If 18 plums are packed 3 to a bag, then how many bags will there be?
- 3. A red hat costs 400 LE, which is 4 times as much as a blue hat costs. How much does a blue hat cost?

**Models for Division** 

4. A red hat costs 400 LE and a blue hat costs 100 LE. How many times greater is the cost of the red hat?



# **Representing Division**

Play the game with your partner. If asked, share your answers and thinking with the class.

- Choose one of your Representing Division cards. Read the problem, and draw a model.
- · Trade your model with your partner.
- On your partner's card, write the division sentence. Circle Number of Groups or the Number in Each Group to show what the divisor represents.
- · Repeat until all cards are finished.

# CONNECT

Writing About Math Read the division problem and circle which model you think best matches the scenario. Explain your thinking.

There are 327 job applicants for a new business. They will need to place the people in 6 rooms while they fill out applications. How many people will be in each room?

?

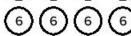
?

?

? ?

B Total = 327









# **Check Your Understanding**

# Using the Area Model to Divide



Quick Code egm5077

### **Learning Target**

• I can use the area model to solve division problems.

# **ACCESS**

Patterns in Multiplication Complete each set of multiplication equations, and explain any patterns you noticed.

# Photo Credit: saragraphika / Shutterstock.com

# BUILD

Whiteboard: Using the Area Model Work with your teacher to use the area model strategy to solve the division equations.

**1.** 2,207 ÷ 7 = \_\_\_\_\_



2. 1,625 ÷ 13 = \_\_\_\_\_



**Model Match** Choose the correct area model that represents each problem and fill in any missing numbers. Then, use the area model to answer each problem.

A.	100	10	6
	3,622	522	212
31	<u> </u>	<u>– 310</u>	<u>– 186</u>
	522	212	26

$$100 + 10 + 6 = 116 R26$$

 9,234
 1,134
 324
 162

 -8,100
 -810
 -162
 -162

 1,134
 324
 162
 0

\_\_\_\_\_+\_\_\_+\_\_\_+\_\_\_=\_\_\_\_

$$100 + 2 + 1 = 103 R26$$

\_\_\_\_\_+\_\_\_=\_\_\_=

# CONNECT

Writing About Math: Error Analysis Look at the problem, and analyze the student's area model. Identify what the student did incorrectly.

Divide: 2,852 ÷ 24 = \_\_\_\_\_

Student's area model:

$$2,852 \div 24 = 20$$



# **Check Your Understanding**

# Using the Partial Quotients Model to Divide



Quick Code

### **Learning Target**

 I can use the partial quotients model to solve division problems.

# **ACCESS**

**Numberless Story Problem** Work with your teacher to build understanding of each problem. As your teacher reveals more information, record your responses.

The factory made \_\_\_\_\_\_ shirts. It sorted the shirts into \_\_\_\_\_ equa groups.

Solve using an area model.



### BUILD

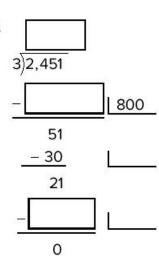
**Modeling Partial Quotients** Use the partial quotients strategy to solve the problems.

# Models for Division

Fill in the Blank Look at the partial quotients solution for each problem. Fill in the blanks and empty boxes to complete the solution.

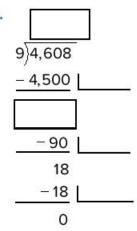
1.

3.



2.

4.



6.

# CONNECT

Writing About Math How can finding parts of a quotient make it easier to solve division problems?



# **Check Your Understanding**

# **Estimating Quotients**

### **Learning Target**

 I can use estimation to check the reasonableness of my answers.



# P

# **ACCESS**

Mental Math Use mental math to divide.

## BUILD

**Compatible Numbers** Estimate using compatible numbers. Then, solve using an area model or the partial quotients model.

My Estimate: \_\_\_\_\_

My Solution: \_\_\_\_\_



Play the game in groups of two to practice estimating quotients.

Object: Collect all the cards.

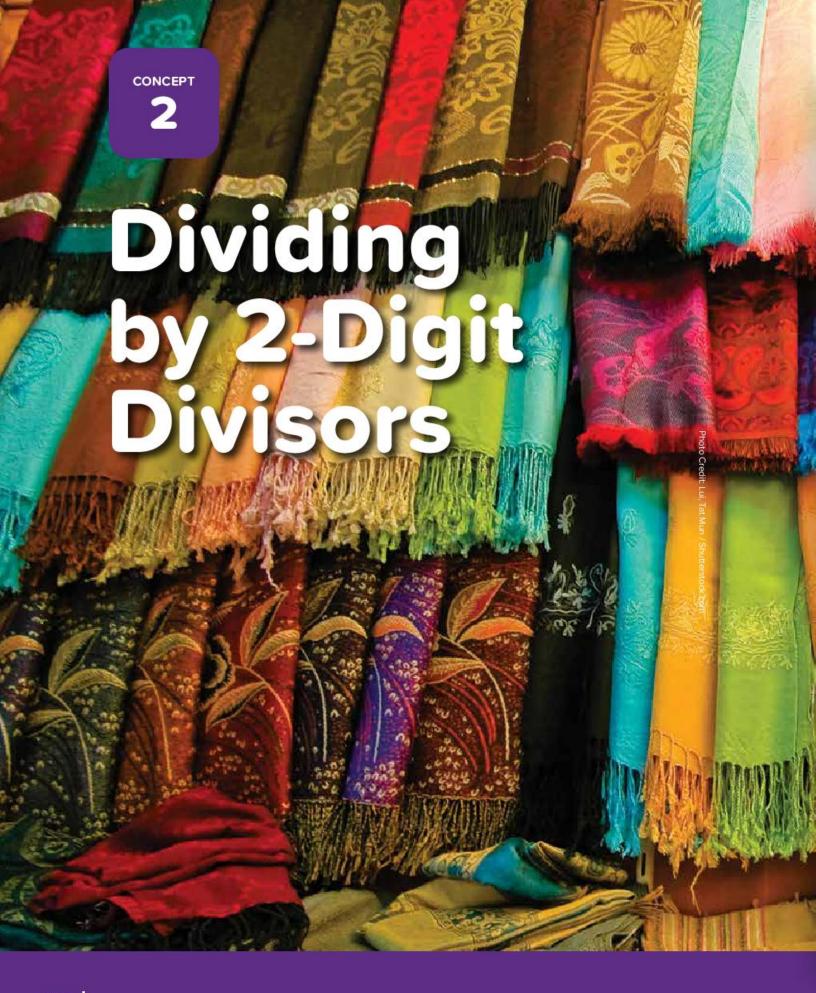
- 1. Each player shuffles a deck of 12 cards and places the cards face down.
- 2. Each player places the top card in the center space at the same time, revealing each division problem.
- Each player estimates the quotient using compatible numbers and then shares their estimate with the other player. Players should check each other's work.
- 4. The player with the greater estimated quotient takes both cards and adds them to the bottom of his or her own pile.
- 5. If there is a tie, both players turn over the next card on their piles and repeat the process. The winner of that round takes all four cards.
- 6. Play continues until one player has all the cards.

# CONNECT

**Writing About Math** Since Primary 2, you have been practicing rounding, estimating, using benchmark numbers, and compatible numbers. How have you used these strategies to improve your skills as a mathematician?



# **Check Your Understanding**



# **Using the Standard Algorithm** to Divide



Quick Code egm5084

### **Learning Target**

 I can use the standard algorithm to divide by a 2-digit divisor.



Dividing Beans Read the problem. Work with your teacher to solve the problem. Then, copy the problem and solution into your Math Notebook.

Rana owns a coffee shop. She uses 1 full scoop of coffee beans to brew one cup of coffee. Her container has \_\_\_\_\_\_ beans. She knows her scoop holds beans. Rana wants to know how many cups of coffee she can make from this container of beans. How could Rana find out how many scoops are in this container?



# BUILD

Find the Similarities Copy your teacher's solution into your Math Notebook. Discuss how the standard algorithm for division is similar to and different from the area model and partial quotients model.

# **Dividing by 2-Digit Divisors**

Let's Try It Divide using the standard algorithm for division.

1. 32)192

**3.** 22 756

2. 65)543

4. 46 8,014

# CONNECT

Making Connections Solve the problems using the standard algorithm. Check your work using an area model or the partial quotients model.

- At her cafe, Rana sells cookies baked by a local bakery. She receives an order
  of 350 cookies. Rana packages the cookies in groups of 12 cookies per bag.
  Solve to find how many full bags, containing 12 cookies each, Rana can sell
  from her order of 350 cookies and how many cookies are left over.
- 2. How could Rana package the cookies so that each bag contains the same number of cookies and she has none left over?



# **Check Your Understanding**

# Checking Division with Multiplication



Quick Code egm5086

### **Learning Targets**

- · I can use the standard algorithm to divide by a 2-digit divisor.
- I can use multiplication to check answers to division problems.



Error Analysis Ayman says that  $8,858 \div 43 = 26$ . Analyze Ayman's work. Do you agree or disagree with his solution? Explain your thinking.

### BUILD



Play the game with your partner to practice checking division answers using multiplication.

- 1. Decide who goes first.
- 2. Player 1 starts with 200 and chooses a divisor from the list. Players cross out the divisor so it cannot be used again.
- 3. Player 1 solves the division problem and announces the solution. Example:  $200 \div 17 = 11 \text{ R}13$ .
- 4. Player 2 uses multiplication and addition to check. Example:  $17 \times 11 = 187$ ; 187 + 13 = 200.



# **Keep the Leftovers**

- When you and your partner agree on the solution, write the equation on the record sheet. Circle the remainder and write Player 1's initials next to the problem.
- 6. Subtract the remainder from the original dividend to find the new dividend for Player 2. Example: 200 13 = 187. The new dividend is 187.
- 7. Player 2 chooses from the remaining divisors and solves the division problem. Player 1 checks the solution with multiplication and addition.
- 8. Take turns until the starting number is 0 or until the dividend is smaller than all of the remaining divisors.
- 9. Both players find the sum of all their remainders. The player with the highest score wins.

wı	niteboar	d: Keep	the Lef	tovers F	Recordin	g Sheet	t		
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Starting Number	Equation	Initials
200		
0		

# **CONNECT**

**Ziad's Buttons** Ziad works in a clothing factory that produces shirts. He has 100 buttons and needs 16 buttons for each shirt. After dividing, he thinks he has enough to make 6 shirts and will have 4 buttons left over. Is Ziad correct in his thinking? Why or why not? Explain your thinking.





# **Check Your Understanding**

# egm5088

### **LESSON 7**

# **Multistep Story Problems**

### **Learning Target**

 I can solve multistep story problems involving whole numbers and the four operations.

# **ACCESS**

Making Sense of Remainders Read the story problem, and look at the student work. Use the information provided to answer the question. Be prepared to justify your thinking.

1. A baker made 140 servings of baklava for a party. If each baking tray holds 12 servings of baklava, how many trays will be needed to hold all the baklava?

2. Mom baked a batch of 12 balah el sham. Two balah el sham fell on the floor, leaving 10 on the platter. If 4 kids split the remaining balah el sham equally, how many balah el sham will each child get?

12 
$$\frac{2}{-2}$$
 4)10  $\frac{-8}{2}$ 

### BUILD

Step by Step Read through the following problems and follow the prompts from your teacher.

1. In one year, a textile factory used 11,650 meters of cotton, 4,950 fewer meters of silk than cotton, and 3,500 fewer meters of wool than silk. How many meters of fabric were used in all?

An architect is designing a bridge. The architect has two choices for materials.
 Mighty Steel sells 5 metric tons (t) of steel for 100,000 LE. Silver Strong Steel
 sells 3 t of steel for 70,000 LE.

If the architect needs 15 t of steel, how much money will be saved by purchasing from Mighty Steel?

Solving Multistep Problems Work with your group to solve each problem.

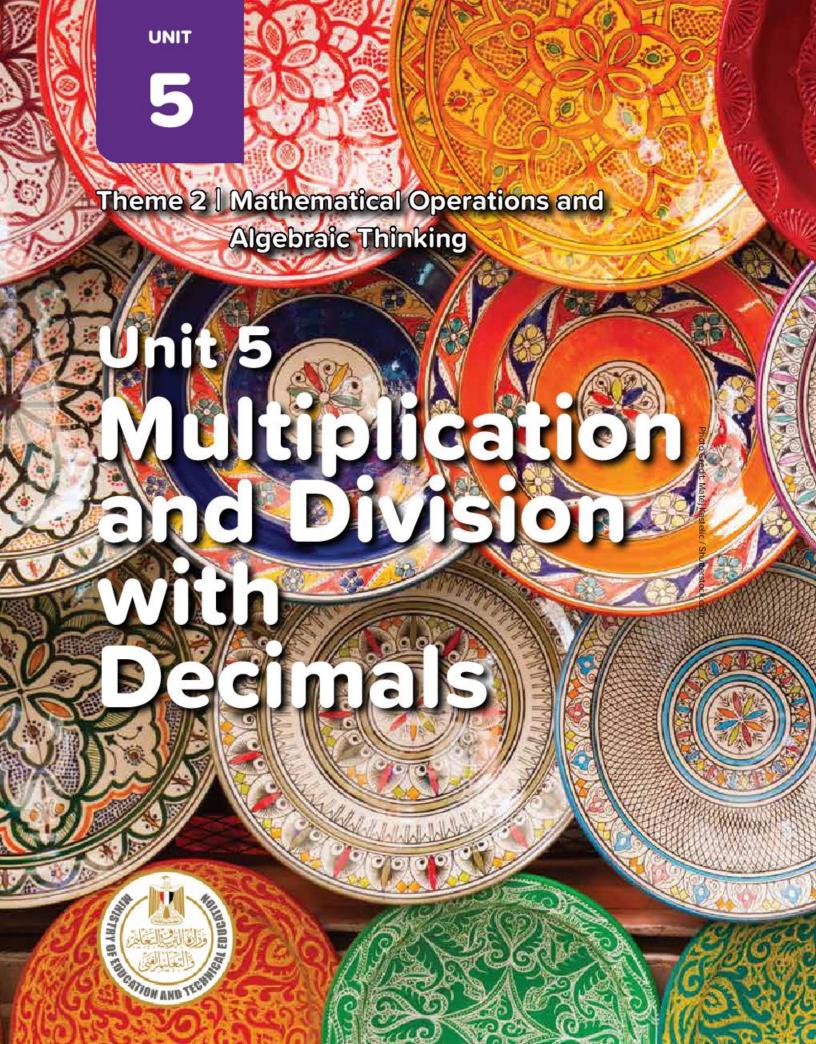
- 1. Computer Depot sold 762 reams of paper. Paper Palace sold 3 times as much paper as Computer Depot and 143 reams more than Office Supply Central. How many reams of paper were sold by all three stores combined?
- 2. Zeinab ordered 12 packages of fabric squares to make a quilt. Each package has 18 fabric squares, and Zeinab used all the squares for her quilt. Reem made a quilt that was 13 squares wide by 13 squares long. How many fewer squares did Reem use than Zeinab for her quilt?
- 3. Nagi sold a total of 30 boxes of sports T-shirts at his store on Monday. These boxes contained only basketball T-shirts and football T-shirts. Each box contained 25 sports T-shirts. He earned 3 LE for each sports T-shirt he sold. He earned a total of 1,134 LE from the football T-shirts he sold. How much money did Nagi earn from the basketball T-shirts he sold?
- 4. Malek and his family are going on a road trip to his grandmother's house, which is 465 kilometers away. On Friday, they travel 124 km. On Saturday, they traveled 210 km. How many kilometers will they need to travel on Sunday to reach his grandmother's house?

# **CONNECT**

**Writing About Math** What strategies are helpful in being a strategic and flexible problem solver?



# **Check Your Understanding**





Multiplying
Decimals

# **Multiplying by Powers of Ten**

### Quick Code egm5093

### **Learning Target**

• I can explain patterns when multiplying whole numbers by powers of ten.



Missing Numbers Fill in the missing numbers in each equation.

1

10

100

1,000

10,000

100,000

1. 
$$496 = 4 \times (A) + 9 \times (B) + 6$$

2. 
$$6,140 = 6 \times (C) + 1 \times (D) + 4 \times (E)$$

3. 
$$20,403 = 2 \times (F) + 4 \times (G) + 3$$

4. 
$$78,594 = 7 \times (H) + 8 \times (I) + 5 \times (J) + 9 \times (K) + 4$$

**5.** 
$$8,032 \times 1,000 = (L)$$

# BUILD

Looking for Patterns Look at the examples in Set 1.

### Set 1

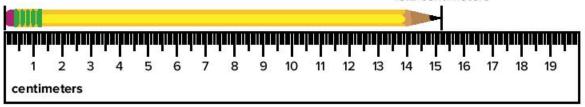
Examples	Products in Standard Form		
3 × 2 Thousands = 6 Thousands	6,000		
3 × 2 Hundreds = 6 Hundreds	600		
3 × 2 Tens = 6 Tens	60		
3 × 2 Ones = 6 Ones	6		
3 × 2 Tenths = 6 Tenths	0.6		
3 × 2 Hundredths = 6 Hundredths	0.06		
$3 \times 2$ Thousandths = 6 Thousandths	0.006		

Now fill in the blanks for Set 2.

### Set 2

(Hint: What could you call the second factor in these problems?)

15.2 centimeters



Answer the questions about Manal's pencil.

1. Manal's pencil is \_\_\_\_\_ centimeters long.

2. If her pencil were 10 times bigger, it would be \_\_\_\_\_ centimeters long.

(pencil length × 10 = \_\_\_\_ cm)

3. If Manal were to line up 100 of the same pencils, the total length would be \_\_\_\_\_ centimeters.
(pencil length × 100 = \_\_\_\_ cm)

4. If Manal's pencil were to shrink to one tenth of its current length, it would be \_\_\_\_\_ centimeters long.
(pencil length × 0.1 = \_\_\_\_ cm)

Let's Try It Evaluate.

# **Multiplying Decimals**

Let's Try More Evaluate.

Multiply to complete the table.

	1.	2.	3.
×	3	30	300
0.001	A	G	M
0.01	В	Н	N
0.1	C	l	O
1	D	J	P
10	E	К	Q
100	F	L	R

# **CONNECT**

Hoda's Stride Hoda's stride is 0.72 meters. How far, in meters, will Hoda walk after taking 1,000 paces? Use words and numbers to explain how you found your answer.





# **Check Your Understanding**

# Multiplying Decimals by Whole Numbers



Quick Code egm5095

### **Learning Target**

· I can multiply a decimal by a whole number.

# **ACCESS**

Multiplying Whole Numbers Complete the equations.

1. 
$$773 \times 2 =$$

4. 
$$108 \times 26 =$$

2. 
$$521 \times 9 =$$

5. 
$$497 \times 85 =$$

3. 
$$385 \times 43 =$$

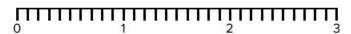
## BUILD

Let's Try It Model the expressions. Then, rewrite each problem vertically and evaluate.

1.  $0.3 \times 3$ 



2.  $0.3 \times 4$ 



3.  $0.3 \times 5$ 



- 4.  $2.5 \times 3$
- 5.  $0.35 \times 5$

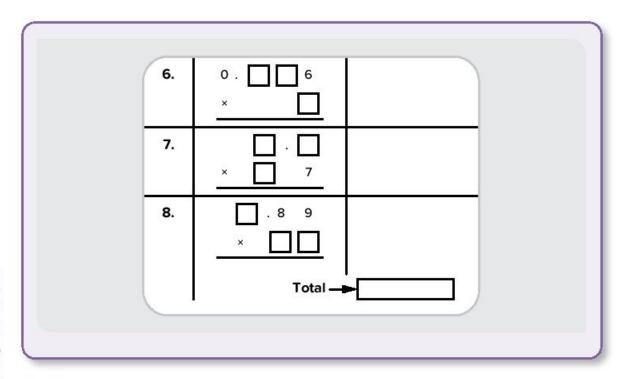


# **Make the Greatest Product**

### Play the game with your partner.

- Player 1 spins the spinner. Both players record the digit in one of the boxes. (Players should record the digits in different boxes.)
- · Player 2 spins and both players record the digit.
- Take turns until all of the boxes are filled. You may not move a digit once it has been written.
- Players solve the multiplication problem they formed. The player with the greatest product wins the round.
  - Whiteboard: Make the Greatest Product Use the Whiteboard to create and solve multiplication problems.

	Make the Greatest Product						
Round	Problem	Product					
1.	×						
2.	0 .						
3.	. o						
4.	□ · □ □ × 4						
5.	5 .						



**Challenge** Add the sum of your products. The player with the greatest sum is the champion.

# CONNECT

Math at Work Ameen owns a bookstore. He uses multiplication to calculate how much he earned from selling items at his store. Sometimes, he has difficulty knowing where to place the decimal point in the product. Write an explanation to help Ameen. Use words and numbers to support your thinking.





# **Check Your Understanding**

# **Multiplying Tenths by Tenths**

### **Learning Targets**

- I can use models to represent multiplying decimals.
- I can explain patterns when multiplying tenths by tenths.



egm5097

# **ACCESS**

The Debate Read the story. Choose the student you think is correct. Use words and numbers to explain your thinking.

Kamal and Nadia are having a debate in math class. Their teacher asked them what place value the product would be in if they multiplied two numbers in the Tenths place, such as 0.5 and 0.7.

Kamal said the Tenths place because multiplication makes numbers greater. Multiplication is repeated addition, so Tenths times Tenths would be adding a lot of Tenths together and that would make more Tenths or a whole number.

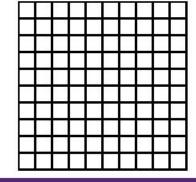
Nadia said the Hundredths place, because  $10 \times 10 = 100$ , so the product of two numbers in the Tenths place would have a product in the Hundredths place.

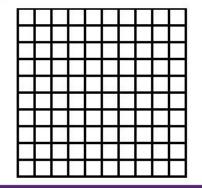
Who do you think is correct? Explain your thinking.

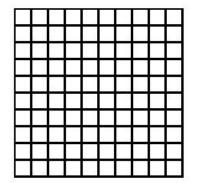
### BUILD

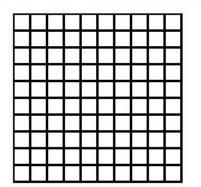
Multiplying with Arrays Work with your teacher to explore multiplying decimals with arrays.

**Exploring with Tenths** Use the Base 10 grids to find the products.

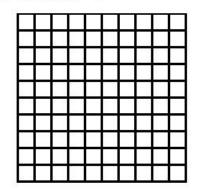




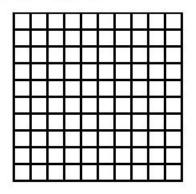




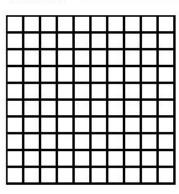
**5.** 0.9 × 0.5 = \_\_\_\_\_

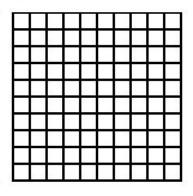


**4.** 0.7 × 0.8 = \_\_\_\_\_\_



7. 1.6 × 0.4 = \_\_\_\_

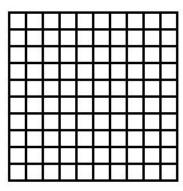


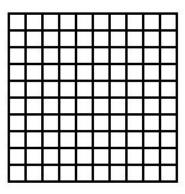


Writing About Math Your friend was absent and missed today's math lesson. Explain why the product is in the Hundredths when multiplying Tenths by Tenths.

Use Whiteboard: Base 10 Grids or create two grids in your journal to provide an example to help your friend understand the concept.

Whiteboard: Writing About Math Use the given Base 10 grids or create two grids in your journal for use in the next task.







# **Check Your Understanding**

# **Estimating Decimal Products**

### **Learning Target**

I can estimate products of decimals.





Rounding Decimals Round items 1–3 to the nearest whole number. Round items 4-8 to the Tenths place.

1. 24.3

4. 37.44

7. 69.248

2. 1.86

- **5.** 649.825
- 8. 174.496

**3.** 19.52

6. 0.839

### BUILD

Estimating Decimal Products Estimate the products by rounding or using compatible numbers.

- 1. 24.3 × 1.8
- Estimate:
- 2. 8.2 × 11.5
- Estimate: \_\_\_\_\_
- 3. 6.7 × 11.5
- Estimate:
- 4. 99.6 × 12.7
- Estimate: \_\_\_\_\_
- 5. 58.25 × 99.3
- Estimate:
- 6.  $649.9 \times 0.8$
- Estimate: \_\_\_\_\_
- 7. 47.1 × 33.6
- Estimate: \_\_\_\_\_
- 8. 450.321 × 2.2
- Estimate:
- 9.  $121.352 \times 3.8$
- Estimate:

Meal Planning Ezz is a public health nutritionist. Use the table and chart to help him plan three different shopping options for his clients. Each client has 2,000 LE to spend per month on food.

Select the items you would like to purchase and decide how many of each (the quantity) you will buy. Estimate to find the total spent per item. Keep a running total and make sure to stay close to 2,000 LE.

Milk (regular), (0.25 L)	3.69 LE
Loaf of Fresh White Bread (125.00 g)	2.40 LE
Rice (white), (0.10 kg)	1.12 LE
Eggs (one dozen)	21.60 LE
Local Cheese (0.10 kg)	5.19 LE
Chicken Fillets (0.15 kg)	10.73 LE
Beef Round (0.15 kg) (or Equivalent Back Leg Red Meat)	20.31 LE
Apples (0.30 kg)	7.28 LE
Bananas (0.25 kg)	3.18 LE
Oranges (0.30 kg)	2.42 LE
Tomatoes (0.20 kg)	1.28 LE
Potatoes (0.20 kg)	1.22 LE
Onions (0.10 kg)	0.61 LE
Lettuce (0.20 head)	0.94 LE

### Example

Food Item	Actual Cost LE	Rounded Cost LE	Quantity	Equation	Running Total Estimated Cost LE
Eggs	21.60	22	10	22 × 10 = 220	220
Cheese	5.19	5	30	5 × 30 = 150	220 + 150 = 370

1.

Food Item	Actual Cost LE	Rounded Cost LE	Quantity	Equation	Running Total Estimated Cost LE

2.

Food Item	Actual Cost LE	Rounded Cost LE	Quantity	Equation	Running Total Estimated Cost LE

3.

Food Item	Actual Cost LE	Rounded Cost LE	Quantity	Equation	Running Total Estimated Cost LE

# **CONNECT**

Math at Work Nadia is a museum curator. She wants to repaint the gallery walls, which are measured in meters.

There are four walls, each measuring  $3.8 \text{ m} \times 15.2 \text{ m}$ . Estimate how many square meters she needs to cover with paint. Explain your thinking.



**Painting Supplies** 



# **Check Your Understanding**

# Using the Area Model to **Multiply Decimals**



egm5101

### **Learning Target**

I can use the area model to multiply decimals.

# **ACCESS**

Area Model Puzzles Look at the area models. Some of the numbers are missing. Use the information provided to fill in the blanks.

Write the problem, and then find the product. Be prepared to share your reasoning or strategy for finding what was missing in each diagram.

1.

	20	8
50	1,000	?
?	80	32

	?	6
60	1,200	360
?	80	24

Product: \_\_\_\_\_

Product: \_\_\_

30

1,500

60

4

200

?

5.

j.	?	?	5
30	12,000	600	150
?	1,600	80	?

Product: \_

Product: \_\_\_\_

3.

2.

50

?

86	40	?	
80	3,200	560	
?	120	21	

Product: \_

### BUILD

**Extending Multiplication Patterns** Look for patterns in each set of problems. Use the patterns to complete the unanswered problems.

1. 
$$80 \times 3 = 240$$

$$8 \times 30 = 240$$

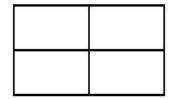
$$8 \times 0.3 = 2.4$$

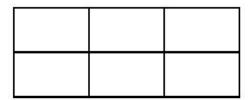
**2.** 
$$7 \times 600 = 4,200$$

$$7 \times 6 = 42$$

$$7 \times 0.06 = 0.42$$

Decimal Area Models Use an area model to complete each problem.





# CONNECT

Math at Work Malak works for a construction company. The company had 12 pallets of cinder blocks delivered for a building project. Each pallet weighed 1.36 metric tons.

Help Malak revise and complete the area model to figure out how much the cinder blocks weighed all together. If necessary, place a decimal point in the partial products. Use estimation to explain why your answer is reasonable.

<u> </u>	1	0.3	0.06
10	10	30	6
2	2	6	12



## **Check Your Understanding**

## **Multiplying Decimals through** the Hundredths Place



egm5103

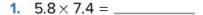
#### **Learning Targets**

- · I can use the standard algorithm to multiply decimals through the Hundredths place.
- I can use estimation to check the reasonableness of my answers.



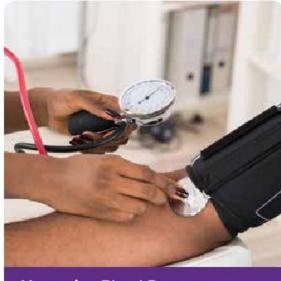
Place the Decimal Point Math is important to doctors. Doctors must be precise in their calculations and measurements, especially when prescribing medicine for their patients. Misplacing a decimal point can be problematic.

The digits of the product for each problem have been provided, but the decimal point is missing. Without multiplying, use your reasoning to place the decimal point correctly in the product.



4,292

17,172



**Measuring Blood Pressure** 

28,032

7,546

### BUILD

**Same and Different** Review both completed problems shown. Identify what is the same and what is different in the problems. Be prepared to share your thinking with the class.

$$\begin{array}{cccc} & & & & & & \\ 43 & & & 4.3 \\ \hline \times 18 & & \times 0.18 \\ \hline 344 & & 344 \\ + 430 & & + 430 \\ \hline 774 & & 0.774 \\ \end{array}$$

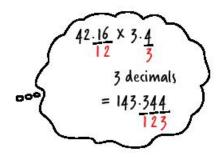
Using the Standard Algorithm for Decimal Numbers Find the product for each multiplication problem using the standard algorithm.



Writing About Math Two students are having a discussion based on the student work shown here. Read their discussion and respond to the prompt.

**Dalal:** I know the student placed the decimal correctly because 143.344 is close to her estimate of 126.

**Doha:** I know she placed the decimal correctly because the final product has three decimal places and there are three decimal places altogether in both factors of the problem.



Do you agree with Dalal or Doha? Can you count decimal places in the factors to place the decimal in the product? Explain your thinking.



### **Check Your Understanding**

# Multiplying Decimals through the Thousandths Place



Quick Code egm5105

#### **Learning Targets**

- I can use the standard algorithm to multiply decimals through the Thousandths place.
- I can use estimation to check the reasonableness of my answers.

# **ACCESS**

Place the Decimal Points Math is important to architects. Architects draw blueprints to design buildings that are safe and beautiful. Misplacing a decimal point can cause problems during construction.

The correct product for each problem has been given. Without multiplying, use reasoning to place the decimal point correctly in one or both factors. More than one correct answer is possible.

- 1.  $38 \times 64 = 24.32$
- 2.  $532 \times 17 = 9.044$
- 3.  $18 \times 145 = 261$
- 4.  $826 \times 43 = 3.551.8$

### BUILD

Making Sense of the Standard Algorithm Use the standard algorithm to find the products.

1. 7.184 × 6.3

4. 8.108 × 0.45

2. 2.607 × 41 **5.** 6.429 × 1.9

3. 5.328 × 7.9 6. 8.375 × 20

# CONNECT

Writing About Math Reflect on the Essential Question: How does understanding place value help to multiply decimals more efficiently?



### **Check Your Understanding**

# **Decimals and the Metric System**

Quick Code egm5107

#### **Learning Targets**

- I can explain relationships between the metric system and decimals.
- I can use decimals to represent equivalent measurements.

# **ACCESS**

What Would You Use? Look at each image. Select the most appropriate unit of measurement from the given terms to measure the length of each object. Then, answer the question.

millimeters centimeters meters kilometers

1. Pencil: Unit of measure \_\_\_\_\_



2. Height of building: Unit of measure \_\_\_\_\_



3. Length of dinner table: Unit of measure \_\_\_\_\_



# Multiplying Decimals



4. Length of the Nile River: Unit of measure \_



- 5. Length of insect: Unit of measure \_
- 6. Describe the relationship between millimeters, centimeters, meters, and kilometers.

### BUILD

Back-to-Back, Front-To-Front Follow your teacher's directions to play Back-to-Back, Front-to-Front with your classmates.

Metric Measurements as Decimals Complete the chart. Use whole numbers and decimals to write equivalent measurements.

1. Measurements for Length

Unit of Measurement	In Millimeters	In Centimeters	In Meters
Millimeter	1		
Centimeter		1	
Meter			1

2. Measurements for Mass

Unit of Measurement	In Grams	In Kilograms
Gram	1	
Kilogram		1

3. Measurements for Capacity

Unit of Measurement	In Milliliters	In Liters
Milliliter	1	
Liter		1

Metric Match Select the equivalent measurement.

4	10 070 ~ -	l.e
1.	10,870 g =	kg

10. 694 mm = \_\_\_\_\_ cm

78

780

# CONNECT

Math at Work Yousra is a veterinarian. She needs to weigh a cat to see if it is healthy.

Yousra records that the cat weighs 3.648 kilograms. Her assistant records that the cat weighs 3,648.0 grams.

Do you agree with Yousra or her assistant? Why?



### **Check Your Understanding**

### Measurement, Decimals, and Powers of Ten



egm5109

#### **Learning Target**

 I can relate converting measurements in the metric system to multiplying by powers of ten.

# ACCESS

Powers of Ten Complete each equation. Discuss the difference between powers of 10 and multiples of 10.

1. 
$$425 \times 10 =$$
 \_\_\_\_\_ = 0.425 7. \_\_\_\_  $\times$  1,000 = 1,800

### BUILD

Converting Measurements Use multiplication and powers of 10 to convert the measurements.

1. Amgad is a weightlifter. He needs to drink about 4,230 milliliters of water every day. How many liters of water does he need? Select the multiplication problem that could be used to answer the question.

C. 
$$4,230 \times 0.01$$

Lesson 9: Measurement, Decimals, and Powers of Ten

2. 142 centimeters = ? meters

3. 317 kilograms = ? grams

## **Multiplying Decimals**

Identify the Correct Conversion Study each problem. In each problem, mark whether the multiplication given to complete the conversion is correct. Select Y for yes and N for no. Then, complete all conversions by filling in each blank with the equivalent measurement (even if the conversion is incorrect).

A. 0.007 kg =	G. 4 cm =	M. 1.5 m =	T. 0.8 cm =
g	m	cm	mm
0.007 × 1,000 Y / N	4 × 0.01 Y / N	1.5 × 0.01 Y / N	0.8 × 0.1 Y / N
B. 51 mm =	H. 500 mL =	N. 6,410 cm =	U. 10.3 m =
cm	L	m	cm
51×10 Y / N	500 × 1,000 Y / N	6,410 × 0.01 Y / N	$10.3 \times 0.01  \text{Y}  /  \text{N}$
C. 230 cm =	I. 5.67 m =	P. 6,410 m =	V. 9,320 mm
m	cm	km	cm
230 × 0.01 Y / N	$5.67\times10~\text{Y}$ / N	6,410 × 0.001 Y / N	9,320 × 10 Y / N
D. 4,800 mL =	J. 782 mm =	Q. 350 cm =	W. 9,320 cm =
L	cm	m	m
4,800 × 0.1 Y / N	782 × 10 Y / N	350 × 0.01 Y / N	9,320 × 0.01 Y / N
E. 10 mm =	K. 782 m =	R. 5.5 kg =	X. 0.97 kg =
cm	km	g	g
10 × 0.1 Y / N	782 × 0.001 Y / N	5.5 × 1,000 Y / N	$0.97\times 1{,}000~\textrm{Y}~/~\textrm{N}$
F. 500 m =	L. 315 cm =	S. 3,250 cm =	Y. 970 cm =
km	m	mm	m
500 × 0.001 Y / N	315 × 0.01 Y / N	3,250 × 0.1 Y / N	970 × 100 Y / N

# **CONNECT**

Math at Work There are two categories of weightlifting: the Snatch and the Clean and Jerk. World Champion Egyptian weightlifter Mohamed Ehab wants to compare his personal best in these two categories. In the Snatch, he was able to lift 173 kilograms. He was able to lift 201,000 grams in the Clean and Jerk. Use multiplication and powers of 10 to explain which measurement is greater.





### **Check Your Understanding**

# **Solving Multistep Story Problems**



#### **Learning Target**

 I can solve multistep story problems involving addition, subtraction, and multiplication of decimals.



Write a Story Problem Write a story problem for  $342 \times 0.001$ . Your problem must include a measurement conversion, so be sure to include the units in your scenario.

### BUILD

What Do You Know? Read each story problem. Discuss with your partner how to solve each problem. Once you agree on a plan, work together to answer the question. Be sure to label your answers with the correct unit of measure.

Marwan is a computer engineer. The computer he is repairing is currently in three pieces that have a mass of 2 kilograms, 600 grams, and 0.03 kg. His manager is waiting for the last piece, which has a mass of 1,750 g, to arrive. What will the mass of the computer be when it is completely assembled?



		How many, if any, will be left over?
	3.	Dalia made a liter of sugar cane juice. She drank 320 milliliters. Her father
		drank 0.25 liters. How much sugar cane juice is remaining?
	4.	Ehab wants to know how much he has grown this year. In January, he was 138.2 centimeters. By the end of the year, he was 1.5 meters tall. How much of
		Ehab grow this year?
stock.com	5.	Ehab's twin sister Eman also wants to know how much she grew. In January, she was 1.34 meters. At the end of the year, she was 145 centimeters. Who
Shutters		grew more—Ehab or Eman? How much more?
t Sun Shine	£	CONNECT
De Cred	Ma	ath at Work Read the story problem. Record your problem-solving plan. Use

2.	Rania is a nurse in a hospital. She is getting wrap bandages from the storage closet for her patients. She needs 1.35 meters of bandages for each of her 4 patients. There are 250 centimeters in each package. How many packages
	does she need?
	How many, if any, will be left over?
3.	Dalia made a liter of sugar cane juice. She drank 320 milliliters. Her father
	drank 0.25 liters. How much sugar cane juice is remaining?
4.	Ehab wants to know how much he has grown this year. In January, he was 138.2 centimeters. By the end of the year, he was 1.5 meters tall. How much did
	Ehab grow this year?

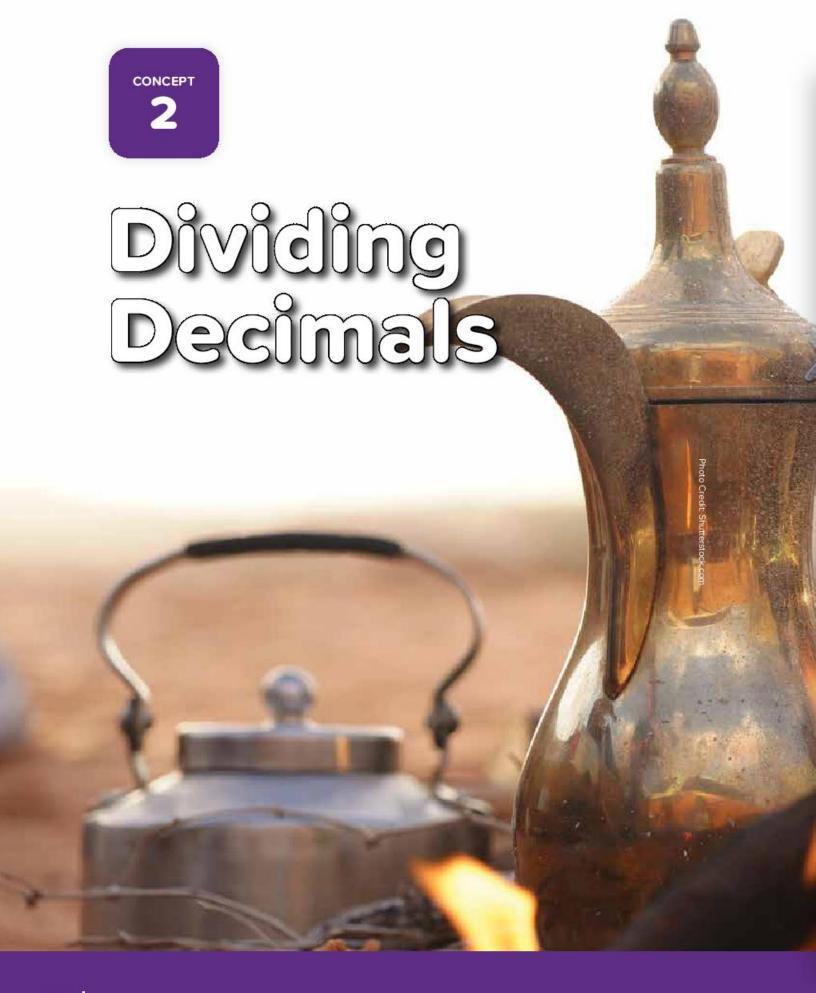
# CONNECT

at Work Read the story problem. Record your problem-solving plan. Use words, numbers, or pictures to explain how to solve the problem.

Marwan is designing a new circuit board for the computer he is repairing. The old circuit board measured 7.25 centimeters by 36 millimeters. He planned for the new circuit board to be 80 mm by 5.5 cm. What is the difference in area of the circuit boards?



### **Check Your Understanding**



# **Dividing by Powers of Ten**



egm5114

#### **Learning Target**

I can explain patterns I notice when dividing by powers of 10.

# \* ACCESS

**Division Practice** Use any division strategy to find the quotients.

### BUILD

Dividing by Powers of Ten Complete each division problem mentally. Look for patterns to predict the placement of the decimal point.

1. 800 ÷ 100 = \_\_\_\_

**How Hot?** Temperatures must reach at least 1,100°C for glass to be blown or for earthenware clay to harden. Water boils at about one-tenth of that temperature. Select the choice that is closest to the temperature at which water boils.

A.  $1,100 \times 10$ 

B. 1,100 ÷ 10

C.  $1,100 \times 0.1$ 

D. 1,100 ÷ 0.1







## **Check Your Understanding**

# Patterns and Relationships in Powers of Ten



Quick Code egm5116

#### **Learning Target**

• I can make connections between multiplying and dividing by powers of ten.

# **ACCESS**

**Human Equations** Follow your teacher's directions to create and solve multiplication and division problems with your classmates.

### BUILD

**The Answer Is...** Your teacher will assign you to a group. Evaluate the expressions in the set for your assigned group. Think about how you knew which way to move the decimal point.

Group 1	Group 2
510.05 × 0.001 =	510.05 ÷ 0.001 =
510.05 × 0.01 =	510.05 ÷ 0.01 =
510.05 × 0.1 =	510.05 ÷ 0.1 =
510.05 × 10 =	510.05 ÷ 10 =
510.05 × 100 =	510.05 ÷ 100 =
510.05 × 1,000 =	510.05 ÷ 1,000 =

Same Answer, Inverse Operation Complete each equation with the correct power of 10. Be sure to look carefully at the given operation.

Metric Conversions with Multiplication and Division Complete each conversion.

Then, write a multiplication equation and a division equation with the same answer.

$$357 \text{ cm} = 3.57 \text{ m}$$

$$357 \times 0.01 = 3.57$$

$$357 \div 100 = 3.57$$

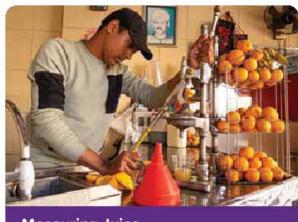
# CONNECT

Math at Work Nour is making a new drink to sell at his juice stall by combining mango juice, orange juice, and guava juice. Look at the recipe to help him decide which container you think he should use to mix his new drink. Explain your choice using multiplication and division.

2,250 mL of mango juice

0.95 L of orange juice

650 mL of guava juice



**Measuring Juice** 

Identify the container you think it is best for Nour to use: 3 L 4 L 5 L



### **Check Your Understanding**

# **Modeling Decimal Division**

Quick Code

#### **Learning Targets**

- I can explain the meaning of decimal division problems.
- · I can use models to represent decimal division.

# **P**ACCESS

Understanding Division Story
Problems Read the problems
with your group and think
about what is happening in
each situation. Discuss how the
problems are similar and how the
problems are different.

 Hazem is making jewelry. He has 1,632 beads. He is asked to use the same number of beads on each of 24 necklaces.



2. Manal is also making jewelry. She has 1,632 beads. She is asked to use 24 beads on each necklace.

### BUILD

**Interpreting Decimal Division** Read each story problem. Determine whether the quotient represents how many groups or how many in each group. Be prepared to share your reasoning.

- Amal had 4.32 meters of string. Each bracelet she makes uses 0.96 m of string.
   How many bracelets can Amal make?
- Amir and his mother traveled 134.4 kilometers over 3 days, traveling the same distance each day. How many kilometers did Amir and his mother travel in 1 day?

- 3. Five bakers shared 8.9 kilograms of sugar equally. How much sugar did they each receive?
- 4. A rope that is 8.9 meters long is cut into 3 equal pieces. How long is each piece?
- 5. Hoda is making hair bows. She has 5.6 meters of fabric. Each hair bow is made from 0.34 m of fabric. How many bows can Hoda make?
- 6. A team of workers construct 0.75 kilometers of road each day. How long will it take them to construct 26.8 km of road?
- 7. Kamel has a 6.83 kilograms bag of peanuts. He split the peanuts evenly into 5 bags. What is the weight of each bag of peanuts?

Modeling Decimal Division Use your Base 10 blocks to model the problem. Write the quotient for each division.

# CONNECT

Writing About Math Create a story problem that involves division of decimals. Explain the meaning of your story problem and whether the quotient represents how many groups or how many in each group. You do not need to solve your story problem.



### **Check Your Understanding**

# **Estimating Decimal Quotients**



Quick Code egm5120

#### **Learning Target**

I can estimate quotients of decimal division problems.

# **ACCESS**

Overestimate or Underestimate? Look at the student work below. Without doing the calculation, determine whether each student's estimate is an overestimate or underestimate of the exact answer. Be prepared to share your reasoning.

overestimate or underestimate

overestimate or underestimate

3. Problem Estimate

$$3.915 \div 436 = 4.000 \div 400 = 10$$

overestimate or underestimate

### BUILD

Estimating Decimal Quotients Estimate the quotient for each expression by rounding the divisor and dividend to the nearest compatible whole numbers.

- 1. 45.64 ÷ 6.87
- My Estimate: \_\_\_\_\_

2. 4.98 22.12

My Estimate: \_\_\_\_\_

3. 3.25)10.17

My Estimate: \_\_\_\_\_

4. 45.35 ÷ 5.3

My Estimate: \_\_\_\_\_

**5.** 18.52 62.31

My Estimate: \_\_\_\_\_

6. 21)492.7

My Estimate: \_\_\_\_\_

Planning for a New Building Emad, an electrician, is the project manager for an upcoming construction project. He needs your help finding estimates for various projects on site. Read through each problem and estimate the answer.



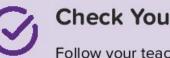
1. A team of workers excavates 15.84 cubic meters (m<sup>3</sup>) of dirt each hour. How long will it take them to excavate 78.1 m<sup>3</sup> of dirt?

- 3. Each floor of the building needs 28.3 meters of plastic piping. The team has a total of 314.58 m of piping. How many floors can they fit with the piping?
- 4. Each steel joist can support 224.6 kilograms of weight. How much weight can 10 steel joists support?
- 5. The team has a total of 668.7 meters of electrical wiring for the building they are constructing. If each floor receives the same amount of wiring, how much wiring can they put on each of the 9 floors?
- 6. The building code requires there to be a window every 4.3 meters apart. If the front of the building is 38.9 m long, how many windows will there be?

# **CONNECT**

Writing About Math Describe in your own words what you have learned about decimal multiplication and division so far. What questions do you still have? You may use words, numbers, and pictures to explain your thinking.





### **Check Your Understanding**

### LESSON 15 **Dividing Decimals by** Whole Numbers



#### **Learning Targets**

- I can use the standard algorithm to divide decimals through the Thousandths place.
- I can use estimation to check the reasonableness of my answer.

# **ACCESS**

What Does the Remainder Mean? Use the standard algorithm for division to find the quotients.

- 1. Reda works as a plumber. He has 150 meters of copper pipe that he needs to cut into 40 equal-sized smaller pipes. How long will each pipe be? How much pipe will be leftover?
- 2. The city council is beautifying the city by planting trees along the roadside. The road is 2,050 meters long and the council has 75 trees which they are spacing an equal distance apart. What is the distance between each tree?

### BUILD

Getting Rid of Remainders Use the standard algorithm to find the quotients. Make sure that your answer does not include a remainder. Check your answer for reasonableness.

- Reda works as a plumber. He has 150 meters of copper pipe that he needs to cut into 40 equal-sized smaller pipes. How long will each pipe be?
- 2. The city council is beautifying the city by planting trees along the roadside. The road is 2,050 meters long and the council has 75 trees which they are spacing an equal distance apart. What is the distance between each tree?
- 3. Emad, the electrician, has 4.5 meters of wire that is cut into 30 pieces that are all the same length. Find the length of each piece of wire.

**4.** 9)121.1

- 6. 16 62.24
- 8. 30)589.5

- **5.** 5)51.65
- 7. 6 73.02

# **CONNECT**

No Hibiscus Left Over Read the problem carefully. Then, use the standard algorithm for division to find the quotients.

Dalia wants to pour 20 liters of hibiscus equally into 50 cups. How much hibiscus (in liters) will be in each cup?





### **Check Your Understanding**

# **Dividing Decimals by Decimals**



Quick Code egm5124

#### **Learning Targets**

- I can use the standard algorithm to divide decimals through the Thousandths place.
- I can use estimation to check the reasonableness of my answers.

# **ACCESS**

Missing Numbers Complete each equation by choosing from the given values. Choices may be used more than one time or not at all.

3	10	12	30	100	120	300	1,200

Make It a Whole Number Work with your teacher to complete each division problem. Estimate the quotients. Then, use the standard algorithm for division to find the quotient. Use your estimates to check the reasonableness of your answers.

1. 2.2)26.4 Estimate: \_\_\_\_\_

Quotient: \_\_\_\_\_

2. 0.4)99 Estimate: \_\_\_\_\_

Quotient: \_\_\_\_\_

3. 0.04)1.5 Estimate:

Quotient:

**Let's Try It Together** Work with your partner to estimate the quotients. Then, use the standard algorithm for division to find the quotients. Stop dividing at the Thousandths place. Use your estimates to check the reasonableness of your answers.

1. 1.9)9.956	Estimate:	<b>4.</b> 0.05)1.43	Estimate:
<b>2</b> . 7.3)3.431	Estimate:	<b>5.</b> 0.5)44	Estimate:
3. 0.04)0.51	Estimate:	<b>6.</b> 0.7)70	Estimate:

	π
	Ħ
	r
	3
	F
	U
	5
	F
	巾
	H
	Ų

<b>7.</b> 0.03)90	Estimate:	9. 0.5)0.91	Estimate:
<b>8.</b> 0.04)57.6	Estimate:	10. 0.5)1.3	Estimate:

# CONNECT

**Error Analysis** Evaluate the student's work below. Explain the error (or errors) the student made. Then, perform the division correctly to find the quotient.

Divide: 0.3 77.43

Student's work:  $77.43 \div 0.3$  will have the same quotient as  $7.743 \div 3$ .



### **Check Your Understanding**

# Solving Challenging Multistep Story Problems



Quick Code egm5126

#### **Learning Target**

 I can solve multistep story problems involving addition, subtraction, multiplication, and division of decimals.

# **P**ACCESS

Telling My Story Write a story problem that can be modeled by the expression 342 ÷ 0.01. Include the use of measurement in your problem. Then, find the quotient, including the units of measure.

### BUILD

**Solving Multistep Problems** Read each problem carefully. Identify what is known and what is unknown. How would you use that information to solve each problem? Label all answers, using a unit of measure when appropriate.

Abdallah buys the sturdiest boxes for the produce at his market. He wonders
what the mass of the box is in kilograms. The total mass of a box and 3 identical
pomegranates is 1.03 kg. When the identical pomegranates in the box are
tripled, the total mass is 2.29 kg. What is the mass of one of Abdallah's empty

boxes? \_\_\_\_\_

2. Samira is training for her weightlifting competition. She attaches 4 weights to her bar—a pair of larger weights and a pair of smaller weights. One of the larger weights is 12.4 kilograms heavier than one of the smaller weights. Together the four weights have a mass of 100 kg. What is the total mass of the pair of larger

weights? \_\_\_\_\_

Basem is having a sale at his sweets shop. One chocolate candy is 1.95 LE. He will provide 2 free candies for every 10 bought. A customer wants to buy 100

candies for an event. How much will the customer spend? \_\_\_\_\_

Partner Problem Solving Work with your partner to solve your assigned problem. Then, collaborate to make a poster illustrating your problem-solving process.

1. As part of her fitness training, Samira cycles 42.12 kilometers in 2 hours.

If she cycles at the same rate the entire time, how far will she travel in 1 hour? Give your answer in km and meters using whole numbers.

\_\_\_\_\_ km and \_\_\_\_\_ m

2. Magdy is filling identical vases with water for flower arrangements at the florist. He pours 18 liters and 250 milliliters equally into 24 vases. When he is finished, Magdy still has 0.85 L of water left.

How much water is in each vase? Give your answer in liters. \_\_\_\_\_

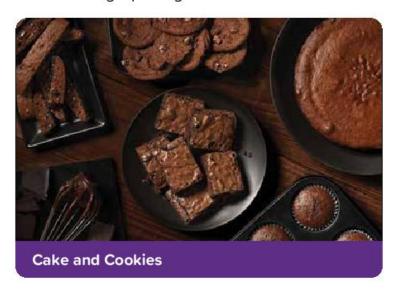
3. Omar had 30 kilograms of planting soil for his garden. He used 2.8 kg in each of his 5 large planters. He used 0.4 kg to fill each of his remaining pots.

Find the maximum number of pots Omar can fill with his planting soil. Label your answer.

4. The mass of a package of cake is 0.08 kilograms heavier than the mass of a package of cookies. The mass of 6 packages of cake is the same as the mass of 9 packages of cookies. Label your answers.

What is the mass of a single package of cookies?

What is the mass of a single package of cake? \_\_\_\_\_





Writing About Math Reflect on your problem-solving process. Write a note to yourself about things to remember when solving multistep problems.



### **Check Your Understanding**

UNIT

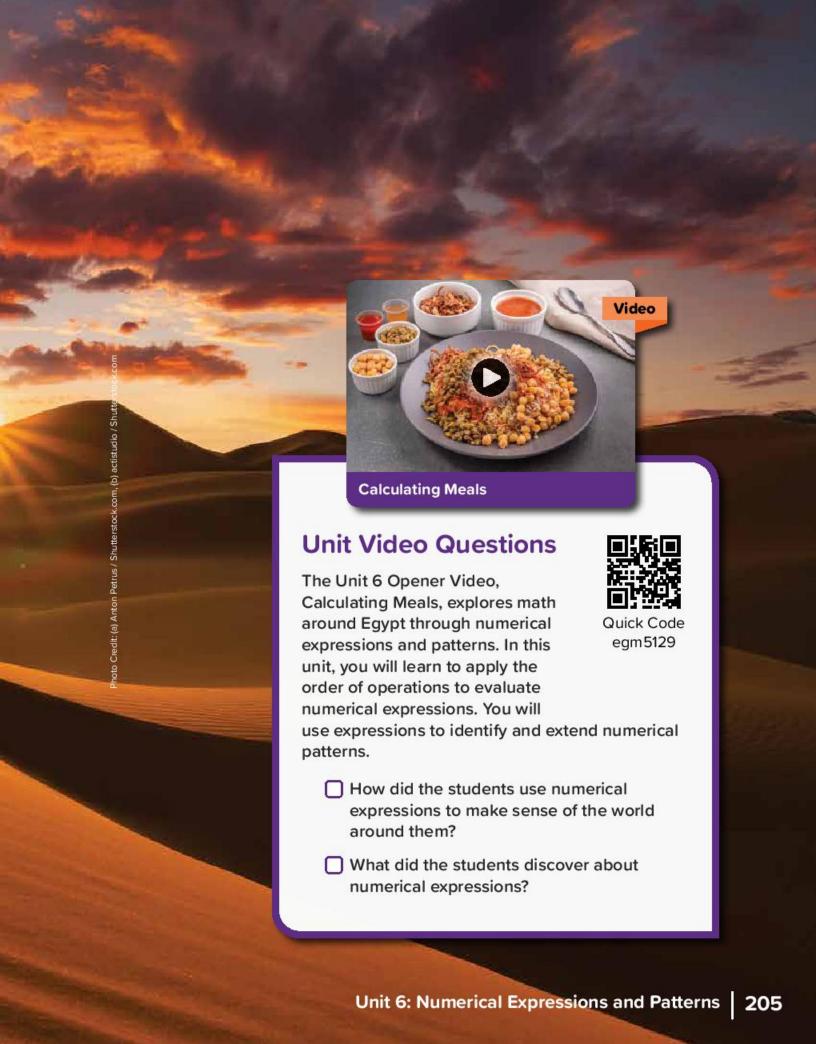
6

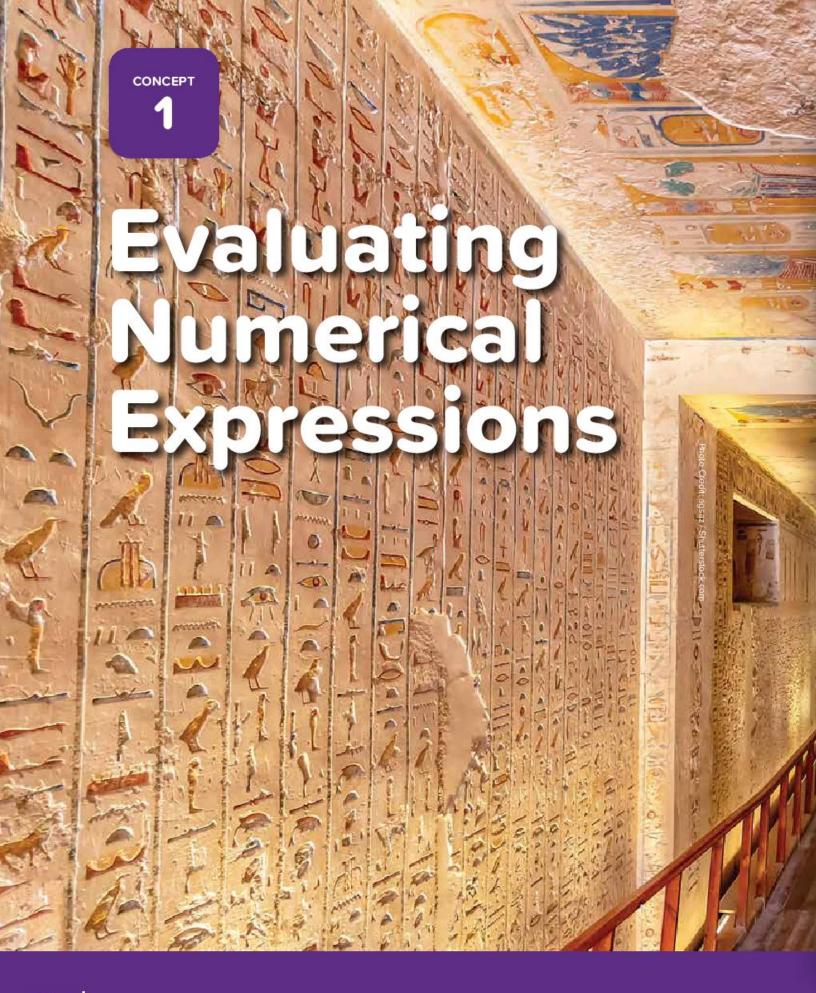
Theme 2 | Mathematical Operations and Algebraic Thinking

# Numerical Expressions and Patterns

lit: Anton Petrus / Shutterstock.com







## **Numerical Expressions**

## Quick Code egm5131

## **Learning Target**

I can use the order of operations to evaluate expressions with whole numbers and decimals.

## **P**ACCESS

Fill in the Blank Record the missing value to complete each equation.

**2.** 
$$\div$$
 9.2 = 4.8

## BUILD

Order Matters Use the order of operations to evaluate each expression.

## **Basic Order of Operations**

- 1. Multiply or divide from left to right.
- 2. Add or subtract from left to right.

1. 
$$82.43 \times 3.1 + 4.05 \div 0.01 - 2.5$$

**4.** 
$$90.7 + 116.6 \times 0.1 \times 2 - 20$$

2. 
$$56.5 \times 2.3 - 15 + 12.7$$

3. 
$$597.8 \div 6.1 + 13 \times 1.7$$

One Step at a Time Evaluate each expression, one step at a time, with your class or group. Be sure to rewrite the expression after each step.

1. 
$$145.42 - 7.11 \times 10 + 13.2$$

3. 
$$102.15 + 6 \div 1.2 - 34 \times 2.3$$

2. 
$$35 \times 0.1 + 89.14 \div 0.1$$

## The Right Route Ali driv of operations for evaluar

The Right Route Ali drives a bus route through the city. His stops follow the order of operations for evaluating the expression.

$$300.53 - 11.04 \times 0.2 \div 0.01 + 13.07$$

STOP1	STOP 2	STOP 3	STOP 4
A. 300.53 – 11.04	E. 2.208 ÷ 0.01	J. 57.898 ÷ 0.01	N. 5,789.8 + 13.07
B. 11.04 × 0.2	F. 0.2 ÷ 13.08	K. 220.8 + 13.07	P. 79.73 + 13.07
C. 0.2 ÷ 0.01	G. 289.49 × 0.2	L. 289.49 × 20	Q. 300.53 – 233.87
D. 0.01 + 13.07	H. 11.04 × 20	M. 300.53 – 220.8	R. 57.898 + 13.07

Record the letters of the correct stops along his route to show the steps for evaluating the expression.

1. Stop 1: \_\_\_\_\_

3. Stop 3: \_\_\_\_\_

2. Stop 2: \_\_\_\_\_

4. Stop 4: \_\_\_\_\_





## **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

## LESSON 2

## Numerical Expressions with Grouping Symbols



Quick Code egm5133

## **Learning Targets**

- I can identify how grouping symbols affect the order of operations.
- · I can evaluate an expression with grouping symbols.

## **ACCESS**

Make It Smaller Work with a partner to describe how you could apply operations to the expressions so that they evaluate to the least possible value. You do not have to follow the standard order of operations.

1. 
$$10 \times 4 - 3$$

3. 
$$12 + 24 \div 4 + 8$$

2. 
$$15 \div 3 + 2$$

4. 
$$34 \times 28 \div 2 + 5$$

## BUILD

**Grouping Symbols** Evaluate the set of expressions. Pay attention to the grouping symbols and how they change the order in which the operations are performed.

## **Expanded Order of Operations**

- 1. For operations within parentheses
  - a. multiply or divide from left to right
  - b. add or subtract from left to right
- 2. For operations outside parentheses
  - a. multiply or divide from left to right
  - b. add or subtract from left to right

### Set A

1. 
$$45.84 + 13.05 \div 5 + 20.32 - 1.14 \times 2.1$$

2. 
$$(45.84 + 13.05) \div 5 + 20.32 - 1.14 \times 2.1$$

3. 
$$45.84 + 13.05 \div 5 + 20.32 - (1.14 \times 2.1)$$

**4.** 
$$45.84 + 13.05 \div 5 + (20.32 - 1.14) \times 2.1$$

**5.** 
$$45.84 + (13.05 \div 5 + 20.32 - 1.14) \times 2.1$$

**Grouping Symbols, Advanced** Evaluate the set of expressions. Pay attention to the grouping symbols and how they change the order in which the operations are performed.

## **Advanced Order of Operations**

- 1. For operations within parentheses
  - a. multiply or divide from left to right
  - b. add or subtract from left to right

b. add or subtract from left to right

3. For operations outside of parentheses or brackets

a. multiply or divide from left to right

b. add or subtract from left to right

Set B

1.  $30 \times 2.5 + 47.18 - 3.12 \div 0.1$ 

2.  $30 \times (2.5 + 47.18 - 3.12 \div 0.1)$ 

3.  $30 \times [2.5 + (47.18 - 3.12) \div 0.1]$ 

4.  $(30 \times 2.5 + 47.18 - 3.12) \div 0.1$ 

**5.**  $[30 \times (2.5 + 47.18 - 3.12)] \div 0.1$ 

## **Evaluating Numerical Expressions**

How Many Values? Use grouping symbols to create as many expressions with different values as you can.

1. 
$$29.2 + 43 \times 0.01 + 15 \div 0.1$$

2. 
$$158 \div 2 + 6 \times 10.5 - 5$$

3. 
$$57 - 11 \times 1.2 + 3.4 + 1.9 \div 10$$

## CONNECT

Place the Grouping Symbols Kamal placed grouping symbols in the expression. When he evaluated the expression, he found a value of 6.45.

What grouping symbols did he use? Where did he place them?

$$15.25 \div 2 + 3 + 6.8 \div 2$$



## **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

## LESSON 3

## **Placing Grouping Symbols**

## **Learning Targets**

- I can evaluate expressions with grouping symbols.
- I can place grouping symbols in expressions to generate given values.



Quick Code egm5187

## <sup>o</sup> ACCESS

**Hidden Symbols** Work with your teacher to evaluate expressions with and without grouping symbols.

## BUILD

Placing Grouping Symbols to Generate Values Place grouping symbols (parentheses and/or brackets) in the expressions to generate the given values. Be sure to evaluate the expression completely to make sure you are correct. (Hint: Sometimes grouping symbols are not needed.)

$$6-5\times7+2$$

$$9 \times 4 + 5 \div 3$$

$$2 \times 18 \div 9 + 9$$

$$88 \div 11 - 7 + 4$$

$$3.8 \times 9.5 + 6.25$$

$$3.8 \times 9.5 + 6.25$$

## **Evaluating Numerical Expressions**

- 8. The value is 526.8.  $20 + 33.29 \times 10 6.1$
- **9.** The value is 3,288.  $20 + 33.29 \times 10 6.1 \times 10$
- **10.** The value is 1,498.31.  $20 + 33.29 \times 10 6.1 \times 10$

**Challenge** Write your own expression with grouping symbols and evaluate. Make sure that the grouping symbols are necessary. Rewrite the expression without grouping symbols and ask your partner to place grouping symbols to generate your value.

## CONNECT

Writing About Math Reflect on the order of operations. Then, explain why it is possible for grouping symbols to change the value of an expression. Give an example to support your thinking.



## **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

## **LESSON 4**

## Writing Expressions to Represent Scenarios



Quick Code

## **Learning Target**

• I can write an expression to represent a written scenario.

## **ACCESS**

With or Without Evaluate each set of expressions. Think about how and when the parentheses change the value of the expression.

1. 
$$1.3 + 3.45 \times 8 - 2.02$$

$$(1.3 + 3.45) \times 8 - 2.02$$

3. 
$$64 \div 0.32 + 0.1 \times 3.2$$

$$64 \div (0.32 + 0.1 \times 3.2)$$

2. 
$$350 + 450.9 \div 2 + 23.7$$

$$350 + (450.9 \div 2) + 23.7$$

4. 
$$50.6 \times 12 - 6.8 \div 0.2$$

$$(50.6 \times 12) - 6.8 \div 0.2$$

## BUILD

**Writing Expressions** For each problem, work with a partner to write an expression that matches the clues. Then, evaluate the expression.

- 1. Subtract 3.1 from 4.62. Then, multiply the result by 2.
- 2. Divide 93 by 0.3 and then add 114.7. After, divide the result by 5.
- 3. Add 30.4, 87, and 17.5. Then, subtract the result from 224.7. Multiply by 100.

- 4. Multiply 7.6 by 100. Next, subtract 34.3. Then, add 12.4. Last, divide the result by 0.1.
- 5. Find the difference between 10 and 9.27. Multiply by the sum of 54 and 46. Then, divide 1,168 by the result.

**Expressions and Story Problems** For each problem, write an expression that matches the scenario. Then, evaluate the expression.

- 1. Kamel is saving money to buy a car. He currently has 1,000 LE. He begins working two jobs. At his first job, he saves 50 LE a week. At his second job, he saves 30 LE a week. He saves the money from his jobs for 4 weeks to add to his savings. How much does Kamel have saved at the end of the 4 weeks?
- 2. Mounir is lifting weights to help train for an upcoming competition. He attaches 4 weights to his bar—a pair of larger weights and a pair of smaller weights. Each large weight has a mass of 33.75 kilograms and is 17.5 kg heavier than each of the smaller weights. Together the four weights have a mass of 100 kg. What is the mass of one of the smaller weights?
- 3. As part of his fitness training, Mounir cycles 38.7 kilometers in 2 hours. If he cycles at the same rate the entire time, how many meters does he cycle per minute?



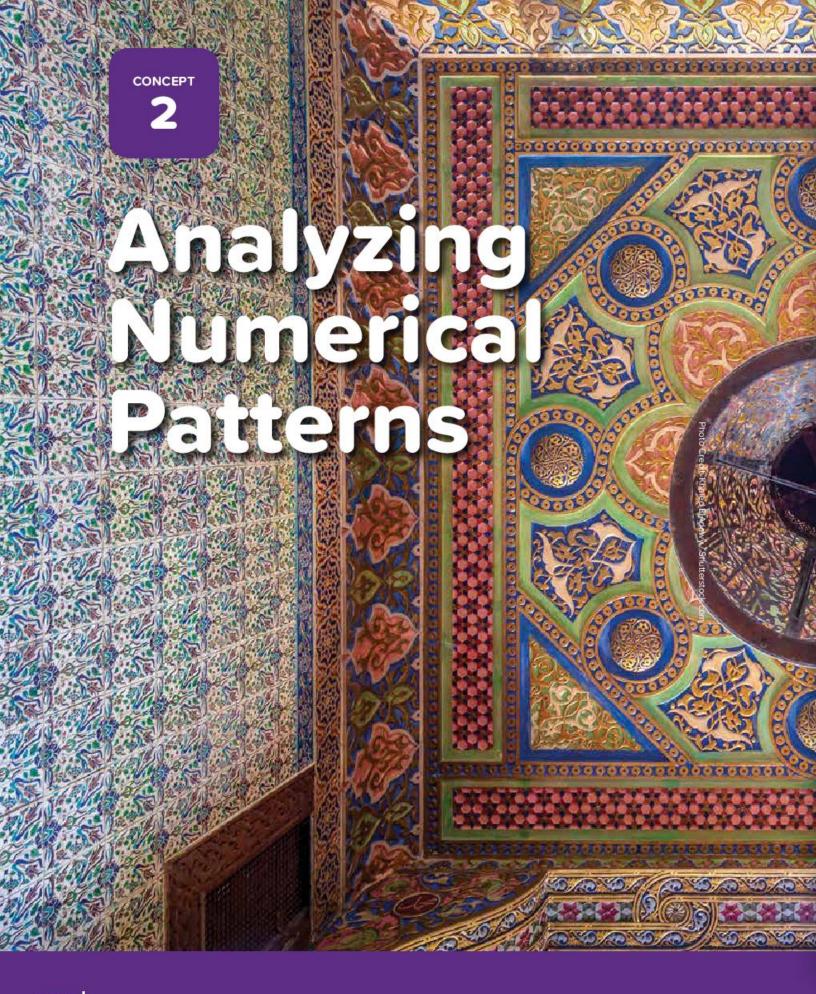
## CONNECT

Writing About Math Reflect on how the order of operations is used to represent real-world situations.





Follow your teacher's instructions to complete this activity.



## dit Khaled ElAdawy / Shutterstock.com

## Identifying Numerical Patterns

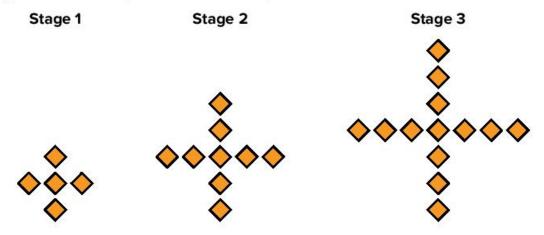
Quick Code egm5138

## **Learning Targets**

- I can identify a numerical pattern.
- I can explain the rule for a numerical pattern.
- I can use letters to represent unknown quantities in a rule for a numerical pattern.

## ACCESS

**Tile Pattern** Yaseen is laying floor tiles in the pattern shown. Each picture represents one stage of the pattern, and the pattern grows consistently between stages. Answer the questions about the pattern.



Draw Stage 4 and Stage 5. How many tiles do you think will be in Stage 10? Explain how you came up with your answer.

**Numerical Patterns** Look at each set of numbers and identify whether the numbers form a pattern. If yes, then identify the rule.

	Set	Pattern? (Y / N)	Rule
1.	5, 10, 20, 40, 80		
2.	3, 6, 9, 15, 21, 28		
3.	1.5, 3, 4.5, 6, 7.5		
4.	5, 3, 6, 1, 7, 5		
5.	1, 3, 9, 18, 54		
6.	85, 73, 61, 49, 37		

What's the Rule? Look at each table and determine the rule. Use a variable to write the rule.

1.

Input	Output
1	8
2	16
3	24
4	32
5	40

2.

Input	Output
1	8
2	9
3	10
4	11

Rule: \_\_\_\_\_

Rule: \_\_\_\_\_

3.

Input	Output
3	12
6	24
9	36
12	48

Rule: \_\_\_\_

4.

Input	Output
5	1
10	2
15	3
20	4
25	5

Rule: \_\_

5.

Number of Bicycles (Input)	Number of Wheels (Output)
1	2
2	4
3	6
4	8
5	10

Rule:\_

## Challenge:

Input	Output
2	3
4	7
6	11
8	15
10	19

Rule: \_





Writing About Math Look at the pattern and the two students' work. Then, respond to the prompt.

Write a rule using a variable and explain your thinking.

Input	Output
28	4
35	5
42	6
49	7
56	8

## Yahia's Work Rule: n x 7

I think the rule is multiply by 7 because  $4 \times 7 = 28$  and  $5 \times 7 = 35$  and it works for each pair.

## Walid's Work Rule: n ÷ 7

I think the rule is divide by 7 because  $28 \div 7 = 4$  and  $35 \div 7 = 5$  and it works for each pair.

Which student is correct? Explain how you know your answer is correct.



## **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

### LESSON 6

## Extending and Creating Numerical Patterns



Quick Code egm5140

### **Learning Targets**

- · I can extend a numerical pattern.
- · I can create a numerical pattern.
- I can create two numerical patterns using two given rules.

## <sup>o</sup> ACCESS

**Tile Pattern** Abeer is laying floor tiles in the pattern shown. Each picture represents one stage of the pattern. The pattern grows consistently between stages.

Answer the questions about the pattern.

Stage 1	Stage 2	Stage 3
<b>X</b>		

 How many blue tiles will be in Stage 4? How many yellow tiles will be in Stage 4?

Blue: \_\_\_\_\_ Yellow: \_\_\_\_

2. How many blue tiles will be in Stage 5? How many yellow tiles will be in Stage 5?

Blue: \_\_\_\_\_ Yellow: \_\_\_\_\_

3. How many blue tiles will be in Stage 10? How many yellow tiles will be in Stage 10?

Blue: \_\_\_\_\_ Yellow: \_\_\_\_\_

## BUILD

**Extending the Tile Pattern** Fill in the missing values. Use the rule for the tile pattern in ACCESS.

Number of Blue Tiles (Input)	Number of Yellow Tiles (Output)
144	A
225	В
C	324
400	D

**Extending Other Patterns** Write the rule for each pattern with a variable. Then, complete the pattern by finding the missing values.

- **1.** 52, 44, 36, 28, 20, \_\_\_\_\_, \_\_\_\_
- Rule: \_\_\_\_\_
- **2.** 23, 27, \_\_\_\_\_, 35, 39, \_\_\_\_\_, \_\_\_
- Rule:\_\_\_\_\_

3

Input	Output
5	20
6	A
7	28
B	32
9	36

Rule:

Input	Output
10	6
12	7
A	8
16	9

Rule: \_\_\_\_\_

5.

Input	Output
31	10
39	18
A	27
56	35
72	В

Rule: \_\_\_\_\_

Creating Patterns Using the information given, list the first five numbers in the pattern.

1. Starting number: 1

Rule: n + 3

2. Starting number: 3

Rule:  $n \times 2 - 1.5$ 

3. Starting number: 5.25

**Rule:** *n* ÷ 0.5

## **Analyzing Numerical Patterns**

4. Starting number: 11

**Rule:**  $(n + 3) \times 10$ 

Select your own starting number and rule. Write the first five numbers in your pattern.

Starting number:

Rule:

## CONNECT

Writing About Math When might it be helpful to identify and extend numerical patterns? Use words and numbers to explain your thinking.



## **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

### **LESSON 7**

## Solving Problems with Numerical Patterns



Quick Code egm5142

## **Learning Target**

· I can solve real-world problems involving numerical patterns.



What's the Rule? Explore the pattern. How can you extend the pattern? (Think: How are the numbers changing? Is the change the same every time?)

## BUILD

**Pyramid Pattern** Each picture represents one stage of the pattern, and the pattern grows consistently between stages.

Complete the table.

Stage 1	Stage 2	Stage 3

Stage	Number of Balls
1	1
2	5
3	14
4	A
5	В

Patterns in the Real World Use a pattern to help you solve each problem.

1. When Shams was 6 years old, her brother Tamer was half her age. How old will

Tamer be when Shams is 12?

2. Complete the table to show Shams' and Tamer's ages.

Shams' Age	Tamer's Age
15	A
17	В
C	16
22	D
E	21

A seamstress is making dresses. She noticed the amount of fabric she used to make 3 dresses and to make 5 dresses. Use the pattern to complete the table.

Number of Dresses	Fabric Needed (m)
1	A
2	В
3	7.5
4	C
5	12.5

4. How much fabric will the seamstress need to make 7 dresses? \_\_\_\_\_

How many dresses can the seamstress make with 42.5 meters of fabric?

5. The local library charges a fine on the first day a book is overdue. It charges another amount for each additional day it is overdue. The table shows the amount charged for a book that is overdue.

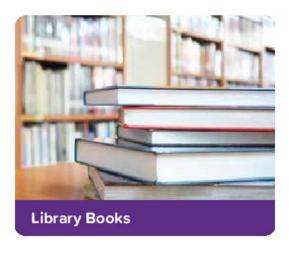
### **Fines for Overdue Library Books**

Days Overdue	Fine in LE
2	5
4	11
6	17

What is the amount charged for each additional day? \_\_\_\_\_

Following that rule, what is the amount charged on the first day?

6. Write a rule with a variable for how much the library charges where n is the number of days the book is overdue. Remember to include the amount charged on the first day in your rule.





Writing About Math Where do you see patterns in your life? Describe how those patterns change.



## **Check Your Understanding**

Follow your teacher's instructions to complete this activity.

## Primary 5 Resources

- Glossary
- Index



## acute

An angle measuring less than 90°.

## addend

Any number being added. In the equation 6 + 8 = 14, 6 and 8 are both addends, 14 is the sum.

## algorithm

A step-by-step method for computing.

## angle

Two rays that share an endpoint.

### area

The measure, in square units, of the inside of a plane figure.

## area model

A model of multiplication that shows each place value product.

## Associative Property of Multiplication

States that changing the grouping of three or more factors does not change the product.

## attribute

A characteristic or property of an object, such as color, shape, size, and so on.



## base

Any side of a plane figure. Usually thought of as a side where the figure "sits."

## benchmark

A known size or amount that can be used as a reference to help understand a different size or amount. Benchmarks can be helpful in estimation and in checking the reasonableness of answers.

## **Glossary**

## benchmark fractions

Fractions that are commonly used for estimation. Benchmark fractions are useful when comparing and ordering.

One-half, one-third, one-fourth, three-fourths, and two-thirds are all benchmark fractions.

## brackets

Symbols used in pairs to group things together.



## capacity

The amount of liquid a container can hold.

## circle graph

A type of graph in which a circle is divided into sectors that each represent a proportion of the whole.

## circular degrees

A circle is divided into 360 equal degrees.

### common factor

Any factor that is shared by two or more numbers. Six is a common factor of both 12 and 24.

## common multiple

Any multiple that is shared by two or more numbers. Six is a common multiple of both 2 and 3.

## Commutative Property of Addition

States that changing the order of the addends does not change the sum.

## Commutative Property of Multiplication

States that changing the order of the factors does not change the product.

## compatible numbers

Numbers that are easy to compute mentally and are close in value to the actual numbers. Compatible numbers can be used when estimating.

## compose

To put together smaller numbers to make larger numbers.

## composite

A whole number that is not prime.

## compound shape

Any shape that is made up of two or more geometric shapes.

### cone

A solid object that has a circular base joined to a point by a curved side.

## congruent

Having exactly the same size and shape.

## coordinate

A set of values that show an exact position.

## coordinate plane

A two-dimensional system in which a location is described by its distances from two perpendicular reference lines (axes). Also called a coordinate grid.

### cube

A box-shaped solid object that has six identical square faces.

## cubic units

A number, multiplied by itself and then multiplied again by itself.

## cylinder

A solid object with two identical flat ends that are circular or elliptical and one curved side.



## decompose

To separate a number into two or more parts.

## denominator

The quantity below the line in a fraction. It tells how many equal parts are in the whole.

## difference

The amount that remains after one quantity is subtracted from another. The answer in a subtraction problem.

## Glossary

## digit

Any of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9. (Also known as Base 10 numerals.)

## dimension

A measurement of length in one direction.

## Distributive Property of Multiplication

States that whether the numbers in parentheses are added before or after multiplication, the results are the same.

## dividend

A number that is divided by another number. Fifty-six is the dividend in  $56 \div 8 = 7$ .

## division

Splitting into equal parts or groups also known as fair sharing.

## divisor

The number by which another number is divided. Eight is the divisor in  $56 \div 8 = 7$ .



## edge

A line segment on the boundary joining one vertex to another.

## equation

A mathematical sentence with an equal sign. The amount on one side of the equal sign has the same value as the amount on the other side. 4 + 3 = 7

## equilateral

Having all sides of equal length.

## equivalent

Having the same value.

## estimate

To find a number close to an exact amount; an estimate tells about how much or about how many.

## expanded form

A way to write numbers that shows the place value of each digit. 263 = 200 + 60 + 3

## exponent

A symbol written above and to the right of a mathematical expression to indicate the operation of raising to a power.

## expression

A mathematical phrase without an equal sign. n + 4



## face

Any of the individual flat surfaces of a solid object.

## factor

Numbers we can multiply together to get another number.

## factor pair

Two numbers that multiply together to reach a certain product.

## factor tree

A diagram that shows all the factors of a number, with the number appearing at the top of the "tree" and factors of that number appearing in "branches" until each branch ends in prime number.

## finite

Not infinite. Has an end.

## formula

A rule that is written as an equation.  $A = I \times w$ 

## fraction

A way to describe a part of a whole or a part of a group by using equal parts.

## frequency

The number of times an event or a value occurs.

## Glossary



## greatest common factor (GCF)

The greatest number that is a factor of two (or more) other numbers.



## hierarchy

A way of ranking and organizing things or people.

## Hundredths

In the decimal numeration system, Hundredths is the name of the next place to the right of Tenths.



## Identity Property of Multiplication

States that the product of any number and 1 is that number:  $n \times 1 = n$ .

## improper fraction

A fraction in which the numerator is larger than or equal to the denominator.

## infinite

Without an end. Not finite.

## input

The known variable you feed into the expression.

## intersect

A single point where two lines meet or cross each other.

## intersecting

Two or more lines cross each other in a plane, sharing a common point.

## inverse operation

Opposite operations. They are the operation that reverses the effect of another operation.

## irregular polygon

A polygon that does not have all sides equal and all angles equal.

## isosceles

A triangle having two sides equal in length.



## layers

Horizontal segments of a threedimensional figure; used for calculating the volume of the figure by decomposing it.

## least common multiple (LCM)

The smallest positive number that is a multiple of two or more numbers.

## like denominators

Denominators in two or more fractions that are the same.

## line graph

A type of chart used to show information that changes over time.



## midpoint strategy

A method in which students use the midpoint of a number line to help visualize rounding numbers.

## Milliard

One thousand million.

## minuend

A number from which another is to be subtracted.

## mixed number

A number that has a whole number and a fraction.

## multiple

A product of a given whole number and any other whole number. Twelve is a multiple of 3 and 4 because  $3 \times 4 = 12$ .

## multiples

Numbers created by multiplying two factors.

## Glossary

## multiplication

The method of finding the product of two or more numbers; repeated addition.

## multiplicative comparison

A way to compare quantities using multiplication, as in "This tree is three times shorter than that tree."



### nets

Patterns that can be cut and folded to make a model of a solid shape.

## numerator

The number written above the line in a fraction. It tells how many equal parts are described in the fraction.

## numerical pattern

A list of numbers that follow a certain sequence or pattern.



## obtuse

An angle measuring greater than 90°.

## order of operations

A set of rules that tells the order in which to compute.

- For operations within parentheses
  - a. multiply or divide from left to right
  - add or subtract from left to right
- For operations within brackets
  - a. multiply or divide from left to right
  - add or subtract from left to right
- For operations outside parentheses
  - a. multiply or divide from left to right
  - add or subtract from left to right

## ordered pair

A pair of numbers used to locate a point on a coordinate plane; the pair is written in the form (x-coordinate, y-coordinate); x-coordinate is the perpendicular distance of the point from the y-axis; the y-coordinate is the perpendicular distance of the point from the x-axis.

## origin

In a coordinate plane, the point at the intersection of the *x*- and *y*-axes; the point (0, 0).

## output

What comes out of the function; the solution.

## overestimate

An estimate that is greater than the actual answer to a problem.



## parallel

Always the same distance apart and never touching.

## parentheses

Grouping symbols for operations. When simplifying an expression, the operations within the parentheses are performed first.

## partial products

Any of the multiplication results we get leading up to an overall multiplication result.

## partial products model

A model that breaks numbers down into their factors or place values to make multiplication easier.

## partial quotients model

A method of dividing in which multiples of the divisor are subtracted from the dividend, and then the partial quotients are added together.

## pattern

A repeating or growing sequence or design.

## **Glossary**

## percentage

A number or ratio expressed as a fraction of 100.

## perimeter

The distance around the outside of a figure.

## perpendicular

Two lines intersecting each other at 90° or a right angle.

## pie chart

A type of graph in which a circle is divided into sectors that each represent a proportion of the whole.

## place value

The value of the place of a digit in a number.

## powers of ten

A set of mathematical notations that allow you to express any number as a product of multiples of 10.

## prime

A number greater than 1, with only two factors.

## prime factorization

Finding which prime numbers multiply together to make the original number.

## prime number

A whole number greater than 1 that has exactly two different factors, 1 and itself.

## product

The answer to a multiplication problem. In  $6 \times 7 = 42$ , 42 is the product, or answer.



## quotient

The answer to a division problem.



## ray

A part of a line that has one endpoint and goes on forever in one direction.

## reasonable

Makes sense according to the numbers and operation used.

## rectangular prism

A solid object that has six faces that are rectangles.

## regroup

To rearrange numbers into groups of 10 when performing mathematical operations.

## regrouping

The process of making groups of tens when adding or subtracting two-digit numbers (or more).

## reliable

To be consistent in results.

## remainder

The amount left over when one number is divided by another.

## repeating decimal

A decimal in which after a certain point a particular digit or sequence of digits repeats itself indefinitely.

## right angle

An angle that measures exactly 90°.

### round

A way to change a number to a shorter or simpler number that is very close to the original number.

## rule

Something that happens every time (for example: 2, 5, 8, 11... the rule is +3).



## sample size

A selection taken from a larger group (the "population") that provides information about the larger group.

## scalene

A triangle having three sides unequal in length.

## sequence

A set of numbers arranged in a special order or pattern.

## Glossary

## simplest form

When a fraction is expressed with the fewest possible pieces, it is in simplest form (also known as lowest terms and reduced).

## simplify

To express a fraction in simplest form.

## slices

Vertical segments of a threedimensional figure; used for calculating the volume of the figure by decomposing it.

## sphere

A three-dimensional object shaped like a ball.

## square pyramid

A three-dimensional geometric shape that has a square base and four triangular bases that are joined at a vertex.

## squared

A number multiplied by itself.

## standard algorithm for multiplication

Strategy for multiplying by using partial products or multiplying in parts.

## standard form

A common or usual way of writing a number using digits. 12,376 is in standard form.

## subtrahend

A number to be subtracted from another.

### sum

The answer to an addition problem.

## survey size

The measure of the number of individual surveys used in an experiment.

## symmetry

When two or more parts are identical after a flip, slide, or turn.



## **Tenths**

In the decimal numeration, Tenths is the name of the place to the right of the decimal point.

## terminating decimal

A decimal number that has digits that end.

## **Thousandths**

The value of a digit that is the fourth position from the right when describing whole number place value.

## Three Reads Strategy

A problem-solving strategy in which a story problem is read three times—once to understand what is happening in the problem, a second time to think about the numbers in the problem and what they might mean, and a third time to think about what question the problem could be asking.

## tiling

Overlay of individual tiles that cover the plane without gaps or overlaps; strategy for calculating area.



## underestimate

An estimate that is less than the actual answer to a problem.

## unit fraction

A fraction that has 1 as its numerator. A unit fraction names 1 equal part of a whole.

## unit squares

A unit square is a square whose sides have length 1.

## unknown

Part of an expression or equation that has to be found; a variable that can be represented in a problem by a letter.

## **Glossary**

## unlike denominators

Bottom numbers of two or more fractions that are not equal.



## value

How much a digit is worth depending on where it is in a number; the result of a calculation.

## variable

A letter or symbol that represents a number. For example, in  $5 \times b = 10$ , b is a variable worth 2.

## vertex

The point at which two line segments, lines, or rays meet to form an angle.

## vertices

The point where the edges of a solid figure meet.



## x-axis

The horizontal axis on the coordinate plane.

## x-coordinate

The first number in an ordered pair; tells whether to move right or left along the *x*-axis of the coordinate plane.



## y-axis

The vertical axis on the coordinate plane.

## y-coordinate

The second number in an ordered pair; tells whether to move up or down along the *y*-axis of the coordinate plane.

