Amplify Desmos Math CALIFORNIA

Grade 3

Volume 1: Units 1–4

Student Edition

About Amplify

Amplify is dedicated to collaborating with educators to create learning experiences that are rigorous and riveting for all students. Amplify creates K–12 core and supplemental curriculum, assessment, and intervention programs for today's students.

A pioneer in K–12 education since 2000, Amplify is leading the way in next-generation curriculum and assessment. All of our programs provide teachers with powerful tools that help them understand and respond to the needs of every student.

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Hello Curious Mind,

Welcome to Grade 3!

It's a year of many new things in your world and in your math classroom — like multiplication, division, area, and perimeter. You'll also notice that many of the concepts connect to familiar areas of math too!

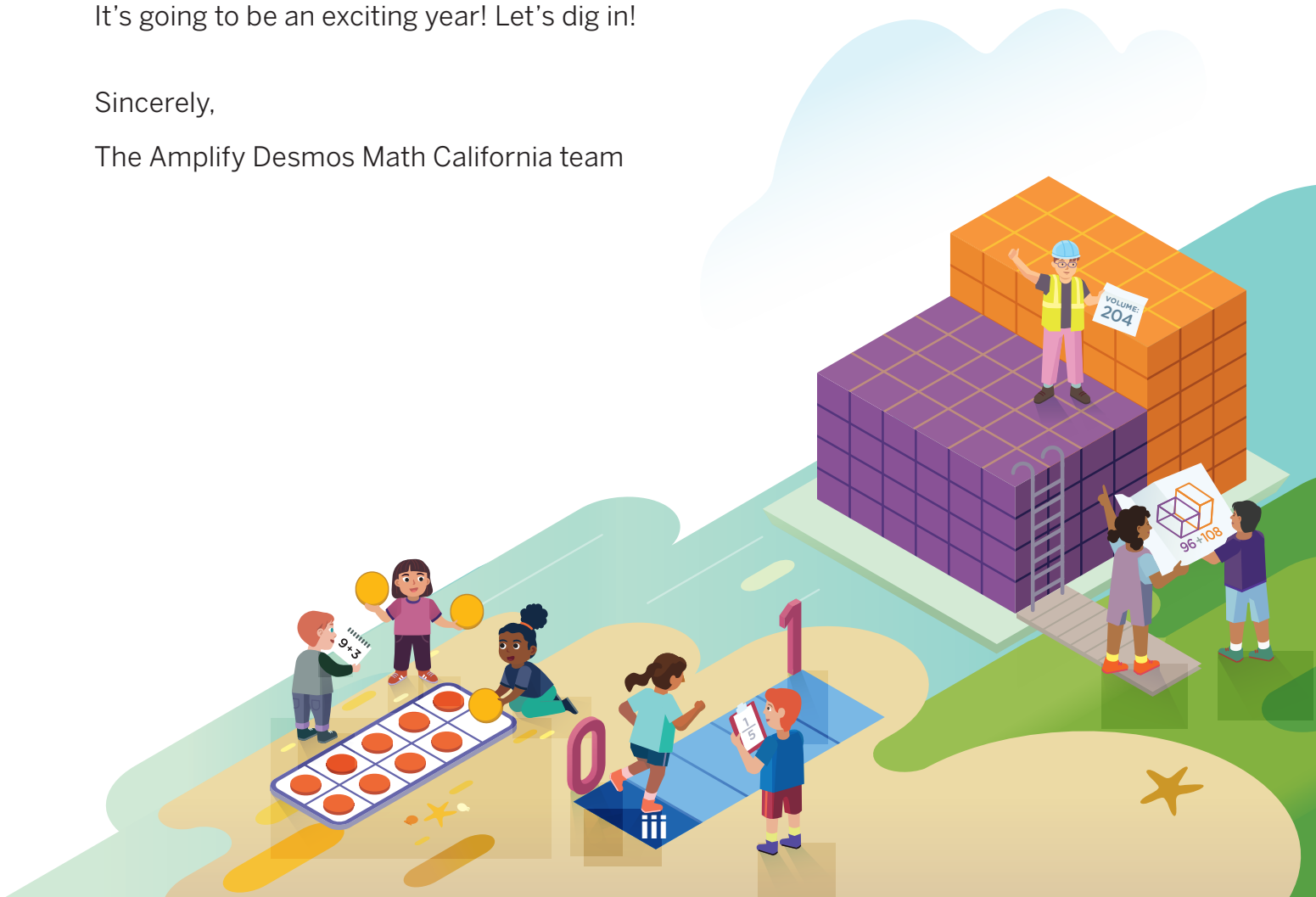
This year in math, you'll travel the world with Max, using addition and subtraction to help him solve problems with large numbers. You'll meet Harper at the library as you explore equal groups and multiply numbers, and you'll help Cheri — a third grader just like you — use concepts of area to help her family settle into their new home. You'll share ingredients to make dinner for Mr. Gharbi's birthday, and you'll also meet a surprising and helpful friend named Obita as you explore fractions as numbers. You'll even get to help Sasha take measurements as she gets her chicken ready for the fair.

And that's not all!

It's going to be an exciting year! Let's dig in!

Sincerely,

The Amplify Desmos Math California team



Unit 1 Introducing Multiplication

Let's learn about a new operation and represent data in graphs.

Unit Story: My Name Is Harper In this story, young Harper found her interests and friends at the library. Now she's a grown-up, running that same library.



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Unit 2 Area and Multiplication

Let's measure the space figures take up and relate that to multiplication.



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Unit Story: Cheri's New Home In this story, Cheri learns about her new home from the house's previous owner, Ms. Sarah.



pfluegler-photo/Shutterstock.com

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Ground Picture/Shutterstock.com

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Unit 3 Wrapping Up Addition and Subtraction Within 1,000

Let's add and subtract three-digit numbers and decide if our answers make sense.



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Unit Story: The View From up Here In this story, Max climbs monuments, step by step, to photograph new perspectives.



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Unit 4 Relating Multiplication to Division

Let's explore the relationship between division and multiplication.



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Unit Story: Home Cooking In this story, Mateo and Amy prepare a surprise birthday meal for their most loyal customer, Mr. Gharbi.



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Unit 5 Fractions as Numbers

Let's explore fractions on the number line. Let's compare fractions using area and number line diagrams.

Unit Story: Coen and Obita In this story, Coen lives alone until an uninvited, tiny guest moves into his home. Eventually the two become friends and use their trade skills to make each other's lives easier.



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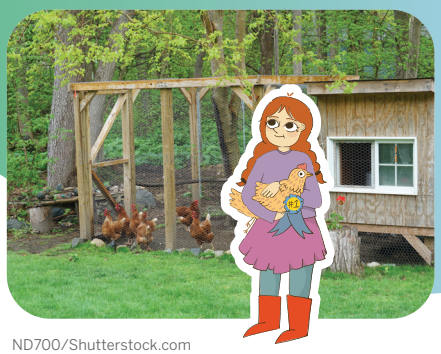
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Unit 6 Measuring Length, Time, Liquid Volume, and Weight



ND700/Shutterstock.com

Let's work with measurements of length, time, volume, and weight.

Unit Story: Just Stick With It, Sasha In this story, Sasha learns about the patience and responsibility needed to raise a show chicken for a county fair competition.



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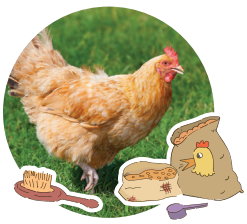
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Unit 7 Two-Dimensional Shapes and Perimeter

Let's identify and define attributes of different quadrilaterals. Let's find the perimeter of two-dimensional shapes.

Unit Story: Through Piho's Eyes In this story, a polar bear named Piho gets the opportunity to see and experience parts of the world from the same perspective as her friend Taka, an Arctic tern.



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Unit 1

Introducing Multiplication

Big Ideas in This Unit

CC1 Represent Multivariate Data

CC2 Number Flexibility to 100

Questions for Investigation

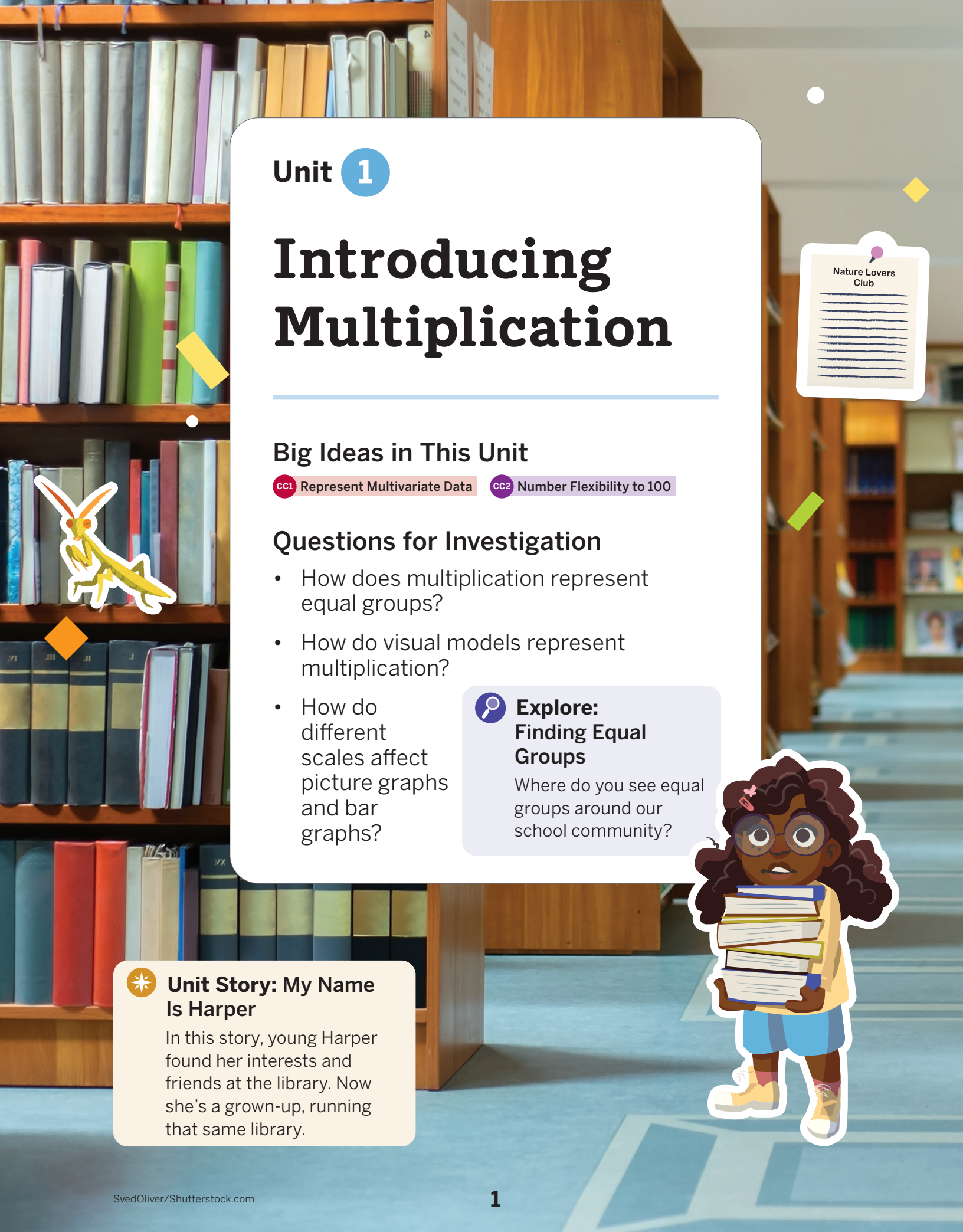
- How does multiplication represent equal groups?
- How do visual models represent multiplication?
- How do different scales affect picture graphs and bar graphs?

Explore: Finding Equal Groups

Where do you see equal groups around our school community?

Unit Story: My Name Is Harper

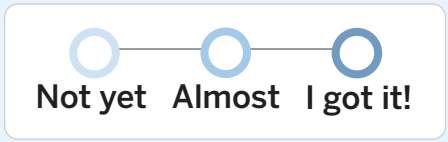
In this story, young Harper found her interests and friends at the library. Now she's a grown-up, running that same library.



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Watch Your Knowledge Grow

This is the math you'll explore in this unit. Rate your understanding to see how your knowledge grows!



I can . . .	Before	After
Represent problems involving equal groups with multiplication expressions and equations.		
Solve multiplication problems using arrays and diagrams.		
Explain the Commutative Property of Multiplication using arrays.		
Use what I know about multiplication to solve real-world problems.		
Use a symbol to represent an unknown value in a multiplication equation.		
Determine the value of an unknown number in a multiplication equation.		
Multiply numbers within 100 to help me solve problems.		
Represent and interpret data on a bar graph.		
Represent and interpret data on a picture graph.		
Scale a graph using multiplication.		

Sub-Unit

1

Introduction to Multiplication

Unit Story: My Name Is Harper



Galyna Motizova/Shutterstock.com

Harper found books about her interests at the library. How could she determine the total number of books about her interests?

Name _____ Date _____

Number Flexibility to 100 Building Toward 3.OA.1, SMP.1, SMP.2, SMP.6

Explore: Finding Equal Groups



Where do you see equal groups around our school community?

We are a math community.
What does it look like and sound like to be engaged in math?

Warm-Up

eyes on teacher

Discuss What do you notice? What do you wonder?



Activity

Name _____ Date _____

Where do you see equal groups around our school community?

- Look for groups of objects that have the same number of objects in each group.
- Represent the equal groups you find on the Recording Sheet in a way that can be clearly understood by others.

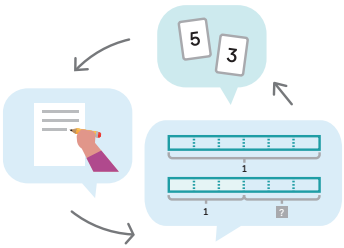
Ways to be a mathematician

1 I can take my time to think about a challenging problem before trying to solve it.



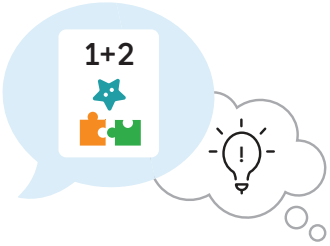
Not yet Almost I got it!

2 I can use numbers, words, and diagrams to make sense of math ideas and situations.



Not yet Almost I got it!

3 I can work carefully and try to be clear when I share my ideas.



Not yet Almost I got it!

Name _____ Date _____

Number Flexibility to 100 Building Toward 3.OA.1, SMP.2, SMP.4, SMP.7, SMP.8

Equal Groups

Let's explore how to represent things in equal groups.



I am a doer of math.
What do you remember about second grade math that can help you now as a third grader?

Warm-Up

eyes on teacher

Activity 1 Equal-Groups Situations

Hands-On You and your partner will be given connecting cubes or counters.

Represent each situation with an equal-groups drawing.

Draw

1 There are 4 bikes. Each bike has 2 wheels.

Name _____ Date _____

Equal-Groups Situations (continued)

Draw

2 There are 2 bins of books about insects. Each bin has 10 books.

3 Each team has 5 players. There are 3 basketball teams.

Activity 2

Name _____ Date _____

Equal-Groups Creations

Hands-On

You will be given a card showing equal groups.

4 Describe a situation that could be represented with the equal groups shown on your card.

_____

_____

_____

5 Read your partner's situation in Problem 4. Create a drawing to represent the situation your partner described.

Draw

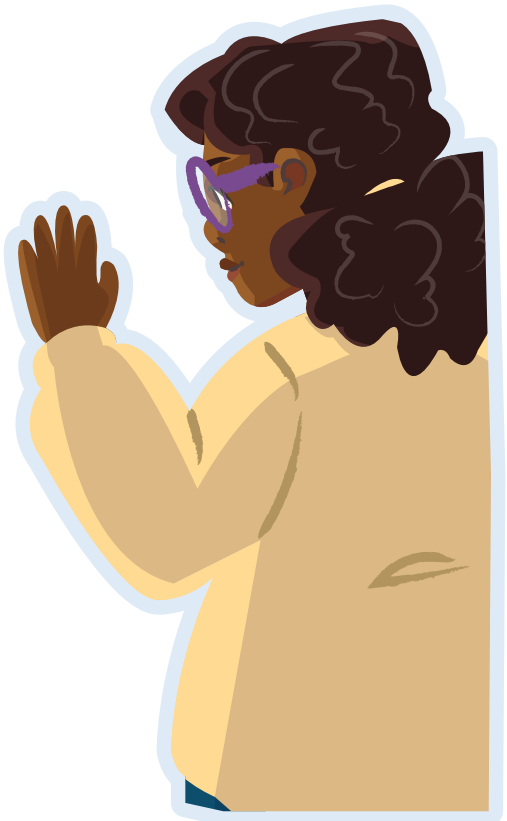
Name _____ Date _____

Equal-Groups Creations (continued)

6 Discuss

What is similar and different about the situations you and your partner described?





Summary 1.02

Multiplication situations describe a certain number of groups with an equal number of objects in each group. You can represent equal groups with drawings.



Practice 1.02

1 There are 6 tennis courts. There are 2 players on each tennis court. Represent the situation with an equal-groups drawing.

Draw

Name _____ Date _____

For Problems 2 and 3, represent the situation with an equal-groups drawing.

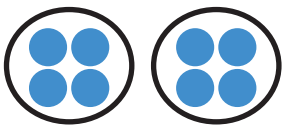
Draw

2 8 students in a chess club get into groups of 2 to play chess.

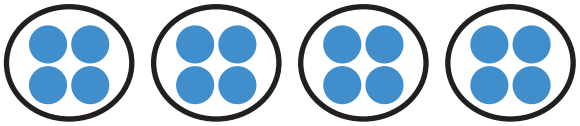
3 There are 3 oranges in each bag. There are 5 bags.

4 There are 3 wagons. Each wagon has 4 wheels. Which equal-groups drawing represents the situation?

A 

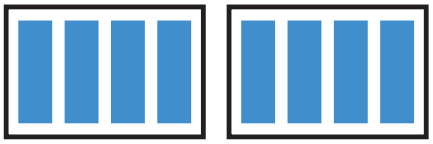
B 

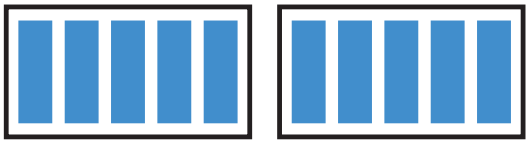
C 

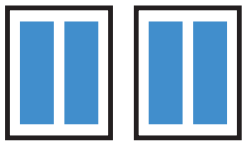
D 

Name _____ Date _____

5 There are 2 packages of crayons. Each package has 5 crayons. Which equal-groups drawing represents the situation?

A 

B 

C 

D 

Spiral Review

For Problems 6–9, determine the value of the expression.

6 7 + 7 _____

7 5 + 5 _____

8 3 + 3 _____

9 6 + 6 _____

10 Partition the rectangle into 2 equal rows and 4 equal columns. How many squares are there?



answer: _____

Unit 1
Lesson
3

Name _____ Date _____

Number Flexibility to 100 3.OA.1, SMP.1, SMP.2, SMP.7

More Equal Groups

Let's represent equal groups in different ways.



Warm-Up eyes on teacher

I can be all of me in math class.
Where do you see yourself represented in your math classroom?

Activity
1

Equal Groups

Hands-On **You and your partner will be given a set of cards with drawings, situations in words, and diagrams.**

1 Sort

Find the cards that match. Be prepared to explain your thinking.

Name _____ Date _____

Equal Groups (continued)

Create a drawing to represent each situation.

Draw

2 There are 3 bags. Each bag has 2 strawberries.

3 Each table has 5 chairs. There are 4 tables.



Activity 2

Name _____ Date _____

Expressions, Drawings, and Diagrams

Create a drawing or diagram to represent each expression.

Draw

4 5×1

5 6×5

Activity 2

Name _____ Date _____

Expressions, Drawings, and Diagrams (continued)

Write a multiplication expression to represent each diagram or situation. Be prepared to explain your thinking.

Show or explain your thinking.

6 

answer: _____

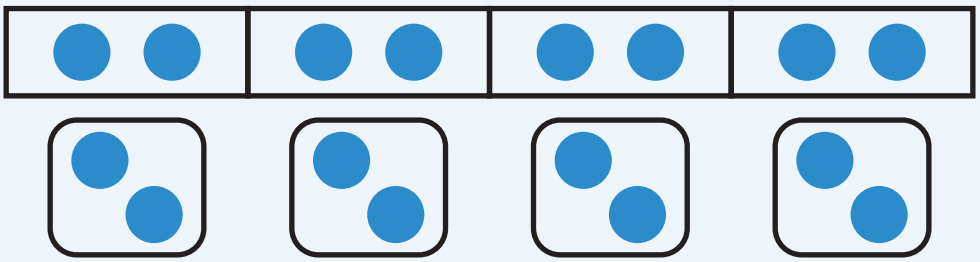
7 Mrs. Park organizes books so that there are 6 books on each shelf. There are 2 shelves.

answer: _____

Summary 1.03

You can write a mathematical expression to represent multiplication. Words, expressions, and drawings can all represent the number of equal groups and the number in each group.

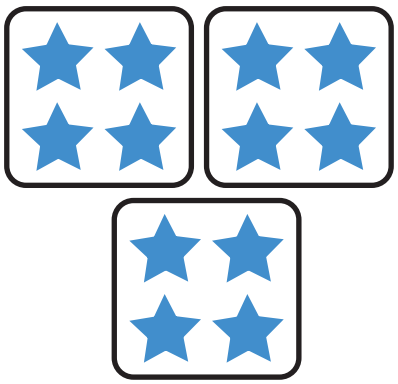
4 × 2
4 groups of 2



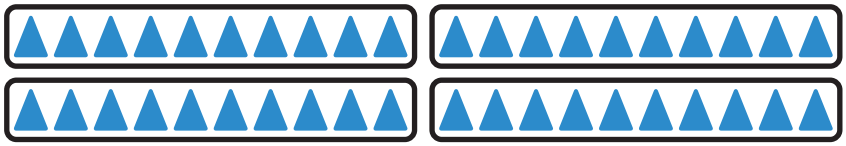
Practice 1.03

For Problems 1 and 2, write a multiplication expression to represent the drawing.

1

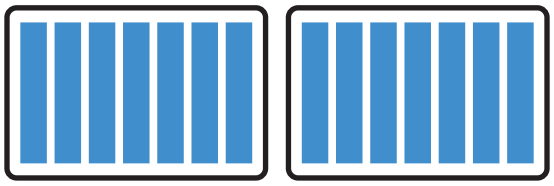
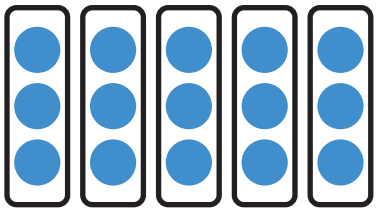
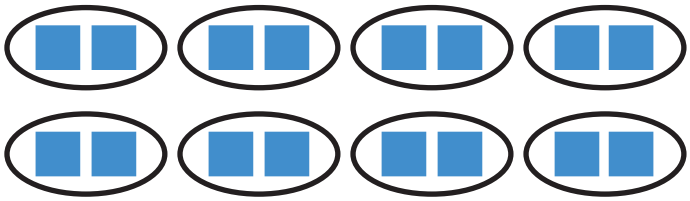


2



Name _____ Date _____

For Problems 3–5, match the drawing with the expression it represents.

	Drawing	Expression
3		_____ 8×2
4		_____ 5×3
5		_____ 2×7

6 Decide whether each situation could be represented by the diagram. Select Yes or No for each situation.



	Yes	No
There are 2 bags with 4 basketballs in each bag.		
There are 4 baskets with 2 books in each basket.		
There are 4 bins with 4 magazines in each bin.		
There are 2 boxes with 2 stuffed animals in each box.		
There are 8 scooters with 2 wheels each.		
There are 4 bicycles with 2 wheels each.		

Name _____ Date _____

Spiral Review

For Problems 7–9, determine the value of the expression.

7 14 – 7 _____

8 18 – 9 _____

9 12 – 6 _____

10 Han's family is comparing prices for renting cabins. It costs $22 more to rent a cabin per night at Glen Oak than Mountain Ridge. The cost per night at Glen Oak is $96. How much does it cost per night to rent a cabin at Mountain Ridge? Write an equation.

Show your thinking.

answer: _____ **equation:** _____

Name _____ Date _____

Number Flexibility to 100 3.OA.3, 3.OA.1, SMP.1, SMP.2, SMP.7

Book Clubs

Let's represent and solve multiplication problems involving equal groups.



I can be all of me in math class.
What do you do when you are faced with a math problem that you do not immediately know how to solve?

Warm-Up

eyes on teacher

Activity 1 Book Clubs

There are 6 different book clubs in Harper's class, with 5 students in each book club.

How many students are in book clubs in Harper's class?

1 Discuss

How does this problem relate to what you know about equal groups?

Name _____ Date _____

Book Clubs (continued)

2 Record the multiplication expression that represents the problem. Then talk with your partner about what each of the numbers represents.

_____

3 Represent the problem with a drawing. Solve the problem.

Draw

answer: _____

Activity 2

Name _____ Date _____

Solving Equal-Groups Problems

Solve each problem and write an expression that represents it.

Show or explain your thinking.

4 There are 10 students in the Creepy Crawly Creatures book club. Each student chose 4 creatures to talk about with the book club.

How many creatures will the book club talk about?

answer: _____ **expression:** _____

5 The Amazing Animals book club learned that an alligator has 2 stomachs.

How many stomachs would a family of 5 alligators have?

answer: _____ **expression:** _____

Name _____ Date _____

Solving Equal-Groups Problems (continued)

Show or explain your thinking.

6 The Foods Around the World book club is reading about snacks. In Colombia, bags of roasted ants are sold as snacks by street vendors.

It takes 5 small scoops of ants to fill up 1 bag, and each scoop has 5 ants. How many ants are sold in 1 bag?

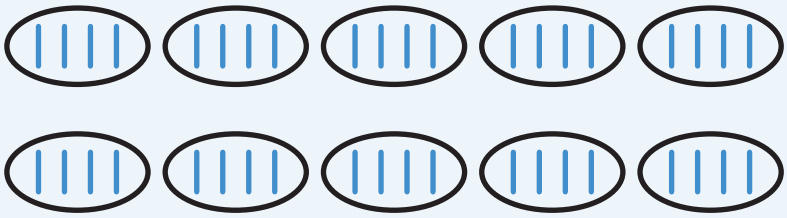
answer: _____ **expression:** _____



Summary 1.04

When you **multiply**, you are determining the total number of objects, which is called the **product**. There are many strategies to determine the product.

There are 10 students in the Creepy Crawly Creatures book club. Each student chose 4 creatures to talk about.



How many creatures will the book club talk about?

multiply Determining the total amount in equal groups.
product The result of multiplying 2 numbers.

Practice 1.04

For Problems 1–3, solve the problem and write an expression that represents it.

Show or explain your thinking.

1 There are 6 basketball teams in the gym. There are 5 players on each team. How many basketball players are in the gym?

answer: _____ **expression:** _____

Name _____ Date _____

Show or explain your thinking.

2 Clare has 4 packs of pencils. Each pack has 2 pencils. How many pencils does Clare have?

answer: _____ **expression:** _____

3 At a museum, Diego saw 5 plant fossils. Each fossil had 4 leaves. How many leaves were there altogether?

answer: _____ **expression:** _____

4 Diego's father has 4 packages of veggie burgers. Each package has 4 veggie burgers. How many veggie burgers does he have?

(A) 20 veggie burgers

(B) 16 veggie burgers

(C) 12 veggie burgers

(D) 8 veggie burgers

Name _____ Date _____

5 There are 10 volleyball teams in the tournament. Each team has 5 players. How many volleyball players are in the tournament?

(A) 50 volleyball players

(B) 25 volleyball players

(C) 20 volleyball players

(D) 15 volleyball players

Spiral Review

For Problems 6–9, determine the value of the expression.

6 7 + 10 _____

7 17 – 7 _____

8 9 + 10 _____

9 19 – 9 _____

10 Clare has a piece of yarn that is 73 centimeters long. She cuts off 38 centimeters of the yarn. How long is the leftover yarn?

Show your thinking.

answer: _____

equation: _____

Unit 1
Lesson
5

Name _____ Date _____

Number Flexibility to 100 3.OA.3, 3.OA.4, 3.OA.7, SMP.1, SMP.2, SMP.7, SMP.8

Choosing Your Own Strategy

Let's consider strategies and representations for solving multiplication problems.



I can be all of me in math class. In the story, Harper realizes it is important to be curious. What are you curious about in math class?

Warm-Up

eyes on teacher

Activity 1 Representing With Equations

Solve each problem and represent it with a multiplication equation.

Show or explain your thinking.

1 There are 15 plates. Han places the same number of plates on 3 tables. How many plates are on each table?

answer: _____

equation: _____

Name _____ Date _____

Representing With Equations (continued)

Show or explain your thinking.

2 Jada made 6 sandwiches. She used 2 slices of bread for each sandwich. How many slices of bread did she use?

answer: _____

equation: _____

3 Priya has some trays of ice cubes. Each tray has 10 ice cubes. She has 60 ice cubes altogether. How many trays of ice cubes does Priya have?

answer: _____

equation: _____

Activity 2

Name _____ Date _____

So Many Books!

People in the community donated boxes of books for the library in Harper's classroom. Harper and some classmates helped organize the donated books.

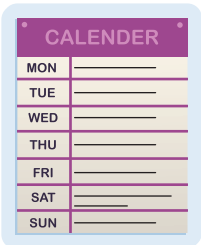
Solve each problem and represent it with a multiplication equation, using a symbol to represent the unknown amount.

Show or explain your thinking.

4 Bethany found 16 books about sports. She put them in piles of 2 books. How many piles did she make?

answer: _____

equation: _____



Name _____ Date _____

So Many Books! (continued)

Show or explain your thinking.

5 Sam made 8 piles of books about nature. Each pile had 2 books. How many books about nature did Sam find?

answer: _____

equation: _____

6 The donated books included 16 graphic novels. Franklin put them in 8 groups that were the same size. How many graphic novels are in each group?

answer: _____

equation: _____

Summary 1.05

You can write a multiplication equation to represent a situation with an unknown amount. The unknown amount could be the product, which is the total, or the **factor**, which is the number of groups or number of objects in each group.

$$6 \times 5 = ?$$
$$? \times 5 = 30$$
$$6 \times ? = 30$$

factor The number being multiplied.

Practice 1.05

For Problems 1–4, solve the problem using any strategy.

Show or explain your thinking.

1 There are 6 boxes of granola bars. Each box has 5 bars. How many granola bars are there?

answer: _____

Name _____ Date _____

Show or explain your thinking.

2 There are 50 chairs in the school library. Each table has 5 chairs. How many tables are in the library?

answer: _____

3 There are 10 stickers on each sheet. Each package has 4 sheets. How many stickers are there?

answer: _____

4 There are 18 basketball players in the gym. Each team has 6 players. How many basketball teams are in the gym?

answer: _____

Name _____ Date _____

5 Jada found 20 seashells. She put them into 4 equal piles. How many seashells were in each pile?

(A) 2 seashells

(B) 4 seashells

(C) 5 seashells

(D) 10 seashells

6 Han had 50 football cards. He put them into 10 equal piles. How many football cards did he put in each pile?

(A) 5 football cards

(B) 6 football cards

(C) 10 football cards

(D) 15 football cards

Spiral Review

For Problems 7–10, determine the value of the expression.

7 7 + 9 _____

8 17 – 9 _____

9 5 + 9 _____

10 15 – 9 _____

11 Clare planted a garden. She had 25 pansies and the same number of daisies. Shawn had 15 flowers. How many more flowers did Clare have than Shawn?

Show your thinking.

answer: _____

Name _____ Date _____

Number Flexibility to 100 3.OA.4, 3.OA.1, 3.OA.3, 3.OA.7, SMP.2, SMP.4, SMP.7, SMP.8

What's Missing?

Let's write and solve multiplication equations with symbols for the unknown values.



I can be all of me in math class.
What do you want your math peers to know about you as they get to know you better?

Warm-Up

eyes on teacher

Activity 1 Card Sort: Unknown Numbers

Hands-On **You will be given a set of cards.**

1 Sort

Match each equation with a diagram and situation that represents it. Record the letters for the matches in the table.

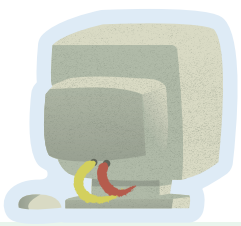
Equation	Diagram	Situation

Name _____ Date _____

Card Sort: Unknown Numbers (continued)

2 Choose 1 match from Problem 1 and copy the equation and diagram here. Explain how you know the cards match.

card: _____	card: _____

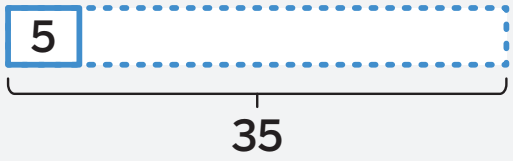
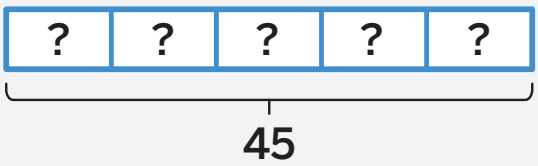
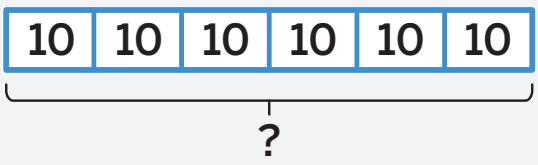


Activity 2

Name _____ Date _____

Writing Equations With Symbols

3 Write an equation to represent each diagram. Use a symbol to represent the unknown value.

Diagram	Equation with symbol
	
	
	

Name _____ Date _____

Writing Equations With Symbols (continued)

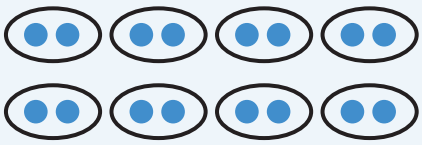
4 Choose 1 diagram from the table in Problem 3 and circle it. Determine the unknown value to complete the equation.

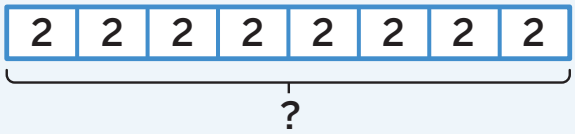
Show or explain your thinking.



Summary 1.06

You can use different representations to help you understand and solve multiplication problems.





$$? = 8 \times 2$$

Practice 1.06

Use the situation for Problems 1 and 2.

There are 8 soccer teams. Each team has 10 players. How many players are there altogether?

1 Write a multiplication equation to represent the problem. Use a ? to represent the unknown value.

_____

2 Solve for the number of players.

Show or explain your thinking.

answer: _____

Name _____ Date _____

Use the situation for Problems 3 and 4.

A starfish has 5 eyes. In a zoo exhibit, there are 4 starfish. How many starfish eyes are there altogether?

3 Write a multiplication equation to represent the problem. Use a ? to represent the unknown value.

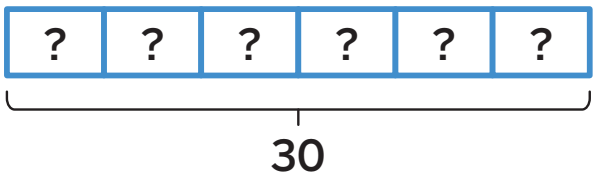
_____

4 Solve for the number of starfish eyes.

Show or explain your thinking.

answer: _____

5 Which multiplication equation represents the diagram?



(A) ? = 6 × 30

(B) 30 × 6 = ?

(C) 30 = ? × ?

(D) 30 = 6 × ?

Name _____ Date _____

6 Jada has 4 bags of apples. Each bag has 10 apples. Which equation could be used to determine the total number of apples?

(A) $10 = ? \times 4$

(B) $? \times 10 = 4$

(C) $? = 10 \times 4$

(D) $? = 4 + 10$

Spiral Review

For Problems 7–10, determine the value of the expression.

7 $4 + 3 + 6$ _____

8 $9 + 8 + 1$ _____

9 $7 + 3 + 6$ _____

10 $5 + 2 + 5$ _____

11 An art teacher has 30 large buttons and 55 small buttons. How many buttons does she have?

Show or explain your thinking.

answer: _____

Name _____ Date _____

Number Flexibility to 100 3.OA.1, 3.OA.4, 3.OA.7, SMP.2, SMP.3, SMP.6, SMP.7, SMP.8

As a Matter of Fact

Let's strengthen our understanding of multiplication to help build fluency.



I am a doer of math.
What number patterns do you see around you?

Warm-Up

eyes on teacher

Activity 1

Looking for Patterns

Determine each product.

Show or explain your thinking.

1. 3×5

   answer: _____

2. 4×5

   answer: _____

3. 5×5

   answer: _____

Name _____ Date _____

Looking for Patterns (continued)

4 **Discuss**

How can you use 4 × 5 to help you solve 5 × 5?

Determine each product.

Show or explain your thinking.

5 2 × 3

answer: _____

6 2 × 4

answer: _____

7 2 × 5

answer: _____

Activity 2

Name _____ Date _____

Introducing the Center, Capture Squares

Stage 5



Pairs Let's multiply numbers (2, 5, and 10).

You'll need: 2 crayons or colored pencils, number cube, paper clip, Gameboard, Spinner

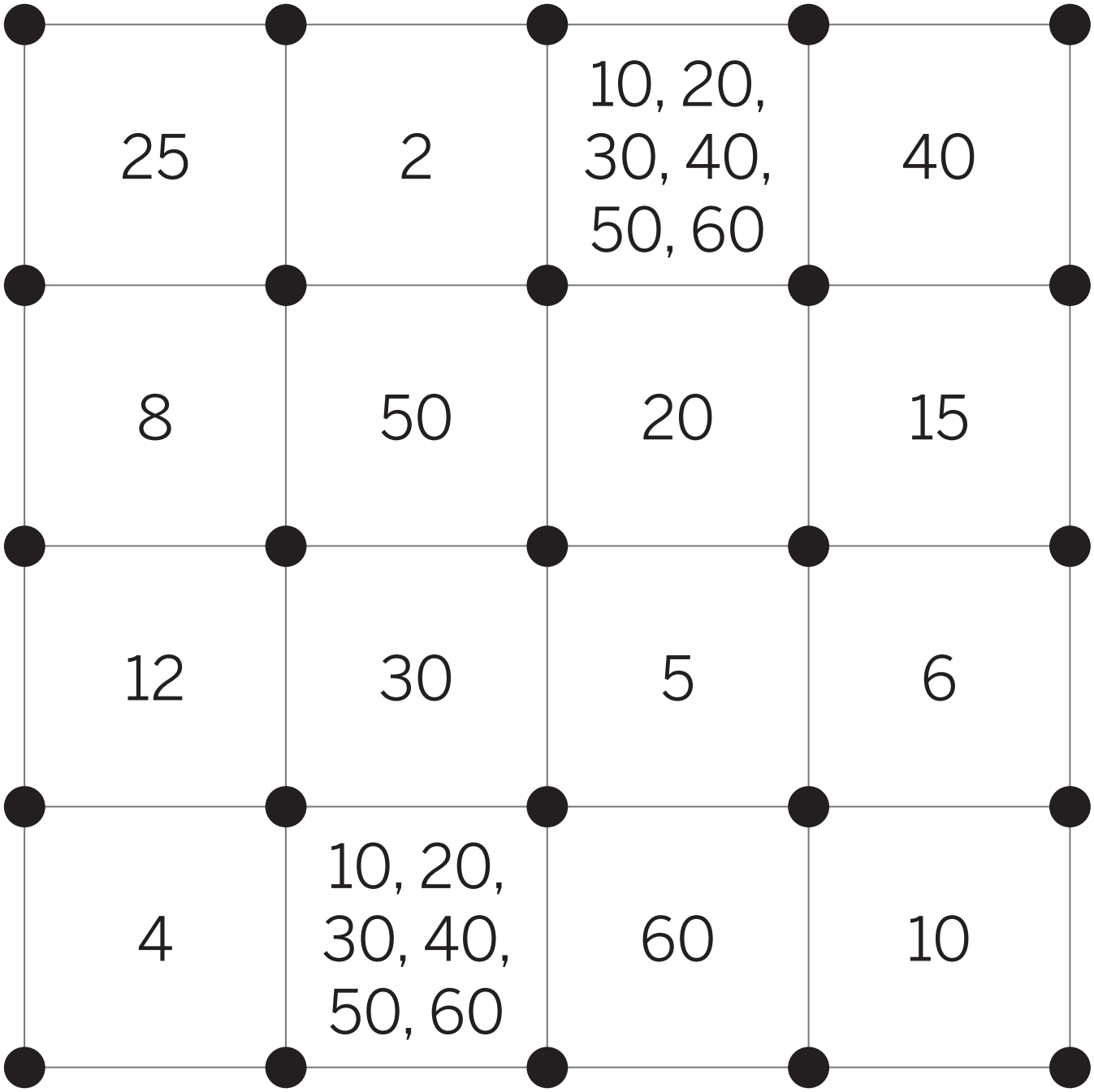
How to Play

1. Roll the number cube and spin the Spinner. Determine the product.
2. Draw 1 line connecting any 2 dots around the product. If you cannot draw a line, roll the number cube and spin again.
3. If you complete a square, shade the box with your color.
4. Take turns.

How to Win The first player to shade 3 boxes wins.

Name _____ Date _____

Capture Squares (continued)



Summary 1.07

You can use patterns, known facts, and the **Identity Property of Multiplication** to help you solve multiplication problems.

$$3 \times 2 =$$
$$4 \times 2 =$$
$$5 \times 2 =$$
$$10 \times 2 =$$

Identity Property of Multiplication The product of any number and 1 is itself.

Practice 1.07

For Problems 1 and 2, create a drawing, tape diagram, or situation that represents the multiplication equation.

Show your thinking.

1 $7 \times 5 = 35$

2 $6 \times 2 = 12$

Name _____ Date _____

For Problems 3–6, determine the product.

Show or explain your thinking.

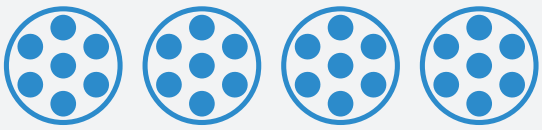
3 $5 \times 5 =$ ____

4 $8 \times 2 =$ ____

5 $4 \times 3 =$ ____

6 $2 \times 3 =$ ____

7 Decide whether each representation of the multiplication equation $4 \times 7 = 28$ is true or false.

	True	False
7 7 7 7		
		
4 4 4 4		
		
Han has 4 jars with 7 pickles each.		
Han has 4 plants with 4 seeds each.		

Name _____ Date _____

Spiral Review

For Problems 8–10, determine the value of the expression.

8 9 + 11 _____

9 14 + 6 _____

10 20 – 7 _____

11 Diego collected 52 cans. Clare collected 27 more cans than Diego. How many cans did Clare collect?

Show your thinking.

answer: _____ **equation:** _____

Notes:

Sub-Unit

2

Arrays

Unit Story: My Name Is Harper



littlenySTOCK/Shutterstock.com

Harper likes to keep the library organized in stacks, rows, and bins.

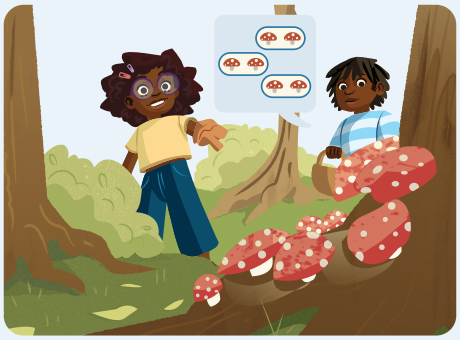
Where do you see equal groups in your community?

Name _____ Date _____

Number Flexibility to 100 3.OA.1, SMP.6, SMP.7, SMP.8

Searching for Arrays

Let's identify and describe arrays using what we know about multiplication.



We are a math community.
How do your classmates support you as a doer of math? How do you support your classmates?

Warm-Up

eyes on teacher

Activity 1 Array Hunt

You will be given illustrations from the Unit Story. Work with your group to find 4–5 arrays in the illustrations.

1 For each array you find, record the illustration number and the object(s) that show an array.

Illustration number	Objects that show an array

Name _____ Date _____

Array Hunt (continued)

2 Discuss

Choose 1 array you found in Problem 1. How does the array show equal groups?



Activity 2

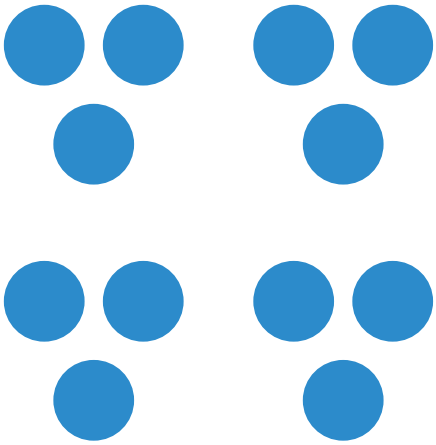
Name _____ Date _____

Drawing Arrays

Hands-on

You and your partner will be given inch tiles and counters.

3 Show 1 way in which the equal-groups drawing could be rearranged into an array. Write an expression that represents your array.



Show your thinking.

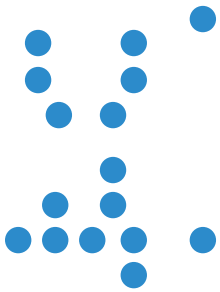
expression: _____

Activity 2

Name _____ Date _____

Drawing Arrays (continued)

4 Create as many arrays as you can using the same number of dots as shown in the image. Label each array with a matching expression.



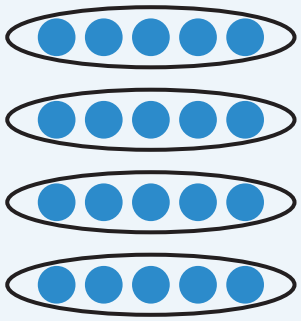
Show your thinking.

5 Discuss

Why can more than 1 array be created for a given number of dots?

Summary 1.08

You can use arrays to represent multiplication because arrays show equal groups. There is an equal number of objects in each row, and there an equal number of objects in each column.



4 × 5

Practice 1.08

1 Create 2 different arrays using 12 dots.

Draw

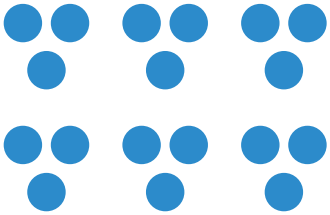
2 Choose 1 of your arrays in Problem 1. How is the array related to equal groups? Explain your thinking.

Name _____ Date _____

3 Determine whether each image shows an array.

	Yes	No
		
		
		
		

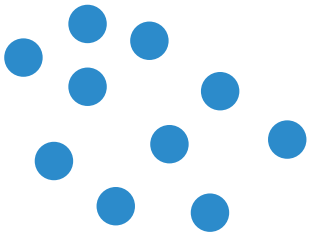
4 Show 1 way in which the set of dots could be rearranged into an array.



Draw

Name _____ Date _____

5 Create as many arrays as you can using the same number of dots as shown in the image.



Draw

Spiral Review

For Problems 6 and 7, determine the value of the expression.

6 47 – 9 _____

7 26 + 24 _____

8 There are 5 basketball teams in the tournament. Each team has 9 players. How many basketball players are in the tournament?

(A) 50 basketball players

(B) 45 basketball players

(C) 40 basketball players

(D) 14 basketball players

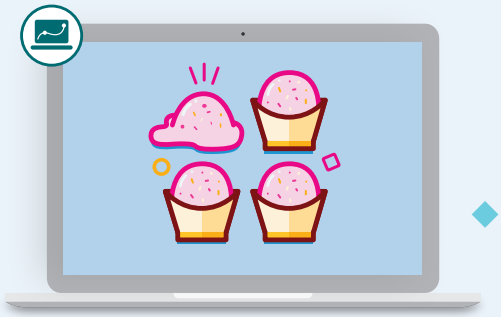
Unit 1
Lesson
9

Name _____ Date _____

Number Flexibility to 100 3.OA.5, 3.OA.1, SMP.7, SMP.8

Arrays of Flavor

Let's look for patterns to make conjectures about multiplication.



I am a doer of math.
Where do you see arrays in the world around you?

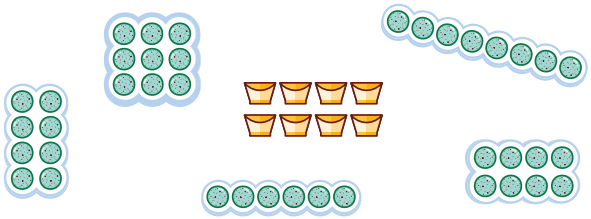
Warm-Up

1 eyes on teacher

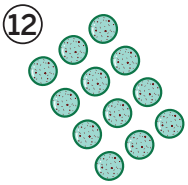
Activity 1

Scoops of Frozen Yogurt

2 Circle different arrays of scoops of frozen yogurt with the same total as the cups.



3 Draw 2 different arrays of cups that could hold 12 frozen yogurt scoops. Write an expression to represent each array.



Draw

Array 1

expression: _____

Array 2

expression: _____

Name _____ Date _____

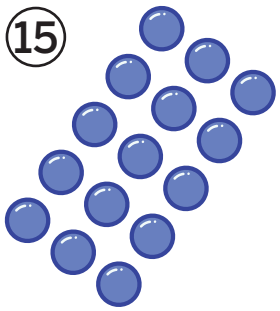
Scoops of Frozen Yogurt (continued)

3 Discuss

What do you notice about the arrays and expressions?
What do you wonder?

4

Draw 2 different arrays of cups that could hold 15 frozen yogurt scoops. Write an expression to represent each array.



Draw

Array 1

expression: _____

Array 2

expression: _____

5 Discuss

A *conjecture* is a statement you believe is true based on information you have. Let's make a conjecture.

Activity 2

Name _____ Date _____

Testing Conjectures

6 Circle 2 expressions with the same product. Use drawings, numbers, words, or equations to test your conjecture.

3 × 5	5 × 6	5 × 3	6 × 2

Show your thinking.

4 × 7	3 × 8	3 × 7	8 × 3

Show your thinking.

Name _____ Date _____

Testing Conjectures (continued)

7-8 For each row, circle 2 expressions with the same product. Complete as many rows as you have time for.

5 × 4	8 × 5	4 × 8	8 × 4
8 × 7	6 × 4	7 × 8	8 × 6
13 × 3	12 × 4	3 × 13	13 × 4
6 × 4	3 × 7	8 × 4	4 × 6
1 × 11	4 × 3	3 × 4	2 × 5
9 × 6	12 × 4	4 × 12	7 × 7

9 Let's talk about our conjecture.

Summary 1.09

You can multiply numbers in any order and get the same product. This is called the **Commutative Property of Multiplication**.

$$5 \times 8 = 8 \times 5$$

5 rows of 8 scoops



$5 \times 8 = 40$

8 rows of 5 scoops



$8 \times 5 = 40$

Commutative Property of Multiplication The order in which 2 numbers are multiplied does not change the product.

Practice 1.09

Use the situation for Problems 1 and 2.

There are 4 rows of water bottles in a box. There are 5 bottles in each row.

1 Create an array to represent the situation.

Draw

Name _____ Date _____

2 Write 2 multiplication expressions that could be used to determine the total number of water bottles.

_____ _____

Use the situation for Problems 3 and 4.

A paint set has 3 rows of paint colors. Each row has 8 paint colors.

3 Create an array to represent the situation.

Draw

4 Write 2 multiplication expressions that could be used to determine the total number of paint colors.

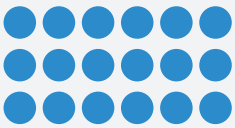
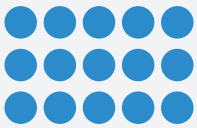
_____ _____

5 Create an array to represent the multiplication equation $5 \times 3 = 15$.

Draw

Name _____ Date _____

6 Determine which array represents the expression 3 × 6.

	Yes	No
A. 		
B. 		
C. 		
D. 		

Spiral Review

For Problems 7 and 8, determine the value of the expression.

7 47 + 10 _____

8 80 – 60 _____

9 There are 8 tricycles on display at the store. If each tricycle has 3 wheels, how many wheels are there? Write a multiplication equation to represent the problem. Use a ? for the unknown value.

_____

Unit 1
Lesson
10

Name _____ Date _____

Number Flexibility to 100 3.OA.3, 3.OA.1, 3.OA.7, SMP.1, SMP.2, SMP.7, SMP.8

Organizing Art Supplies

Let's analyze situations that involve arrays.



I can be all of me in math class.
How are you like Harper in math class? How are you different?

Warm-Up

eyes on teacher

Activity
1

Array of Colors

Solve each problem and write an equation that represents it.

Show or explain your thinking.

1 There are 5 rows of crayons in a box. The box has 40 crayons in it. If each row has the same number of crayons, how many crayons are in each row?

answer: _____

equation: _____

Name _____ Date _____

Array of Colors (continued)

Show or explain your thinking.

2 There are 5 watercolor paints in each row of a palette. The palette has 40 paints in it. If each row has the same number of paints, how many rows of paints are there?

answer: _____

equation: _____

3 Discuss

How does each part of your equation represent the situations?

Activity 2

Name _____ Date _____

Arrays of Art Supplies

Write an equation to represent each problem, using a symbol for the unknown value. Then determine the unknown value.

Show or explain your thinking.

4 A case of markers is arranged into 6 sections. There are 30 markers in the case. How many markers are in each section?

equation: _____

answer: _____



Name _____ Date _____

Arrays of Art Supplies (continued)

Show or explain your thinking.

5 A box of pencils has 14 pencils arranged in an array. Each row has 7 pencils. How many rows of pencils are there?

equation: _____

answer: _____

6 Discuss

How are Problems 4 and 5 similar? How are they different?

Summary 1.10

You can represent problems involving arrays with multiplication equations, using a symbol for the unknown. Then you can choose a strategy to determine the value of the unknown number.



? × 4 = 20

Practice 1.10

Use the information for Problems 1 and 2.

There are 20 chairs set up in an array in a classroom. There are 4 chairs in each row. How many rows of chairs are there?

1 Write a multiplication equation to represent the problem. Use a ? for the unknown value.

_____

2 Determine the number of rows of chairs. Then rewrite the equation with the number that makes it true.

Show or explain your thinking.

rows: _____

equation: _____

Name _____ Date _____

Use the information for Problems 3 and 4.

There are 30 eggs placed in an array in a carton. There are 5 eggs in each row. How many rows of eggs are there?

3 Write a multiplication equation to represent the problem. Use a ? for the unknown value.

_____

4 Determine the number of rows of eggs. Then rewrite the equation with the number that makes it true.

Show or explain your thinking.

answer: _____

equation: _____

5 Jada is playing a card game. She placed 42 cards in an array with 6 rows. Select the equations that could be used to determine the number of cards in each row.

	Yes	No
A. $6 \times ? = 42$		
B. $6 \times 42 = ?$		
C. $6 + ? = 42$		
D. $? \times 6 = 42$		
E. $? \times 42 = 6$		

Name _____ Date _____

6 A music teacher places 18 chairs in an array. There are 6 chairs in each row. How many rows of chairs are there?

(A) 2 rows

(B) 3 rows

(C) 4 rows

(D) 6 rows

Spiral Review

For Problems 7–10, determine the value of the expression.

7 25 + 25 _____

8 70 – 15 _____

9 40 + 40 _____

10 32 – 6 _____

11 An art teacher has 30 large buttons and 55 small buttons. She used some of the buttons for a project. Now, the art teacher has 25 buttons. How many buttons did she use?

Show or explain your thinking.

answer: _____

Unit 1
Lesson
11

Name _____ Date _____

Number Flexibility to 100 3.OA.3, 3.OA.7, SMP.1, SMP.4, SMP.7, SMP.8

A Community Reading Event

Let's see how Harper can use math in her reading community.



Warm-Up

eyes on teacher

We are a math community.
What makes your math class a community? How are you a part of that community?

Activity 1 Seating Situations

Harper is setting up the library for the long-awaited community reading event. The day before the event, 30 people said they would be attending.

1 Harper has enough folding chairs to seat the 30 attendees. How could she arrange the chairs in an array?

Show or explain your thinking.

Name _____ Date _____

Seating Situations (continued)

2 The next morning, Harper did one last check online for the number of people attending and saw that it went up to 48 attendees! Harper only has 36 folding chairs, so she will have to use beanbags from some of the reading corners for the rest of the seats.

How could Harper arrange the seating so that the folding chairs are together in 1 array and the beanbags are together in another array? Write an equation that represents each array.

Show or explain your thinking.

Folding chairs:

equation: _____

Beanbags:

equation: _____

3 Work with your group to create a poster showing the seating arrangement you created for the community reading event.

Activity 2

Name _____ Date _____

Introducing the Center, Cover Up

Stage 12

Pairs Let's multiply using factors of 1–5 and 10.

You'll need: 2 base-ten units, two-color counters, Gameboard A or B, Recording Sheet

Set Up

- Choose a Gameboard.
- Choose who will use red counters and who will use yellow counters.

How to Play

1. **Player A:**
   - Place each cube on a number in the gray row. Each cube can be on a different number, or both cubes can be on the same number. Multiply the numbers.
   - Cover the product of the two numbers with a counter.
   - Record the multiplication expression and product.
2. **Player B:**
   - Move one of the cubes. Multiply the numbers.
   - If the product is not already covered with a counter, cover it.
   - Record the multiplication expression and product.
3. Take turns moving one cube at a time. Record each multiplication expression and product, even if you were unable to cover the product.

How to Win The first player to cover 5 squares in a row wins.

CENTER
Recording Sheet

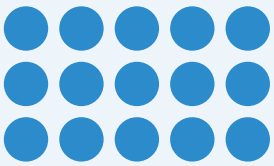
Name _____ Date _____

Cover Up (continued)

Multiplication expression	Product

Summary 1.11

You can use multiplication and the different representations of multiplication to solve problems involving equal groups.



$5 \times 3 = 15$
or
$3 \times 5 = 15$

Practice 1.11

1 A band will be marching in a parade. There are 40 people in the band. Show how they could be lined up in an array.

Draw

2 An elevator has buttons for 24 floors. Show how the elevator buttons could be organized in an array.

Draw

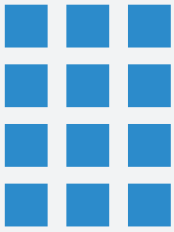
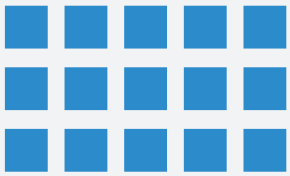
Name _____ Date _____

3 Volunteers are placing 18 chairs in the gym for guests to watch a school performance. Show how the chairs could be organized in an array.

Draw

4 A muffin pan can make 12 muffins.

Determine which arrays could represent the muffin pan.

	Yes	No
A. 		
B. 		
C. 		
D. 		

Name _____ Date _____

Spiral Review

For Problems 5–8, determine the value of the expression.

5 60 – 30 _____

6 17 + 13 _____

7 60 – 35 _____

8 21 + 14 _____

9 There are 32 pencils sitting on tables. Each table has 8 pencils on it. How many tables are there? Write a multiplication equation to represent the problem. Use a ? for the unknown value.

_____

10 Han and Diego are collecting rocks. Han collected 16 fewer rocks than Diego. Han collected 33 rocks. How many rocks did Diego collect?

Show your thinking.

answer: _____ **equation:** _____

Notes:

Sub-Unit

3

Data in Scaled Graphs

Unit Story: My Name Is Harper



SvedOliver/Shutterstock.com

Harper, Sam, Bethany, and Franklin all liked reading about different topics but came together to form a book club.

How can they organize and keep track of their books?

Name _____ Date _____

Represent Multivariable Data | Building Toward 3.MD.3, SMP.2

Library Surveys

Let's represent data with a picture graph or bar graph.



I can be all of me in math class. Harper feels comfortable being herself at the library. What makes you feel comfortable being yourself in math class?

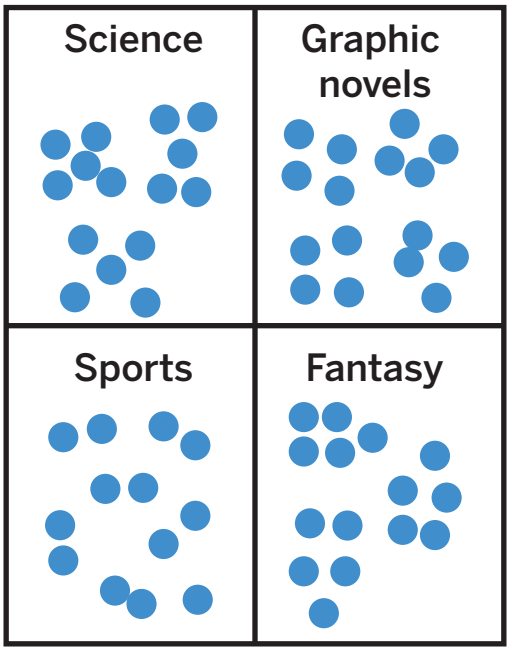
Warm-Up

eyes on teacher

Activity 1

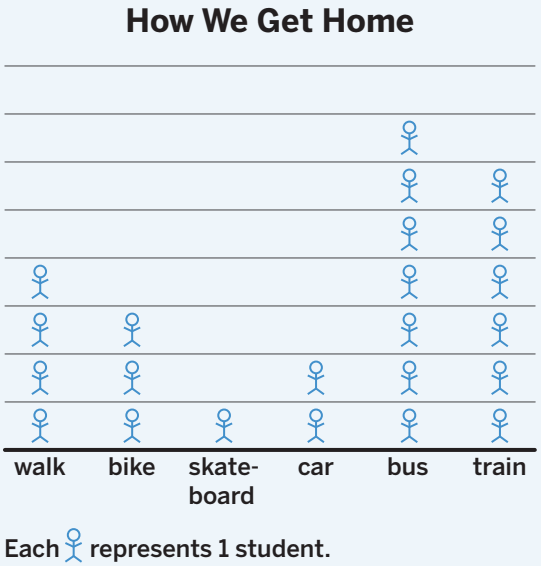
Favorite Types of Books Survey

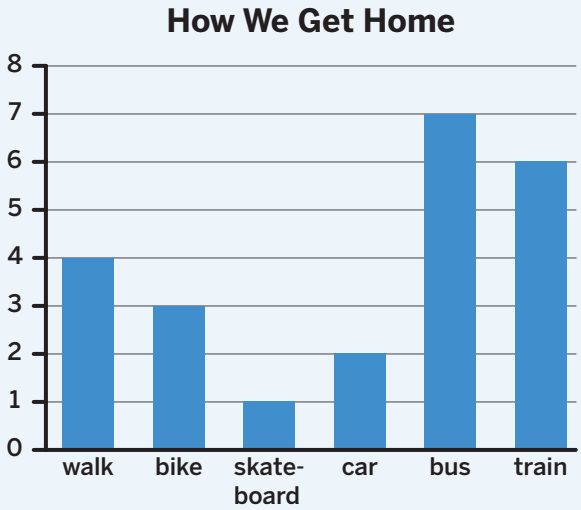
Create a picture graph or a bar graph representing Harper's survey results on your Activity 1 handout.



Summary 1.12

In a picture graph, the **key** tells you what each picture represents. Use the features of a picture graph or bar graph to help interpret the data represented by the graph.

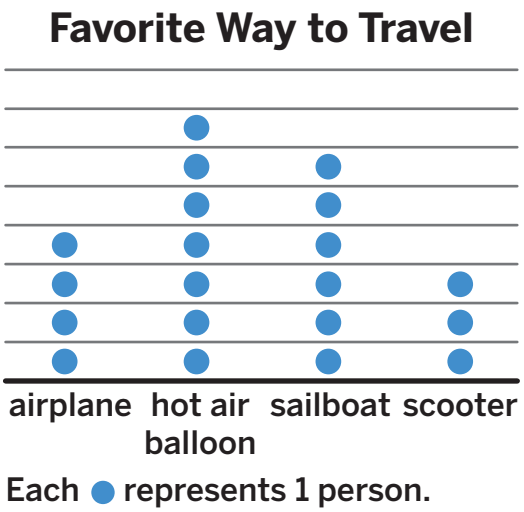




key The part of a picture graph that shows what each picture represents.

Practice 1.12

For Problems 1–3, use the picture graph.



1. How many *fewer* people chose scooter than hot air balloon?

   _____

2. How many people chose airplane or sailboat?

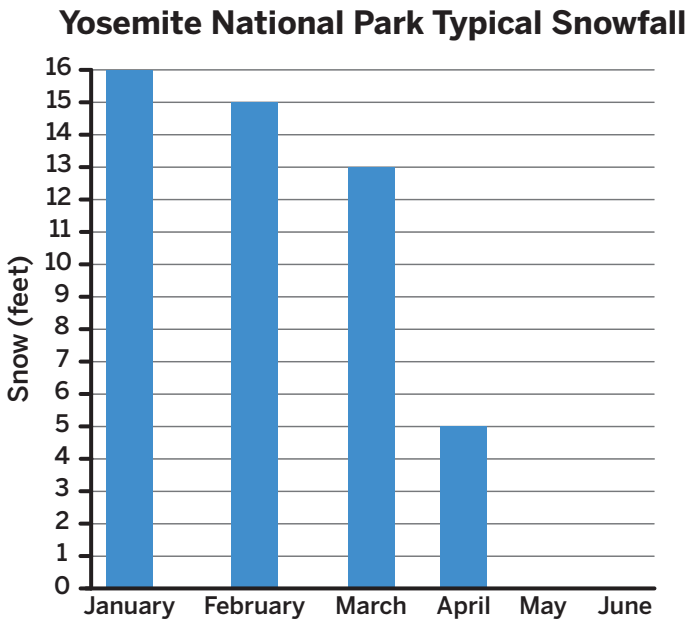
   _____

3. State whether this statement is *true* or *false*. 7 more people chose airplane or hot air balloon combined than scooter.

   _____

Name _____ Date _____

For Problems 4–6, use the bar graph about the typical snowfall at Yosemite National Park.



4 How many *more* typical feet of snow is there in January than April?

_____

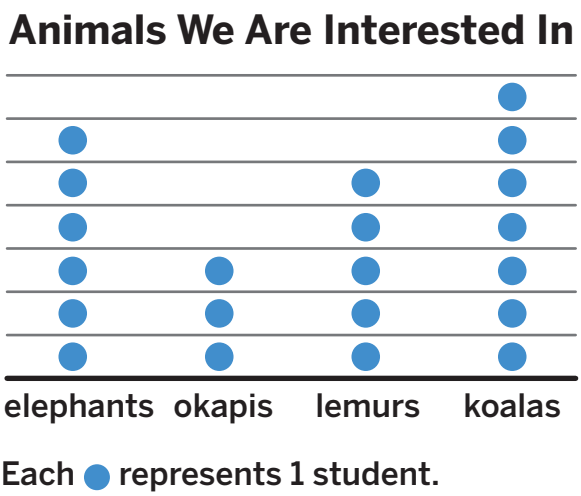
5 How many feet of snow usually fall in March and April combined?

_____

6 State whether this statement is *true* or *false*. The total typical snowfall from January through April is 49 feet.

_____

For Problems 7 and 8, use the picture graph that shows the results from a survey about students' interest in animals.



7 How many students chose lemurs or koalas?

(A) 5 students

(B) 7 students

(C) 12 students

(D) 13 students

Name _____ Date _____

8 How many *more* students chose elephants or okapis combined than koalas?

(A) 1 student

(B) 2 students

(C) 3 students

(D) 7 students

Spiral Review

For Problems 9–11, determine the product.

9 $2 \times 4 =$ _____

10 $2 \times 5 =$ _____

11 _____ $= 2 \times 6$

12 At the zoo, 67 students visited the sea lions. 24 more students visited the elephants than the sea lions. How many students visited the elephants?

Show your thinking.

answer: _____ **equation:** _____

Unit 1
Lesson
13

Name _____ Date _____

Represent Multivariable Data 3.MD.3, 3.OA.1, SMP.1, SMP.2, SMP.7, SMP.8

School Surveys

Let's explore and interpret a new type of picture graph.



I can be all of me in math class.
What are your strengths as a math learner?

Warm-Up

eyes on teacher

Activity 1 So Many Responses

Data Talk! A group of third graders was asked, "How do you feel about the new school year?" The results are shown on the picture graph.

1 How many students said they felt overwhelmed?

_____

2 **Discuss**

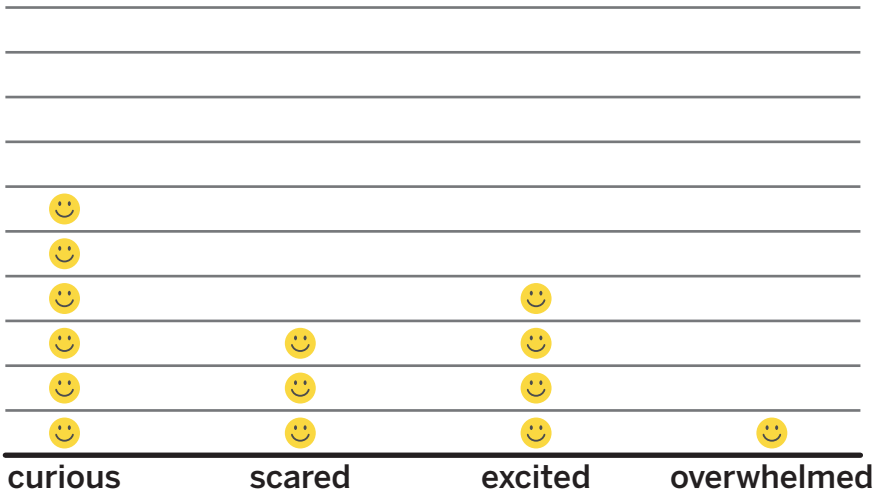
Why would it be difficult to create a graph showing a response from every student in the school?

Name _____ Date _____

So Many Responses (continued)

Here is another picture graph showing the same data.

Feelings of Third Graders About the New School Year



Each ☺ represents 5 students.

3 How many students said they felt overwhelmed?

_____

4 How are the 2 graphs similar? How are they different?

_____

_____

_____

_____

_____

_____

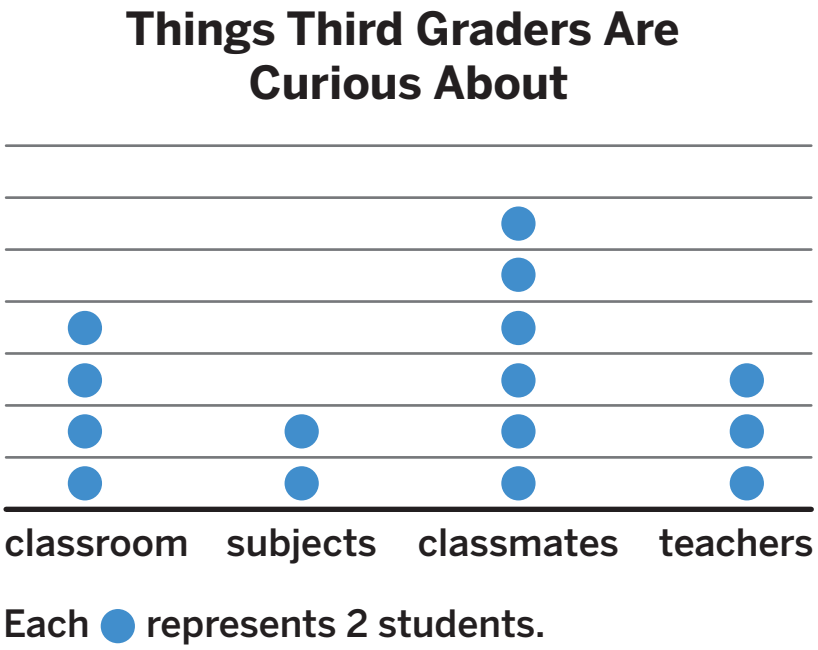
Activity 2

Name _____ Date _____

Using a Scaled Picture Graph

Most third graders chose *curious*, so the school decided to ask, "What are you curious about as you start a new school year?"

The scaled picture graph shows their responses to the question.



5 How many students chose each category?

classroom: _____ **subjects:** _____

classmates: _____ **teachers:** _____



Name _____ Date _____

Using a Scaled Picture Graph (continued)

6 How many students' responses are represented on the graph?

_____

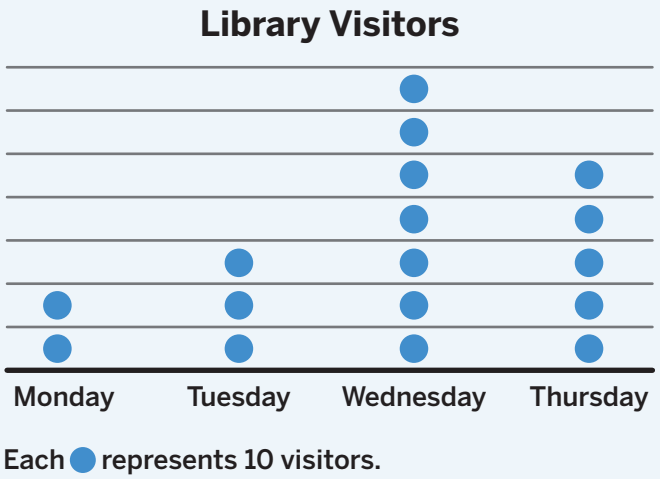
7 **Data Talk!**

Compare the data presented in Activity 1 to the data in Activity 2. How does this data match the data presented in Activity 1 for students who chose *curious*? How do you know?



Summary 1.13

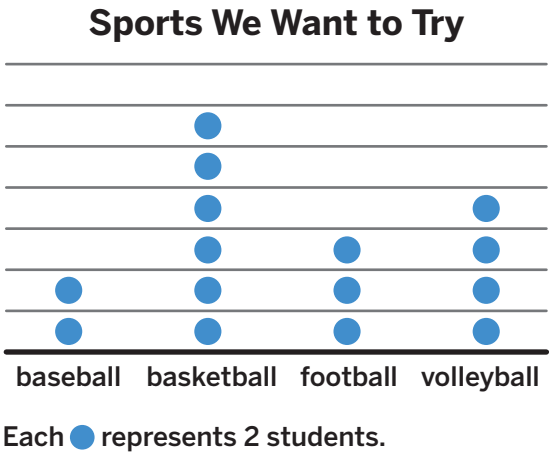
When each picture on a picture graph represents a number other than 1, the graph is called a **scaled picture graph**. The key tells you the number of objects or responses that each picture represents.



scaled picture graph A picture graph where each picture represents an amount other than 1.

Practice 1.13

For Problems 1–3, use the picture graph about sports that some students want to try.



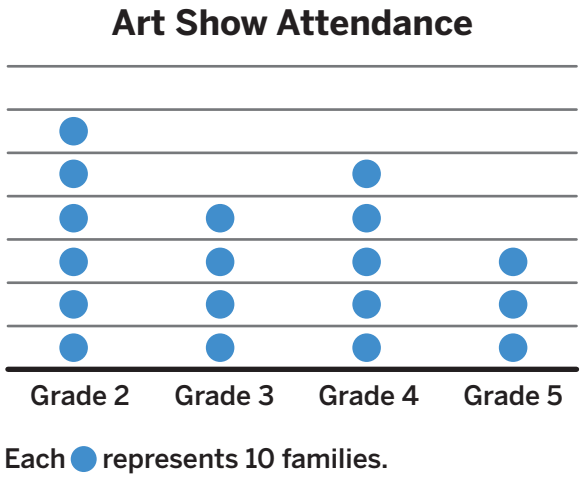
1. How many students want to try basketball?

2. How many *fewer* students want to try baseball than volleyball?

3. Write another question that could be answered using the graph.

Name _____ Date _____

For Problems 4–6, use the picture graph about the number of families that attended the art show.



4 How many Grade 3 families attended the art show?

_____

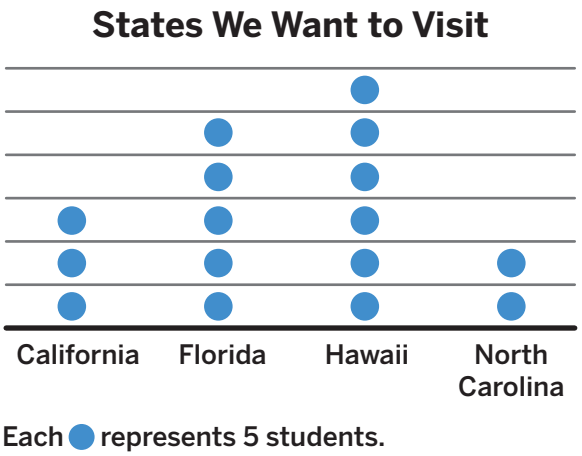
5 How many *more* Grade 4 families attended than Grade 5 families?

_____

6 Write another question that could be answered using the graph.

_____

For Problems 7 and 8, use the picture graph that shows the results from a survey about the states students want to visit.



7 How many students said they want to visit California?

(A) 3 students

(B) 10 students

(C) 15 students

(D) 30 students

Name _____ Date _____

8 How many *more* students want to visit Hawaii than Florida?

(A) 1 student (B) 5 students (C) 10 students (D) 20 students

Spiral Review

For Problems 9–11, determine the product.

9 10 × 3 = _____

10 5 × 3 = _____

11 _____ = 4 × 3

12 19 fewer people attended the school play on Friday than on Saturday. 63 people attended the school play on Friday. How many people attended the school play on Saturday?

Show your thinking.

answer: _____ **equation:** _____

Unit 1
Lesson
14

Name _____ Date _____

Represent Multivariable Data | 3.MD.3, 3.OA.1, SMP.2, SMP.6, SMP.7

Which Character Are You?

Let's represent data using a scaled picture graph.



I can be all of me in math class.
What math ideas will you bring to class today?

Warm-Up

eyes on teacher

Activity 1 Representing Our Class Data

1 Record the total number of students who chose each category. Then record the total number of students surveyed.

Category	Number of students
hero	
villain	
sidekick	
mentor	

total students surveyed: _____

Name _____ Date _____

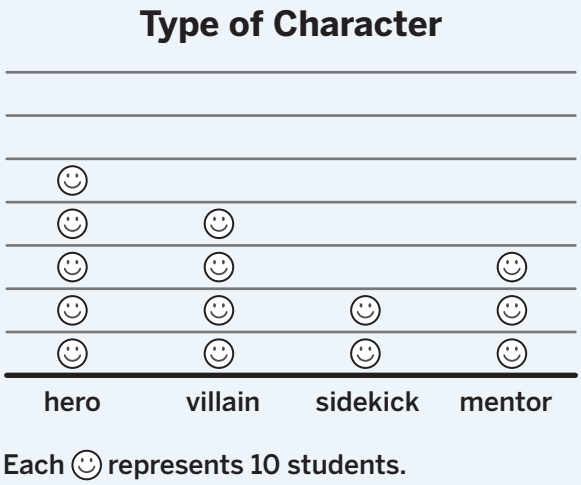
Representing Our Class Data (continued)

2 Represent the class survey data on a scaled picture graph where each picture represents 2 students.

Each _____ represents 2 students.

Summary 1.14

To create a scaled picture graph, use 1 picture to represent more than 1 person or thing. The scale is used to determine how many pictures represent the number of responses in each category.

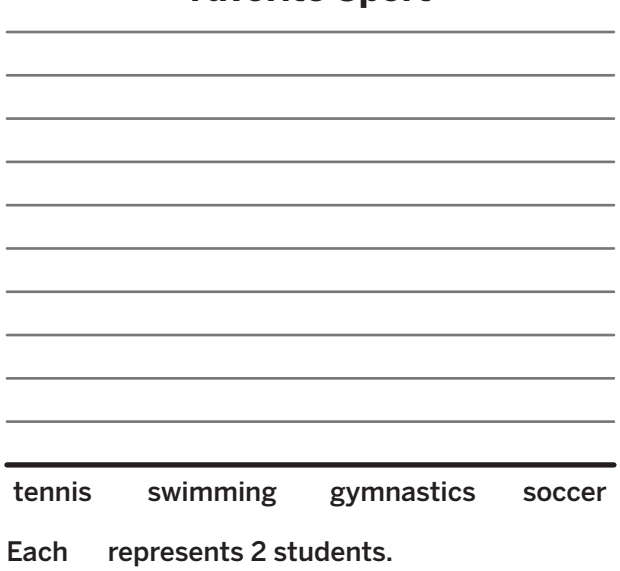


Practice 1.14

Use the table about the favorite sports of some students for Problems 1 and 2.

Sport	Number of students
tennis	6
swimming	6
gymnastics	4
soccer	8

1 Complete the scaled picture graph for the data in the table.



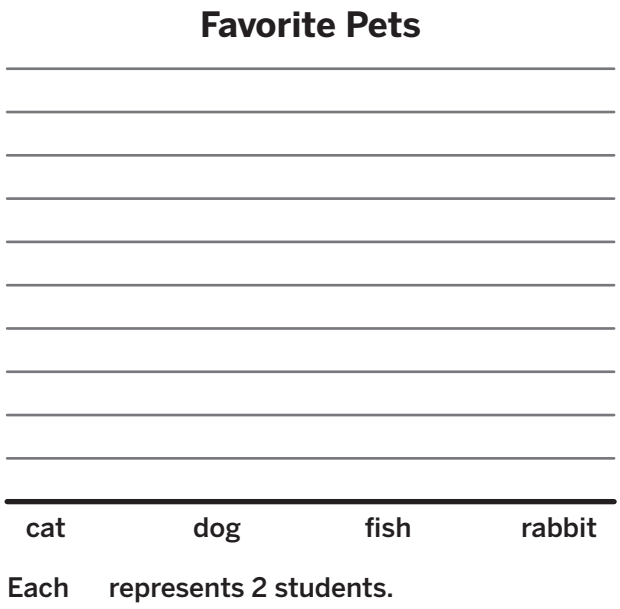
Name _____ Date _____

2 The next day, 2 more students said their favorite sport was tennis, and 4 more students said their favorite sport was gymnastics. Add the data to the graph.

Use the table about the favorite pets of some students for Problems 3 and 4.

Pet	Number of students
cat	4
dog	8
fish	2
rabbit	6

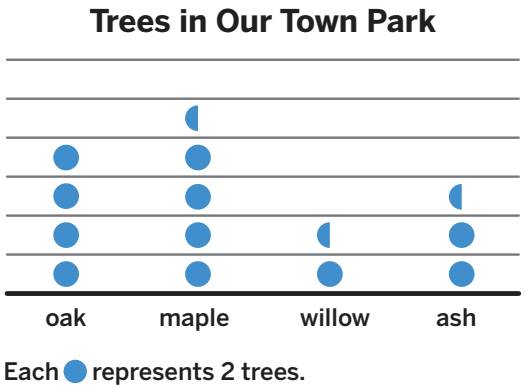
3 Complete the scaled picture graph for the data in the table.



4 The next day, 2 more students said their favorite pet was cat, and 6 more students said their favorite pet was fish. Add the data to the graph.

Name _____ Date _____

5 The scaled picture graph shows the trees in Priya's town park. If the town plants 2 more ash trees, what needs to change on the graph?



(A) Draw 1 half circle for ash.

(B) Draw 1 whole circle for ash.

(C) Draw 2 whole circles for ash.

(D) Remove 1 whole circle from ash.

Spiral Review

For Problems 6–8, determine the product.

6 $5 \times 10 =$ _____

7 _____ $= 5 \times 5$

8 $5 \times 4 =$ _____

9 Jada collected 20 large seashells and 55 small seashells on the beach. She dropped some of the seashells. Now Jada has 65 seashells. How many seashells did she drop? Write an equation to represent the problem.

Show or explain your thinking.

equation: _____

answer: _____

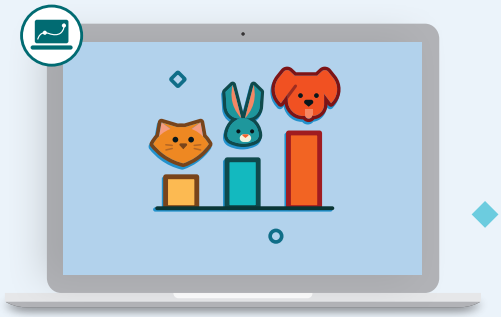
Unit 1
Lesson
15

Name _____ Date _____

Represent Multivariable Data | Number Flexibility to 100 | 3.MD.3, 3.OA.1, SMP.3, SMP.6, SMP.7

Puppy Pile

Let's look at bar graphs with scales other than 1.



We are a math community.
Mrs. Park learns about the library visitors. How can collecting and representing data on graphs help you learn about your classmates?

Warm-Up

1 eyes on teacher

Activity 1 Class Collection

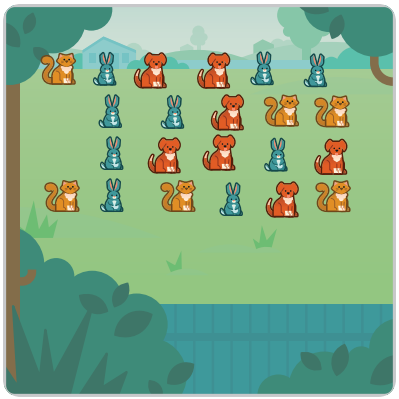
A class is collecting stickers for a project.

2 Circle an animal sticker you would add to the class collection.









Let's look at the class collection and the bar graph that represents it.

3 Data Talk!

How are these graphs similar? How are they different?

Activity 2

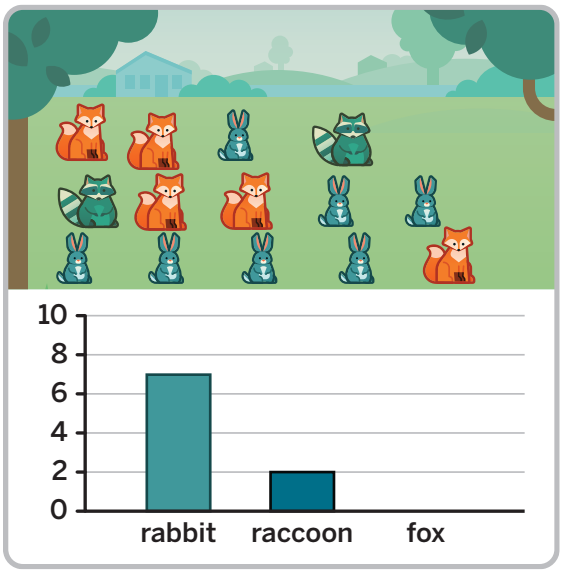
Name _____ Date _____

Creating Scaled Graphs

5 Here is a new animal sticker collection.

Animal	Number of each animal
rabbit	7
raccoon	2
fox	5

A New Collection



Draw a bar on the graph to represent the number of foxes.

6 Design a Challenge

- Use the *Design a Challenge* sheet to represent your own sticker collection on the data table.
- Represent the data from your table on one of the scaled bar graphs.
- Trade your *Design a Challenge* sheet with a partner.
- Represent your partner's data on a different scaled bar graph.
- Repeat with a new partner until all 4 graphs are completed.

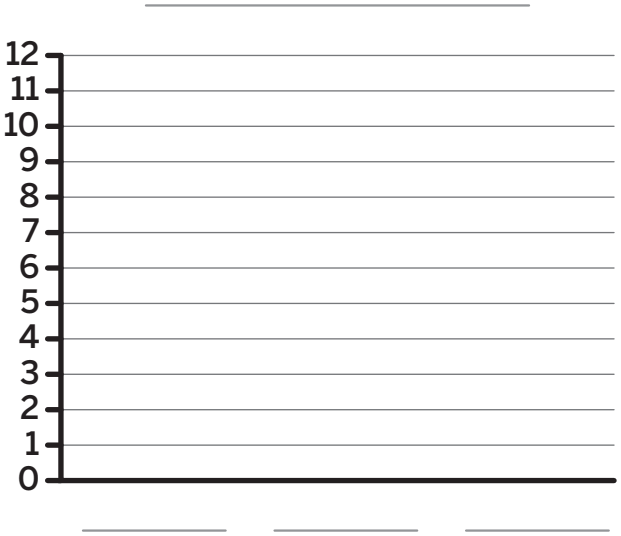
Name _____ Date _____

Creating Scaled Graphs (continued)

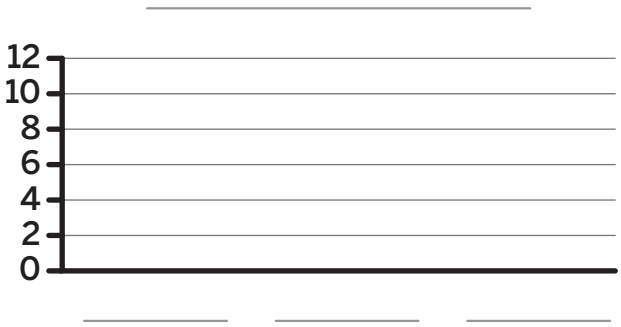
6

Draw

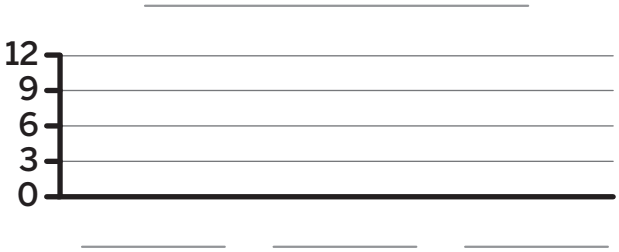
scale = 1



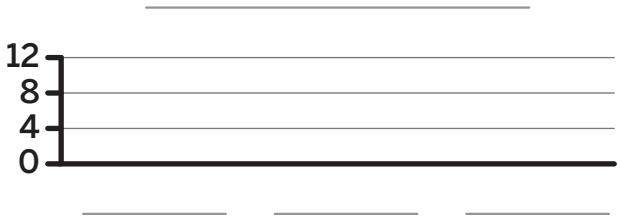
scale = 2



scale = 3

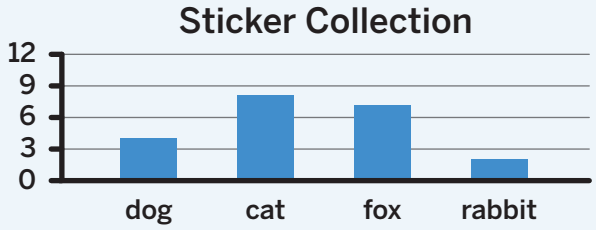


scale = 4

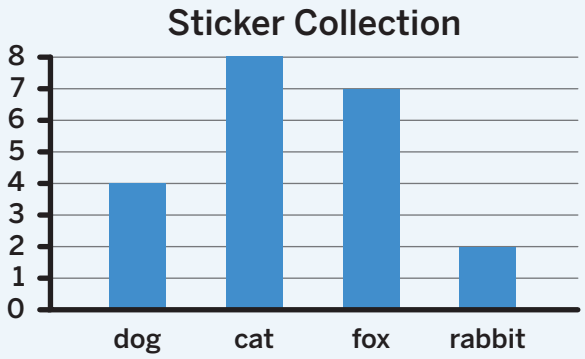


Summary 1.15

Scaled bar graphs have a **scale** other than 1. The same data can look different on bar graphs with different scales.



Scale: 3



Scale: 1

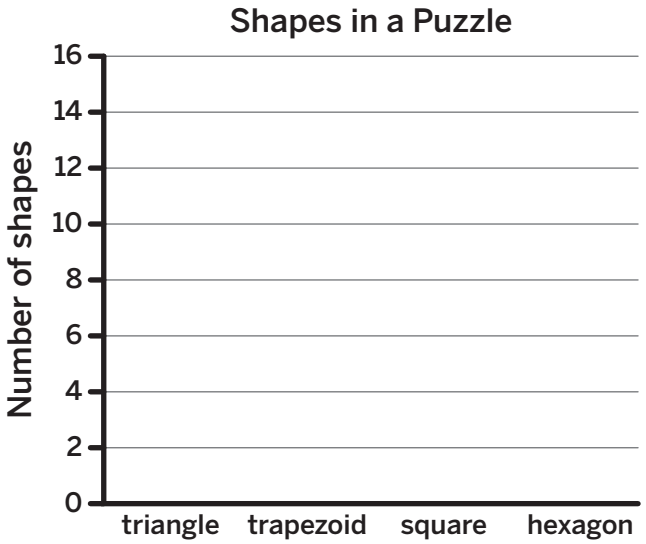
scale On a bar graph, the scale is the amount represented by the space between the lines.

scaled bar graph A bar graph where the scale is marked in units other than 1.

Practice 1.15

1 Use the data in the table to complete the scaled bar graph.

Shape	Number of shapes
triangle	13
trapezoid	10
square	9
hexagon	15

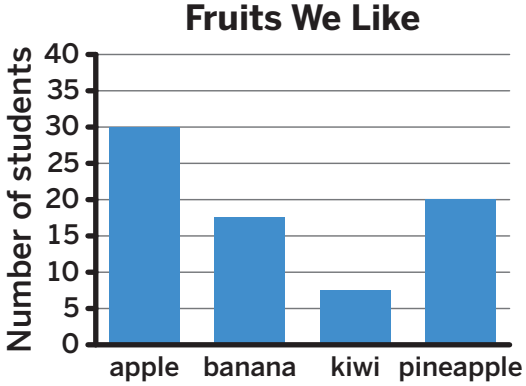


Name _____ Date _____

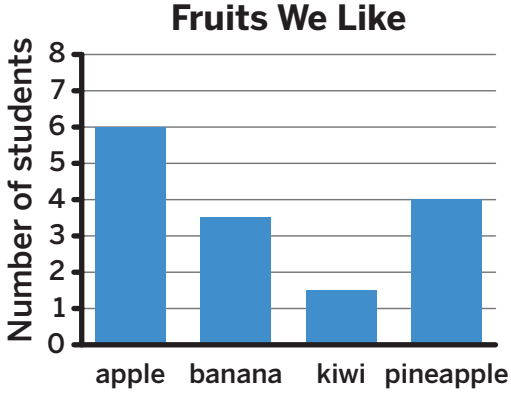
2 The table shows students' favorite types of fruit. Which scaled bar graph correctly represents the data?

Fruit	Number of students
apple	12
banana	7
kiwi	3
pineapple	8

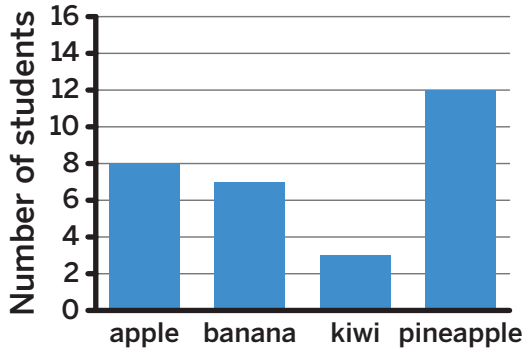
A



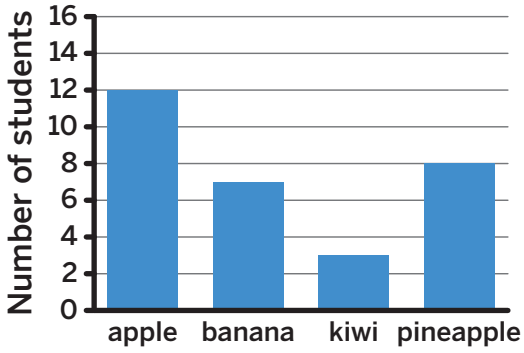
B



C



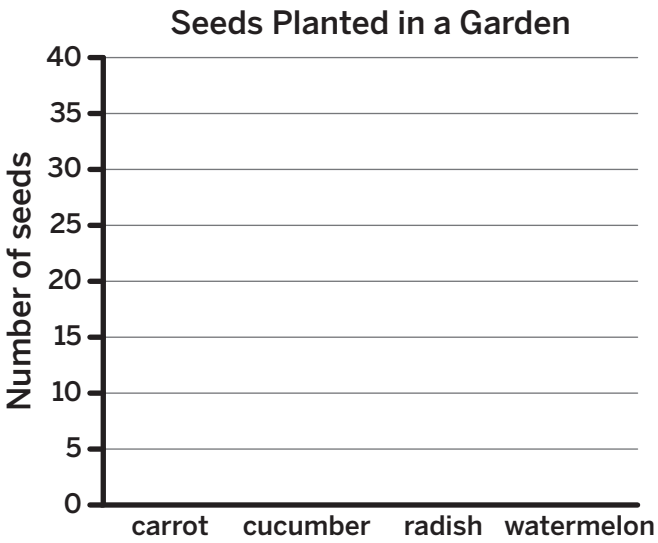
D



Name _____ Date _____

3 Use the data in the table to complete the scaled bar graph.

Seed type	Number of seeds
carrot	35
cucumber	30
radish	15
watermelon	25



Spiral Review

For Problems 4–8, determine the product.

4 4 × 10 = _____

5 5 × 7 = _____

6 2 × 5 = _____

7 10 × 2 = _____

8 6 × 5 = _____

9 Han had a piece of string that was 61 centimeters long. He cut off 28 centimeters of the string. How long is the leftover string?

Show your thinking.

answer: _____

equation: _____

Unit 1
Lesson
16

Name _____ Date _____

Represent Multivariable Data | Number Flexibility to 100

3.MD.3, 3.OA.1, SMP.3, SMP.4, SMP.6, SMP.7

2, 5, or 10?

Let's think about which scale to use for a bar graph — 2, 5, or 10.



I am a doer of math.
What do you do when you need to choose between 2 or more things or ideas in our math class?

Warm-Up

eyes on teacher

Activity
1

Mrs. Park's Interest Survey — Part 1

Mrs. Park wanted to know more about the interests visitors to her library have, so she posted this survey question: "What activities do you like to do in your free time?" By noon that day, the data looked like this.

1 Data Talk!

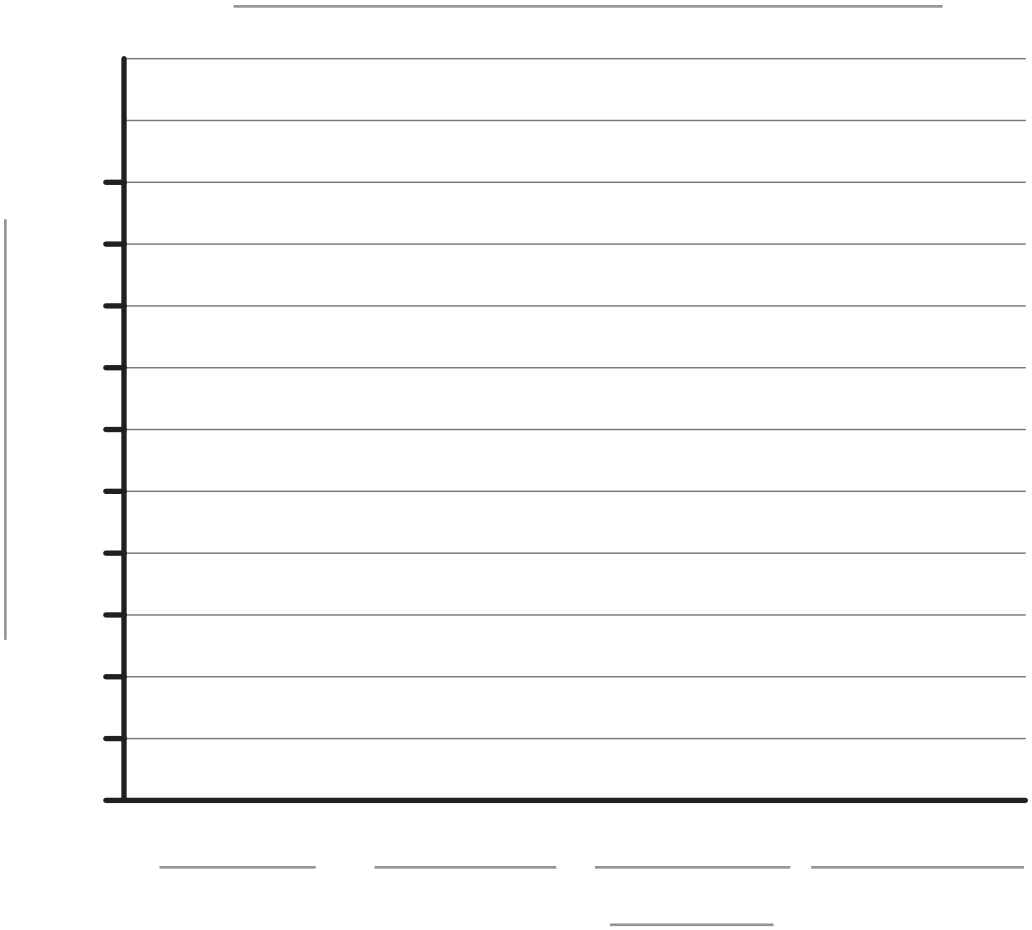
If you were going to make a bar graph to represent the data, would you use a scale of 2 or a scale of 5? Explain your thinking.

Activity	Number of visitors
sports	20
read	15
arts and crafts	2
explore	7

Name _____ Date _____

Mrs. Park's Interest Survey — Part 1 (continued)

2 Use the scale that you chose to create a scaled bar graph to represent the activities of the visitors.



Activity 2

Name _____ Date _____

Mrs. Park's Interest Survey — Part 2

At the end of the day, the data from Mrs. Park's survey looked like this.

Activity	Number of visitors
sports	44
reading	33
arts and crafts	16
exploring	20

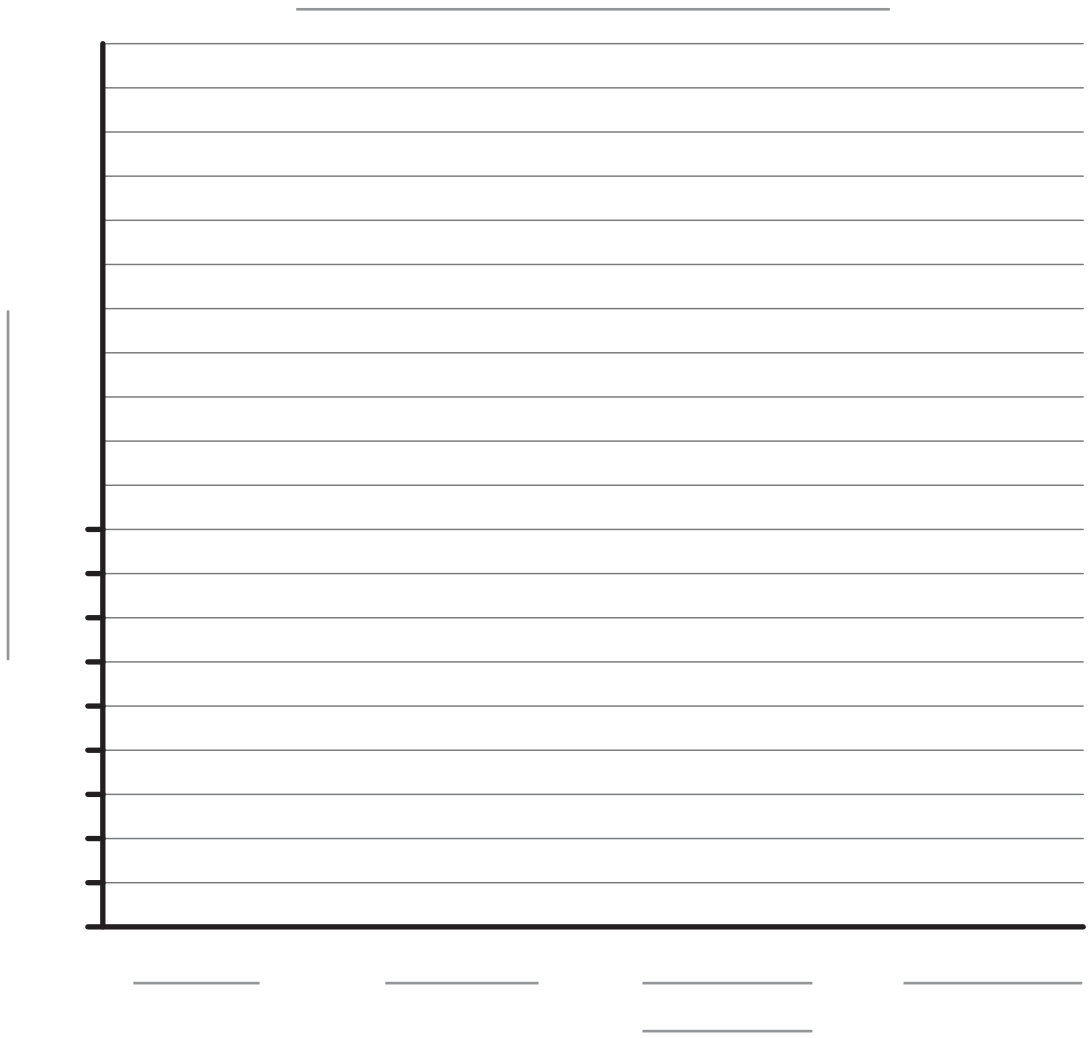


Activity 2

Name _____ Date _____

Mrs. Park's Interest Survey — Part 2 (continued)

3 Use the data from the table to create a scaled bar graph with a scale of 2, 5, or 10 that can be clearly interpreted by others.



4 **Discuss**

Discuss why you chose the scale that you did.

Summary 1.16

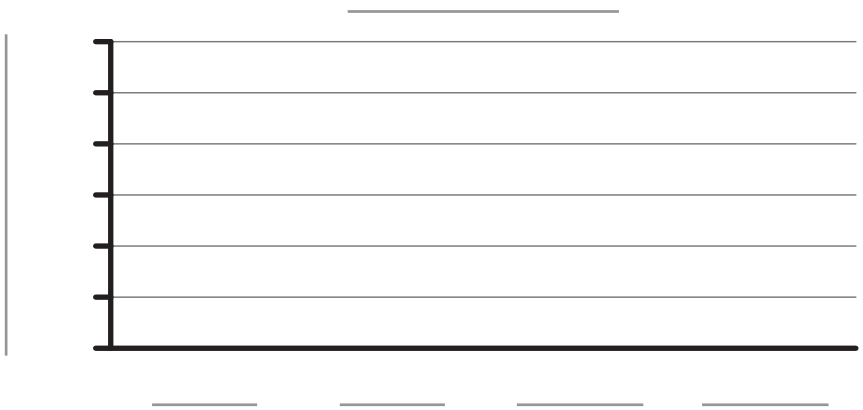
Different scales can be used to represent the same data. When choosing a scale, consider the data you need to represent and what scale will make it clearer to interpret the data.

Activity	Number of visitors
sports	80
reading	62
arts and crafts	44
exploring	119

Practice 1.16

1 The table shows the number of books some students have at home. Use the information from the table to create a scaled bar graph.

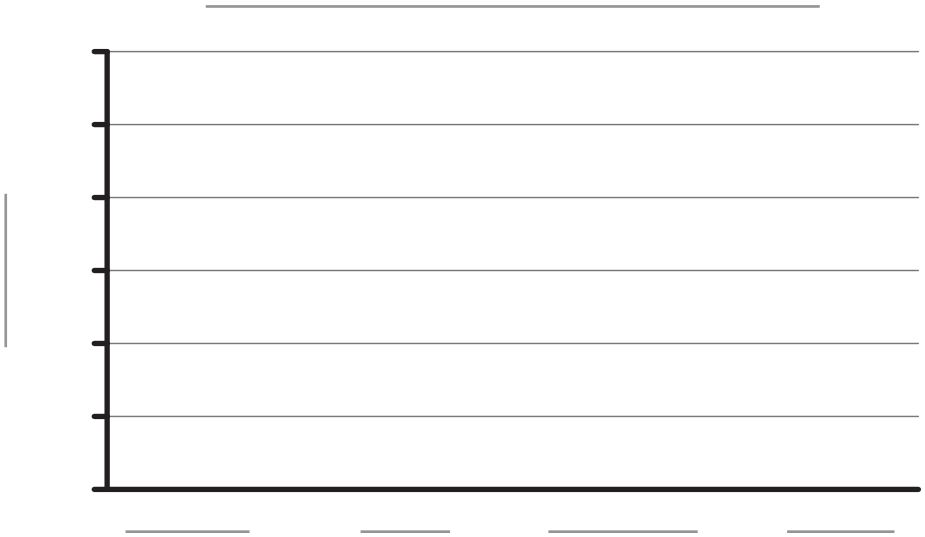
Student	Number of books
Priya	25
Han	9
Shawn	16
Clare	21



Name _____ Date _____

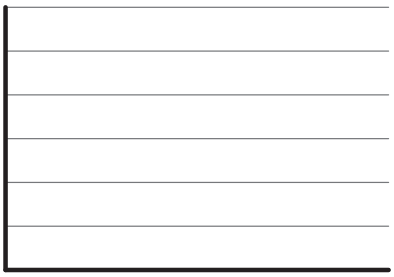
2 The table shows the number of items donated for a winter clothing drive for Jada's class. Use the information from the table to create a scaled bar graph.

Item	Number
gloves	45
hats	50
scarves	30
socks	55



3 The table shows the number of times some students went to the park last year. If you were going to graph the data on the grid shown, which scale should you use?

Student	Number of times to the park
Jada	18
Diego	45
Clare	30
Priya	15



(A) scale of 1

(B) scale of 2

(C) scale of 5

(D) scale of 10

Name _____ Date _____

Spiral Review

For Problems 4–7, determine the product.

4 $1 \times 10 =$ _____

5 $5 \times 1 =$ _____

6 _____ $= 2 \times 10$

7 _____ $= 4 \times 5$

8 A city usually receives 50 inches of rain a year. Last year, the city received 37 inches. How much *less* rain did the city receive than usual?

Show your thinking.

answer: _____ **equation:** _____

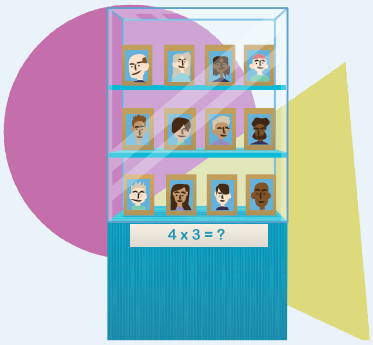
Unit 1
Lesson
17

Name _____ Date _____

Represent Multivariable Data | 3.MD.3, SMP.1, SMP.2, SMP.6, SMP.7

Raising the Bar

Let's answer problems about bar graphs "1 step" at a time.



Warm-Up eyes on teacher

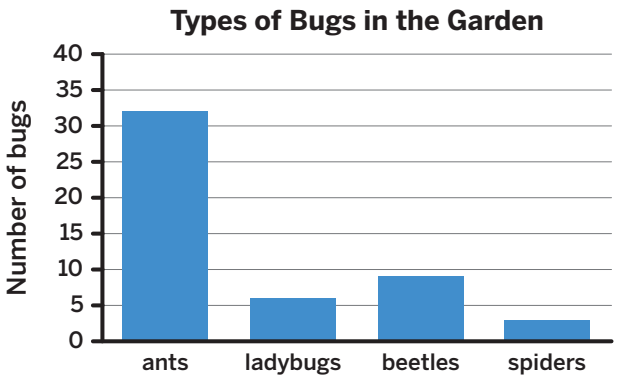
I am a doer of math.
How could you use a bar graph in your everyday life?

Activity
1

Comparing Data on a Bar Graph

Harper collected data to see how many of each type of bug were in her garden. The data is shown on the bar graph.

Use the bar graph to answer the questions. Show your thinking using expressions or equations.



Show your thinking.

1 How many bugs were in Harper's garden?

answer: _____

Name _____ Date _____

Comparing Data on a Bar Graph (continued)

Show your thinking.

2 How many beetles and ladybugs did Harper see?

answer: _____

3 How many *more* ants were in the garden than spiders?

answer: _____

4 How many *fewer* ladybugs were there than ants?

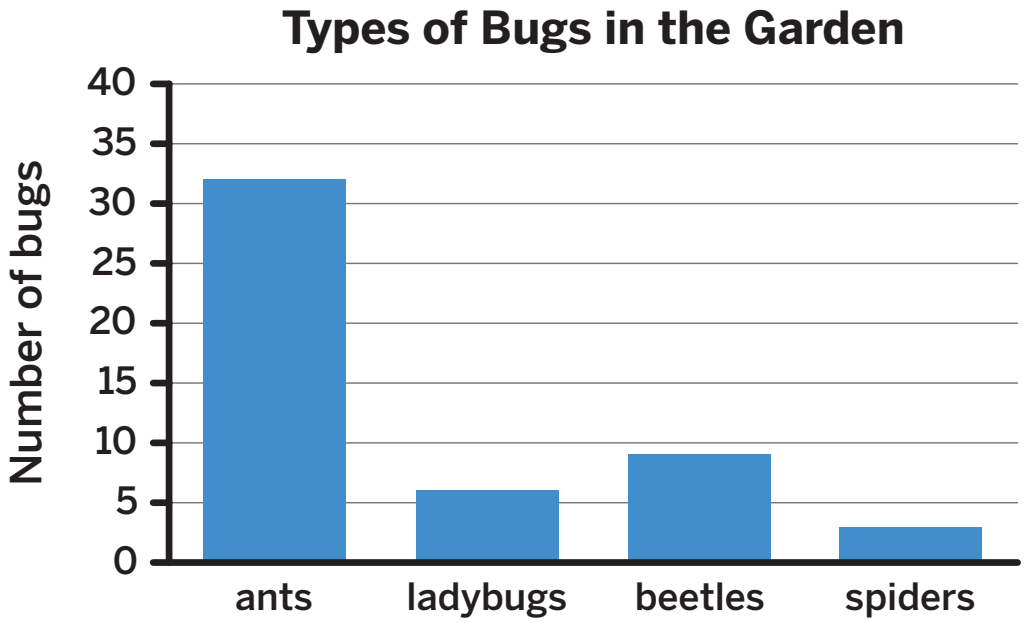
answer: _____

Activity 2

Name _____ Date _____

Questions About Bugs in the Garden

You will use Harper's bar graph from Activity 1.



Name _____ Date _____

Questions About Bugs in the Garden (continued)

5 Write a question about the bugs in the garden that can be answered using the data on the graph.

_____

_____

_____

_____

6 Solve your problem.

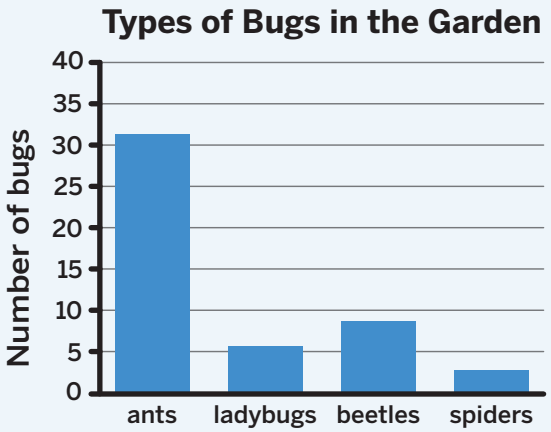
Show or explain your thinking.

answer: _____

7 Make any necessary edits to your problem and then copy it onto the sheet. Trade sheets with your partner and have your partner solve your problem.

Summary 1.17

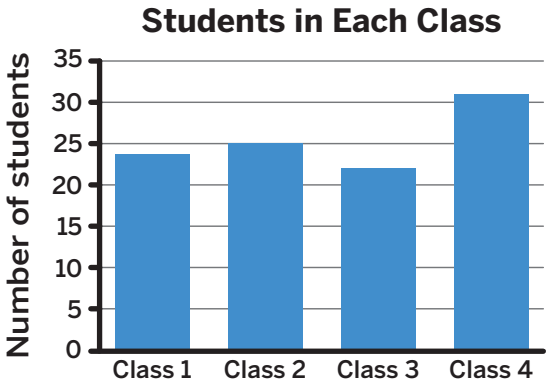
You can use a bar graph to help you answer questions about combining and comparing data.



1. How many ladybugs, spiders, and beetles are in the garden?
2. How many *fewer* spiders are there than beetles?

Practice 1.17

1 The scaled bar graph shows how many students are in each Grade 3 class at a school. How many *more* students are there in Class 4 than Class 3?

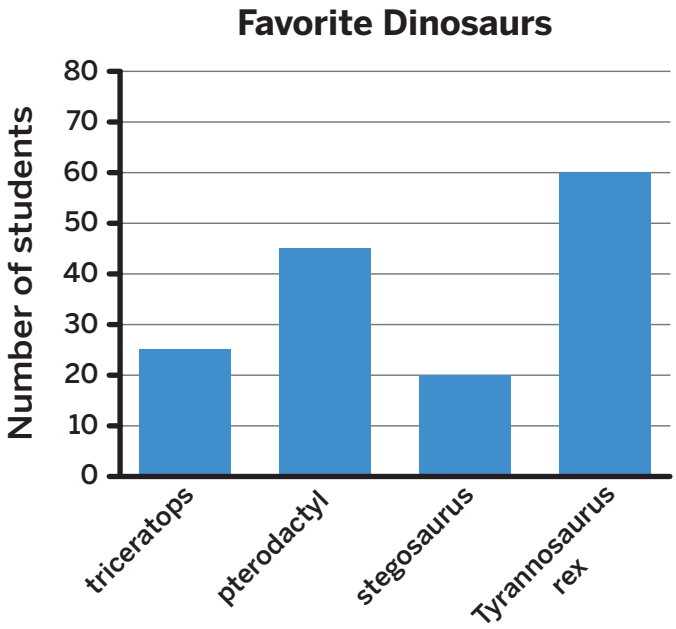


Show or explain your thinking.

answer: _____

Name _____ Date _____

2 The scaled bar graph shows the favorite dinosaurs of students. How many *fewer* students chose triceratops than pterodactyl?



Show or explain your thinking.

answer: _____

3 Use the scaled bar graph that shows the voice types of members of a choir.

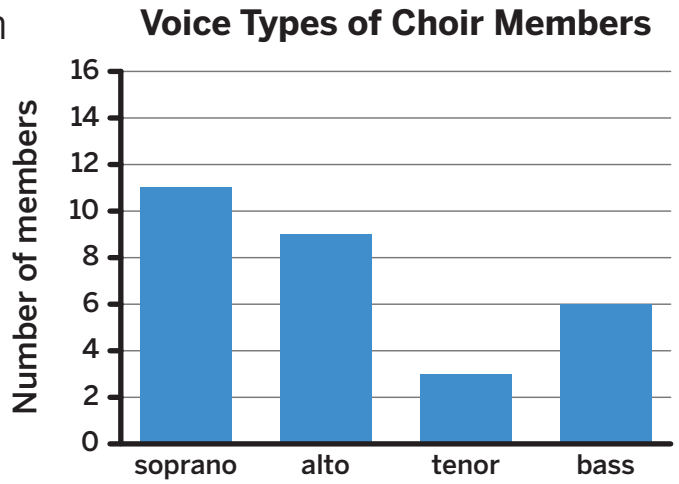
How many soprano and tenor choir members are there combined?

(A) 9 sopranos and tenors

(B) 11 sopranos and tenors

(C) 14 sopranos and tenors

(D) 17 sopranos and tenors



Name _____ Date _____

Spiral Review

For Problems 4–7, determine the product.

4 5 × 2 = _____

5 10 × 2 = _____

6 4 × 10 = _____

7 4 × 5 = _____

8 Jada used beads to make bracelets for her classmates. She had 250 purple and orange beads to use. She used 112 purple beads and 75 orange beads. How many beads did Jada have left?

Show or explain your thinking.

answer: _____ **equation:** _____

Name _____ Date _____

Represent Multivariable Data | 3.MD.3, SMP.1, SMP.7, SMP.8

Favorite Season

Let's see what data represented on scaled bar graphs can show us.



Warm-Up

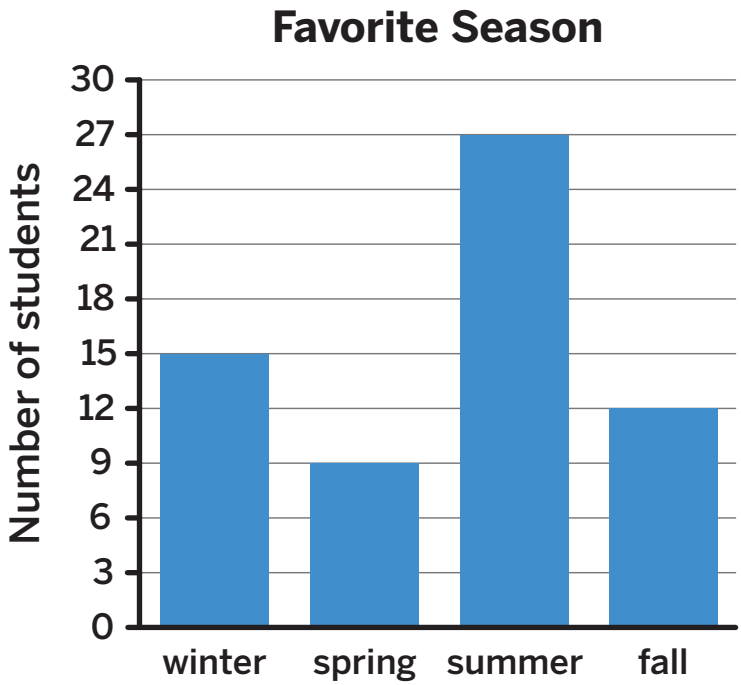
eyes on teacher

I am a doer of math.
What helps you be a successful doer of math?

Activity
1

Three Reads

All the third graders at a school were asked, "What is your favorite season?" Their responses are shown on the bar graph.



Name _____ Date _____

Three Reads (continued)

Show your thinking.

1 How many *more* students chose summer than fall?

answer: _____

2 How many *more* students chose summer than spring or fall combined?

answer: _____

3 Discuss

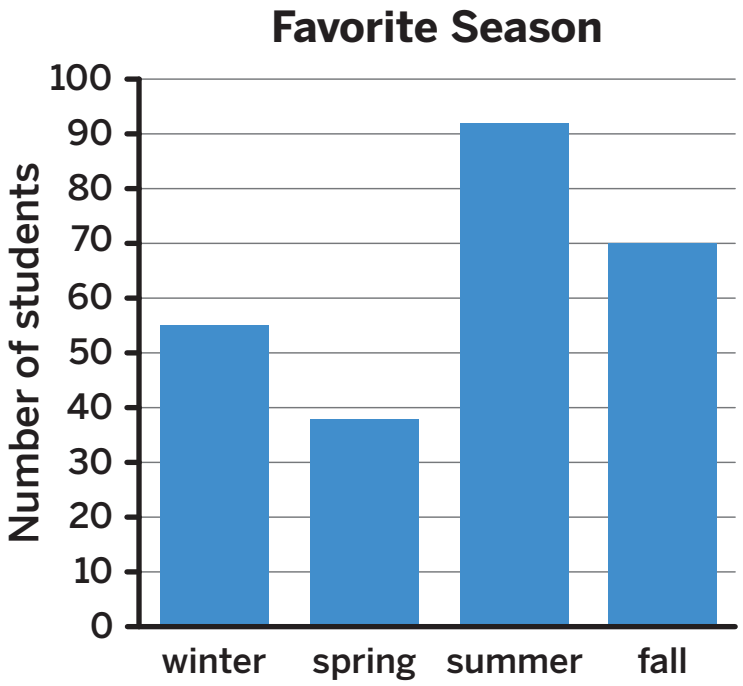
How are Problems 1 and 2 similar? How are they different?

Activity 2

Name _____ Date _____

Using Bar Graphs to Solve Problems

The fourth and fifth graders at the same school were also asked, "What is your favorite season?" The scaled bar graph shows the data of the third, fourth, and fifth graders.





Name _____ Date _____

Using Bar Graphs to Solve Problems (continued)

Show your thinking.

4 How many *fewer* students chose summer than winter or spring combined?

answer: _____

5 How many *fewer* students chose winter than summer?

answer: _____

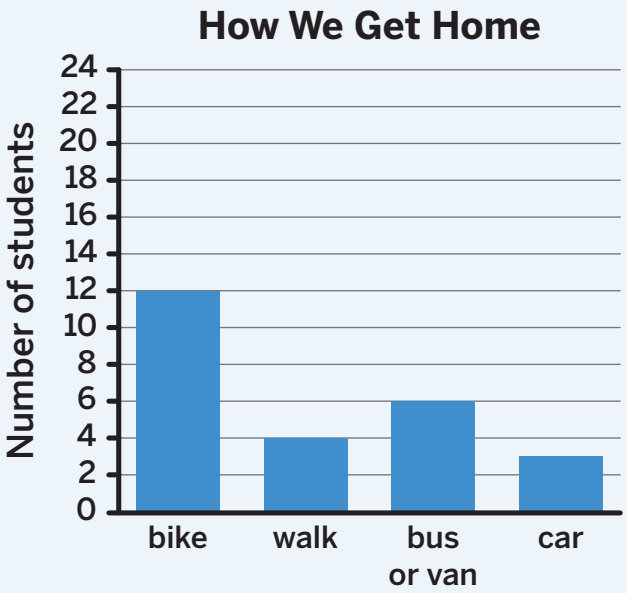
6 More students voted and there are now a total of 300 votes. How many *more* votes will need to be added to the bar graph?

answer: _____

Summary 1.18

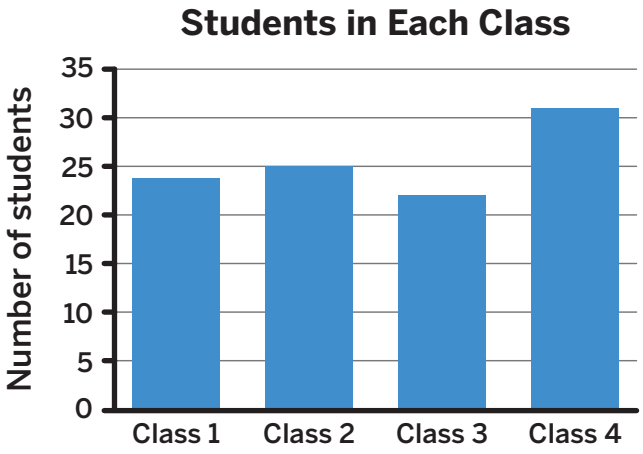
You can answer questions about data represented on a bar graph. Sometimes, the questions require 2 steps.

How many *more* students bike home than walk home or ride in a car combined?



Practice 1.18

1 The scaled bar graph shows how many students are in each Grade 3 class at a school. How many *fewer* students are there in Class 3 than there are in Classes 1 and 2 combined?

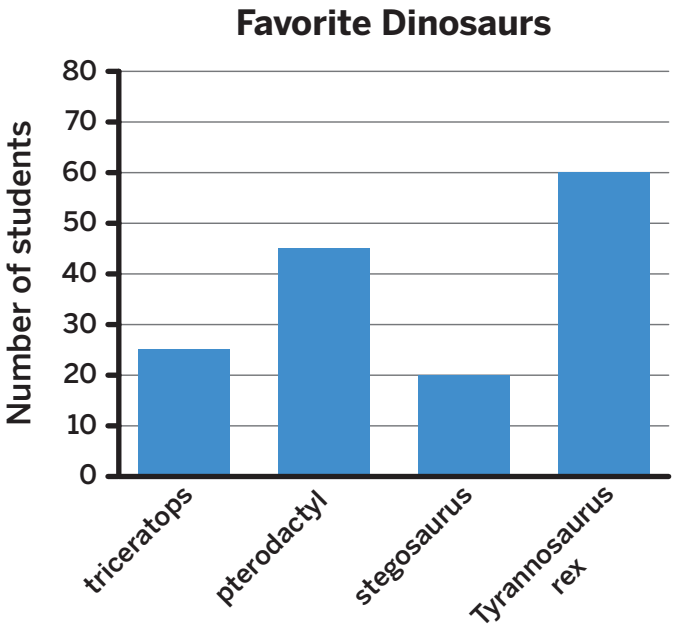


Show your thinking.

answer: _____

Name _____ Date _____

2 The scaled bar graph shows the favorite dinosaurs of students. How many *more* students chose pterodactyl and stegosaurus combined than Tyrannosaurus rex?



Show or explain your thinking.

answer: _____

3 Use the scaled bar graph that shows the voice types of members of a choir.

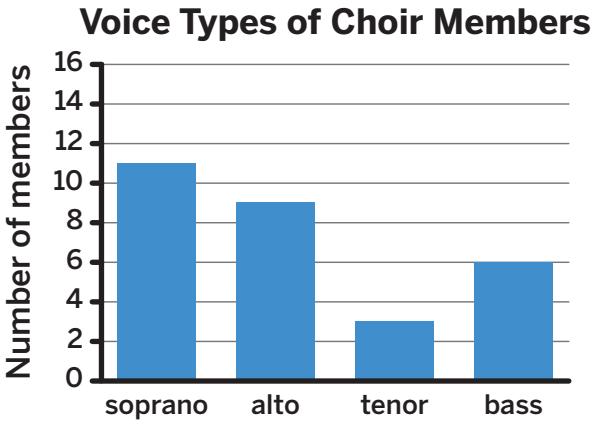
How many *fewer* sopranos are there than altos and basses combined?

(A) 5 sopranos

(B) 3 sopranos

(C) 4 sopranos

(D) 1 soprano



Name _____ Date _____

Spiral Review

For Problems 4–7, determine the product.

4 $3 \times 4 =$ _____

5 $2 \times 4 =$ _____

6 $5 \times 10 =$ _____

7 $5 \times 5 =$ _____

8 Priya made chili for her soccer team. She had $100 to spend on the ingredients. She spent $45 on meat and $25 on tomatoes. How much money did Priya have left?

Show or explain your thinking.

answer: _____ **equation:** _____

Notes:

Math at Work

Do you like planning large social events?

Event managers organize large events, such as weddings or other celebrations. They might multiply to figure out how many place settings are needed for 9 tables if each table has 7 seats.



fizkes/Shutterstock.com. Tsezarina/Shutterstock.com.

Math in the World

Octopuses have 9 brains! They have a mini brain in each of their 8 legs and 1 more between their eyes. How many brains does a group of 6 octopuses have?



Muhammadphotoes/Shutterstock.com.

Math Mindset

How can models or equations represent everyday situations involving equal groups?

Unit 2

Area and Multiplication

Big Ideas in This Unit

CC2 Number Flexibility to 100 CC3 Square Tiles

Questions for Investigation

- How are equal groups, arrays, and area related to multiplication?
- How can you determine the area of any rectangular or rectilinear shapes?

Explore: Comparing Rugs
Which rug is the largest?

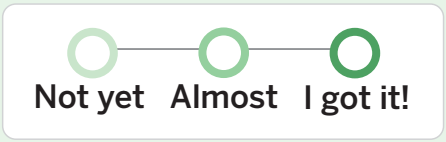


Unit Story: Cheri's New Home
In the story, Cheri learns about her new home from the house's previous owner, Ms. Sarah.

Pixel-Shot/Shutterstock.com

Watch Your Knowledge Grow

This is the math you'll explore in this unit. Rate your understanding to see how your knowledge grows!



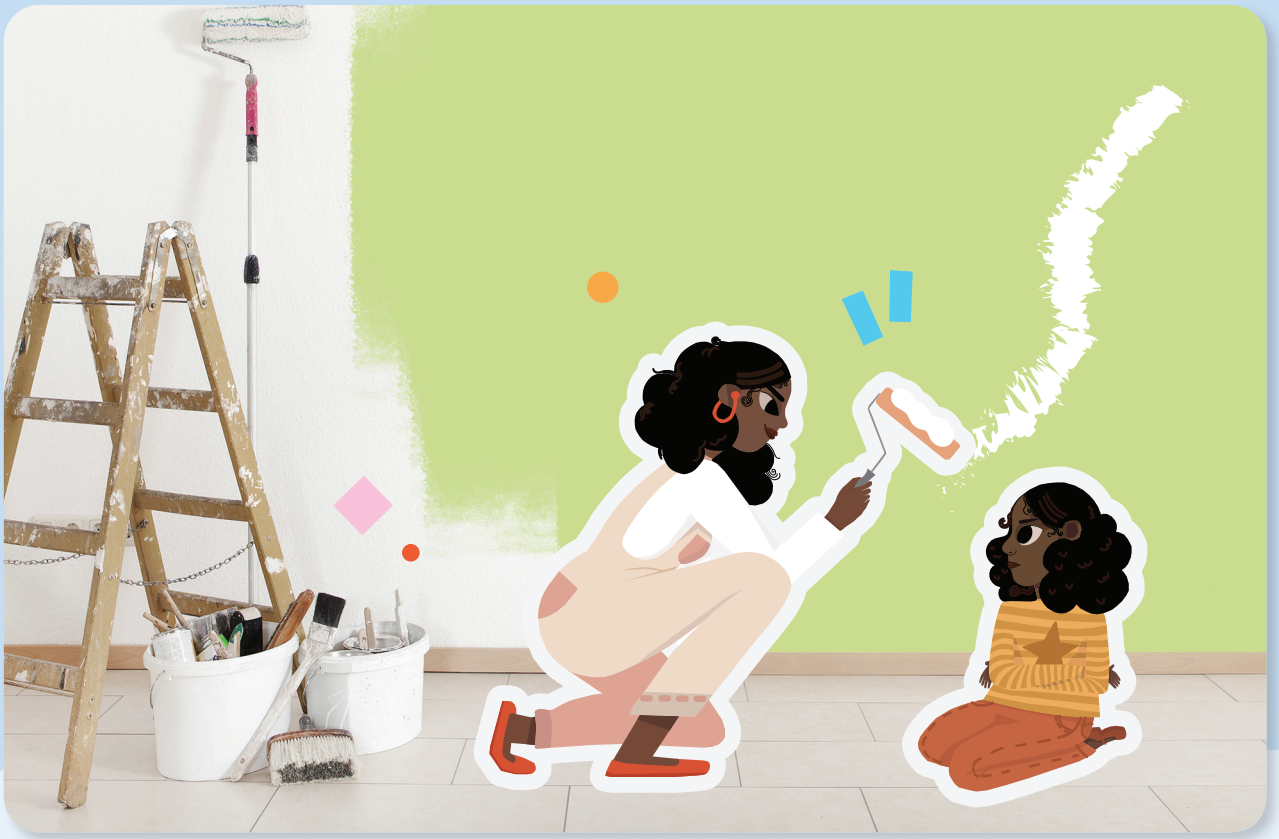
I can . . .	Before	After
Compare the area of different shapes.		
Determine the area of a rectangle.		
Decide which standard unit of area to use.		
Write an expression to represent the area of a rectangle.		
Use rulers to measure rectangles and determine their areas.		
Solve real-world area problems with 1 or more unknown measurements.		
Determine the area of a figure composed of rectangles.		
Determine the area of a non-gridded figure.		
Determine the area of a figure with an unknown side length.		

Sub-Unit

1

Concepts of Area Measurement

Unit Story: Cheri's New Home



pfluegler-photo/Shutterstock.com

Cheri and her mom were preparing to cover a wall in paint in their new house. What other ways are parts of a living space covered?

Name _____ Date _____

Square Tiles | Building Toward 3.MD.5, SMP.1, SMP.3, SMP.5

Explore: Comparing Rugs

Which rug is the largest?



Warm-Up

eyes on teacher

Discuss What do you notice? What do you wonder?



Activity

Name _____ Date _____

Which rug is the largest?

- Cheri and her mom are picking out a rug for her room. Cheri wants as large a rug as possible so she can spread out her things and play.
- With your partner, answer the question, "Which rug is the largest?" You can use any tools you have available. Be prepared to explain your thinking.

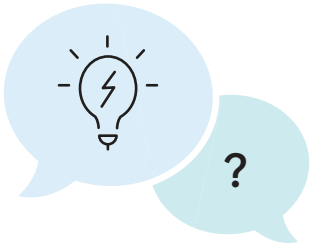
Ways to be a mathematician

1 I can take my time to think about a challenging problem before trying to solve it.



Not yet Almost I got it!

2 I can explain why my thinking makes sense and ask questions to understand the thinking of others.



Not yet Almost I got it!

3 I can choose the tool that is just right for the problem I am solving.

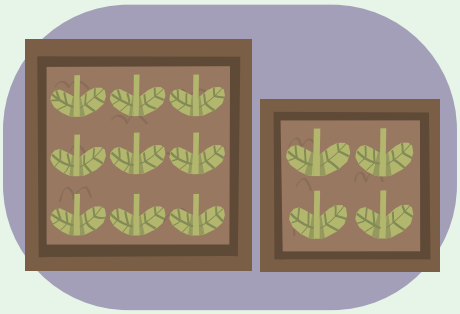


Not yet Almost I got it!

Name _____ Date _____

Square Tiles 3.MD.5, 3.MD.6, SMP. 1, SMP.3, SMP. 6

Which Covers More Space?



Let's use pattern blocks to compare the areas of different shapes.

Warm-Up

eyes on teacher

We are a math community. What does it mean to be a good listener when others share their math ideas?

Activity 1

Using Pattern Blocks to Compare Shapes

Hands-On

Use pattern blocks to determine which shape takes up the most space. Be ready to explain your thinking.

1 Which shape takes up the most space?

_____

2 Explain how you know this shape takes up the most space.

_____

_____

_____

_____

_____

Activity 2

Name _____ Date _____

Creating and Comparing

Hands-On

You and your group members will each build a shape using pattern blocks. Then you will compare the areas of your shapes. Be prepared to explain how you know a shape takes up less or more space than other shapes.

3 On your own, use up to 10 pattern blocks to build a shape.

4 As a group, order the shapes by their areas, from *smallest* to *largest*.

5 On your own, rearrange the pattern blocks from your first shape to build a second shape.

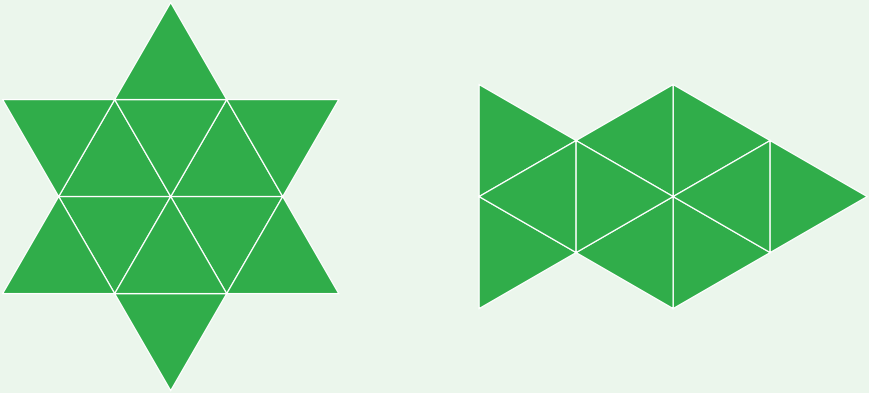
6 As a group, order the second shapes by their areas, from *smallest* to *largest*.

7 ## Discuss

For any 2 shapes, how can you be sure which shape covers more space and has a larger area?

Summary 2.02

When comparing the **areas** of 2 or more shapes, using the same unit to cover each shape helps you determine which shape is the largest by comparing the number of units.

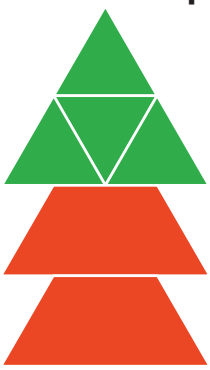


area An attribute of a shape that describes the amount of space it takes up.

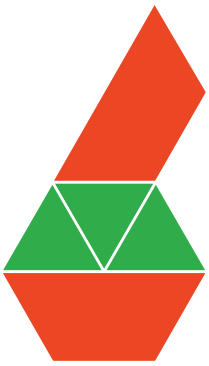
Practice 2.02

1 Jada and Priya made these shapes using pattern blocks.

Jada's shape



Priya's shape

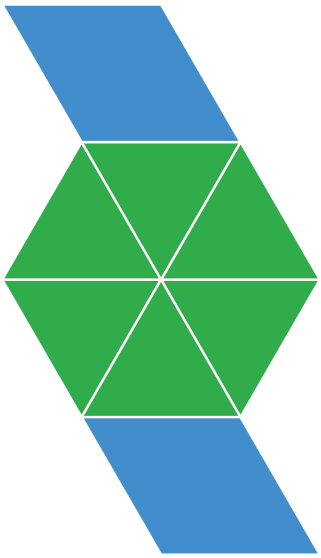


Which shape has a larger area? Explain your thinking.

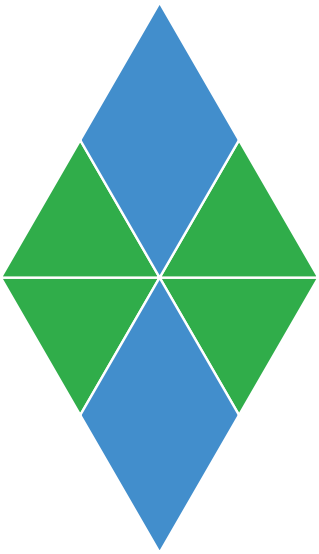
Name _____ Date _____

2 Diego made these shapes using pattern blocks.

Shape A



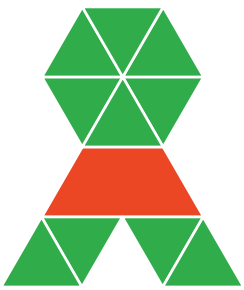
Shape B



Which shape has a smaller area? Explain your thinking.

3 Clare made these shapes using pattern blocks.

Shape A



Shape B



Shape C



Which shows the order of the shapes from *smallest* to *largest* area?

(A) A, B, C (B) C, B, A (C) B, C, A (D) C, A, B

Name _____ Date _____

Spiral Review

For Problems 4–7, determine the value of the expression.

4 1×2 _____

5 5×2 _____

6 10×2 _____

7 2×2 _____

8 The table shows the typical temperature in degrees Fahrenheit for each season in the city of Chicago. How much higher is the typical temperature in summer than winter?

Season	Typical temperature (degrees Fahrenheit)
spring	49
summer	72
fall	53
winter	26

Show your thinking.

answer: _____

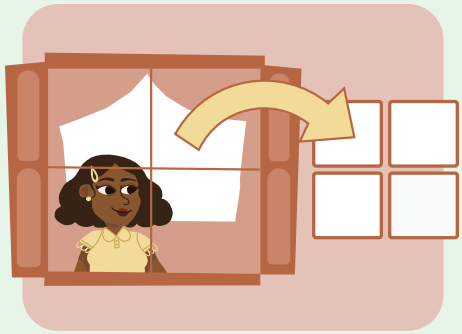
Unit 2
Lesson
3

Name _____ Date _____

Square Tiles 3.MD.5.a, 3.MD.5.b, 3.MD.6, SMP.2, SMP.3, SMP.6, SMP.7

Tiling Figures

Let's use square tiles to build shapes and measure area.



Warm-Up

eyes on teacher

We are a math community.
What does good math partner work look like and sound like?

Activity
1

Tiling Figures

Hands-On

You and your partner will be given square tiles and a sheet with figures.

Use the square tiles to determine the area of each space in Cheri's new home. Be prepared to explain your thinking.

1. **area of the front hallway:** _____ square units

2. **area of Cheri's bedroom wall:** _____ square units

3. **area of the back patio:** _____ square units

4. **Discuss**

   Describe how you could use square tiles to determine the area of any figure like those in Problems 1–3.

Activity 2

Name _____ Date _____

Card Sort: Areas of Rectangles

Hands-On

You and your partner will be given a set of cards with 6 different rectangles.

5 Sort

Sort the cards by the areas of the rectangles. Record the area of each group of rectangles in the *Area* column and record the rectangles in the *Rectangles* column.

Area (square units)	Rectangles

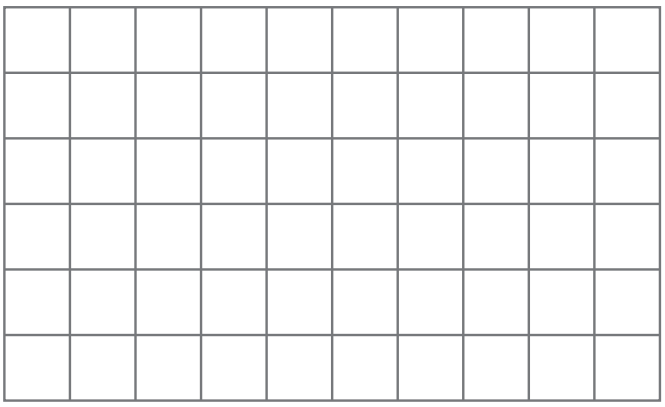


Name _____ Date _____

Card Sort: Areas of Rectangles (continued)

6 Choose 1 group of rectangles from your table in Problem 5 and explain how you determined the areas of those rectangles.

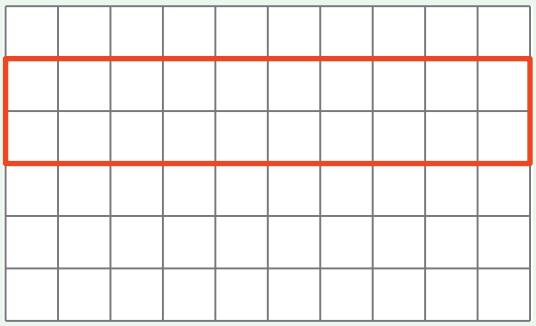
7 Each square on the grid has an area of 1 square unit. Draw a rectangle with an area of 8 square units.

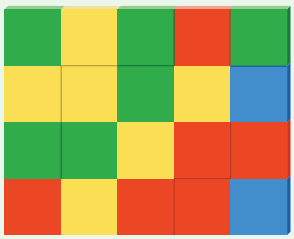


Summary 2.03

Rectangles can have different lengths and widths and still have the same area. The area of a rectangle can be determined by counting the number of **square units** that fill the rectangle without gaps or overlaps.

Each rectangle has 20 square units.

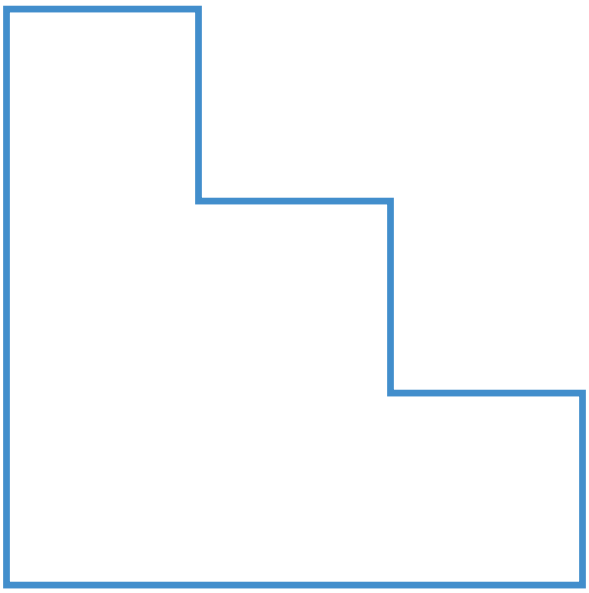




square unit A square with the side length of 1 unit. It is used as the standard measurement of area.

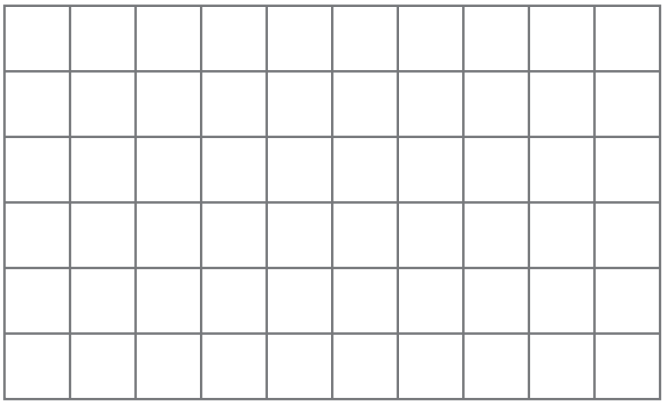
Practice 2.03

1 Use square tiles to determine the area of the figure. Explain your thinking.

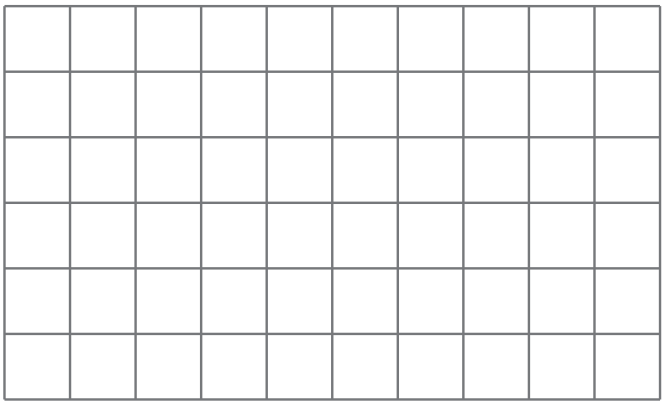


Name _____ Date _____

2 Each square on the grid has an area of 1 square unit. Draw a rectangle with an area of 10 square units.



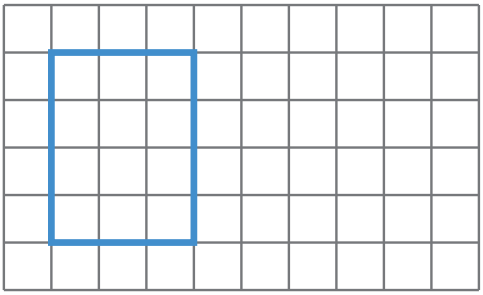
3 Diego drew a rectangle to represent his state flag. His flag has an area of 15 square units. Each square on the grid has an area of 1 square unit. Draw Diego's flag.



Name _____ Date _____

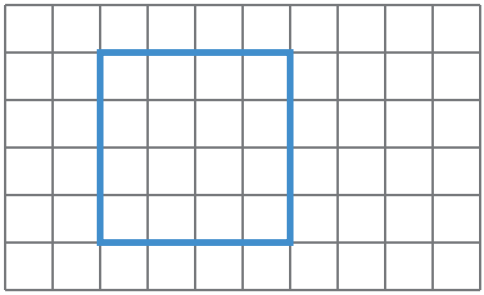
4 Each of the squares on the grid has an area of 1 square unit. What is the area of Rectangles A and B?

Rectangle A



The area of Rectangle A is _____ square units.

Rectangle B



The area of Rectangle B is _____ square units.

Spiral Review

For Problems 5 and 6, determine the value of the expression.

5 5×3 _____

6 10×3 _____

For Problems 7 and 8, write a multiplication expression to represent the situation. Then complete the statement.

7 There are 3 teams. Each team has 5 players.

multiplication expression: _____

There are _____ players total.

8 There are 2 bags. Each bag has 4 tennis balls in it.

multiplication expression: _____

There are _____ tennis balls total.

Name _____ Date _____

Square Tiles 3.MD.6, SMP.2, SMP.3, SMP.4

Area Hunt

Let's learn about different units used to measure area.



Warm-Up eyes on teacher

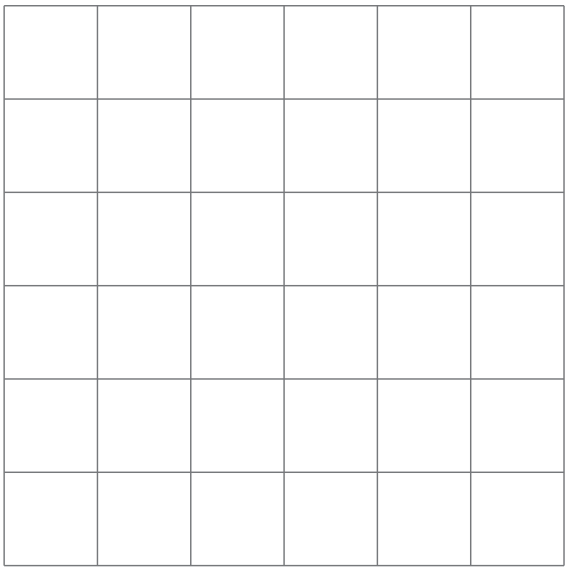
We are a math community. What are you noticing about how others talk about math in your class?

Activity 1 Similar Rectangles

You will be assigned Grid A or Grid B.

1 Draw a rectangle with an area of 10 square units on your assigned grid.

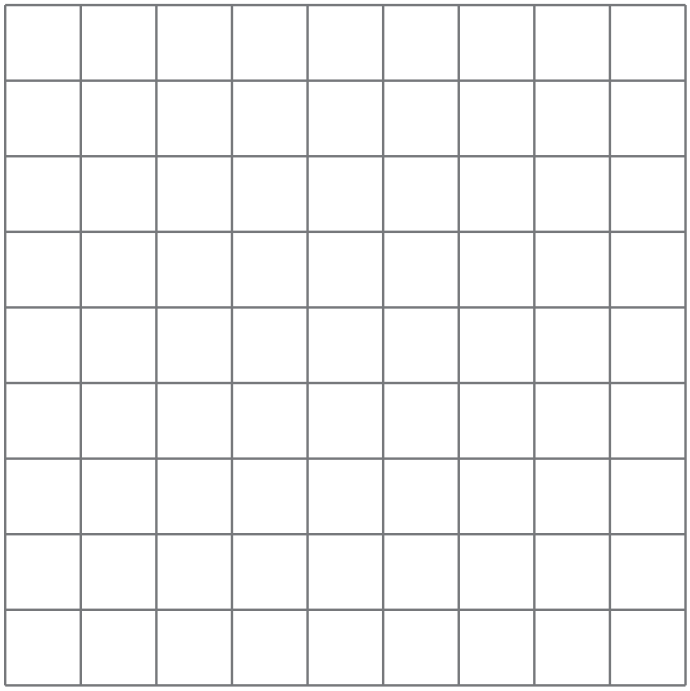
Grid A



Name _____ Date _____

Similar Rectangles (continued)

Grid B



2 Discuss

How are your 2 rectangles similar and different?
Why do you think that is?

Activity 2

Name _____ Date _____

Area Hunt

3 Identify rectangular objects or spaces in your classroom that could be measured with **square centimeters**, **square inches**, **square feet**, or **square meters**. Determine which square unit you would use to measure each object. Then estimate the area of the object and record it in the table.

Object	Square unit	Estimated area



Name _____ Date _____

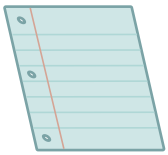
Area Hunt (continued)

Object	Square unit	Estimated area

4 Discuss

Choose 1 object from your table. Share the unit you chose and explain your reasoning with a partner.

Summary 2.04

Square centimeter	Square inch	Square foot	Square meter
eraser	lined paper	desk	classroom
			

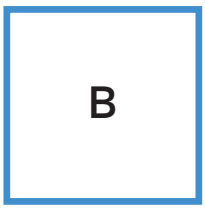
square centimeter A square with side lengths of 1 centimeter.
square inch A square with side lengths of 1 inch.
square foot A square with side lengths of 1 foot.
square meter A square with side lengths of 1 meter.

Practice 2.04

1 Consider the 2 squares. One square is a square centimeter, and the other square is a square inch.

Which square is a square centimeter? Which square is a square inch? Explain your thinking.





Name _____ Date _____

For Problems 2–7, decide whether you would use square centimeters, square inches, square feet, or square meters to measure the object's area.

2 baseball field _____

3 tabletop _____

4 cell phone screen _____

5 book cover _____

6 basketball court _____

7 postage stamp _____

For Problems 8–13, determine the value of the expression.

8 2×2 _____

9 1×5 _____

10 5×4 _____

11 2×4 _____

12 10×4 _____

13 1×3 _____

Name _____ Date _____

14 Which unit would be best to measure the area of a soccer field?

(A) square centimeters
(B) square inches
(C) square feet
(D) square meters

15 For which of the following would you use square inches to measure the area?

(A) football field
(B) textbook
(C) parking lot
(D) front door

Spiral Review

For Problems 16 and 17, write a multiplication expression to represent the story problem. Then complete the statement.

16 A tuatara is a lizard with 3 eyes. A zoo exhibit has 4 tuataras. How many eyes do the 4 tuataras have altogether?

multiplication expression: _____

There are _____ eyes total.

17 An earthworm has 5 hearts. Diego places 5 earthworms in his garden. How many hearts do the earthworms have altogether?

multiplication expression: _____

There are _____ hearts total.

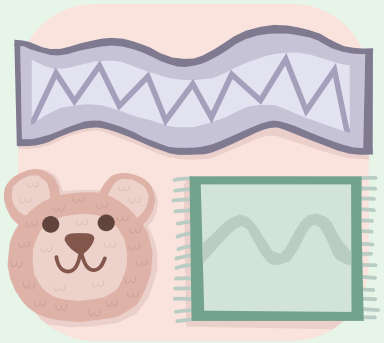
Unit 2
Lesson
5

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.6, 3.OA.5, SMP.2, SMP.3, SMP.6, SMP.7

Rectangles and Arrays

Let's describe how the areas of rectangles are similar or different.



We are a math community. What can you do to create a fun and safe math community today?

Warm-Up

eyes on teacher

Activity 1 What Did I Create?

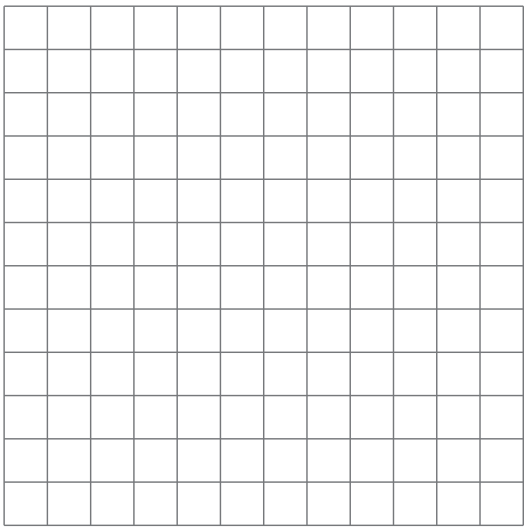
Help Cheri and her mom design a plan for building a garden shed in their backyard. Each square on the grid represents 1 square foot.

1 **Partner A:** Draw a rectangle on the grid. Describe it to your partner *without giving the area.*

Partner B: Draw the rectangle your partner describes to you.

2 **Discuss**

Place your 2 rectangles next to each other. What is similar? What is different?

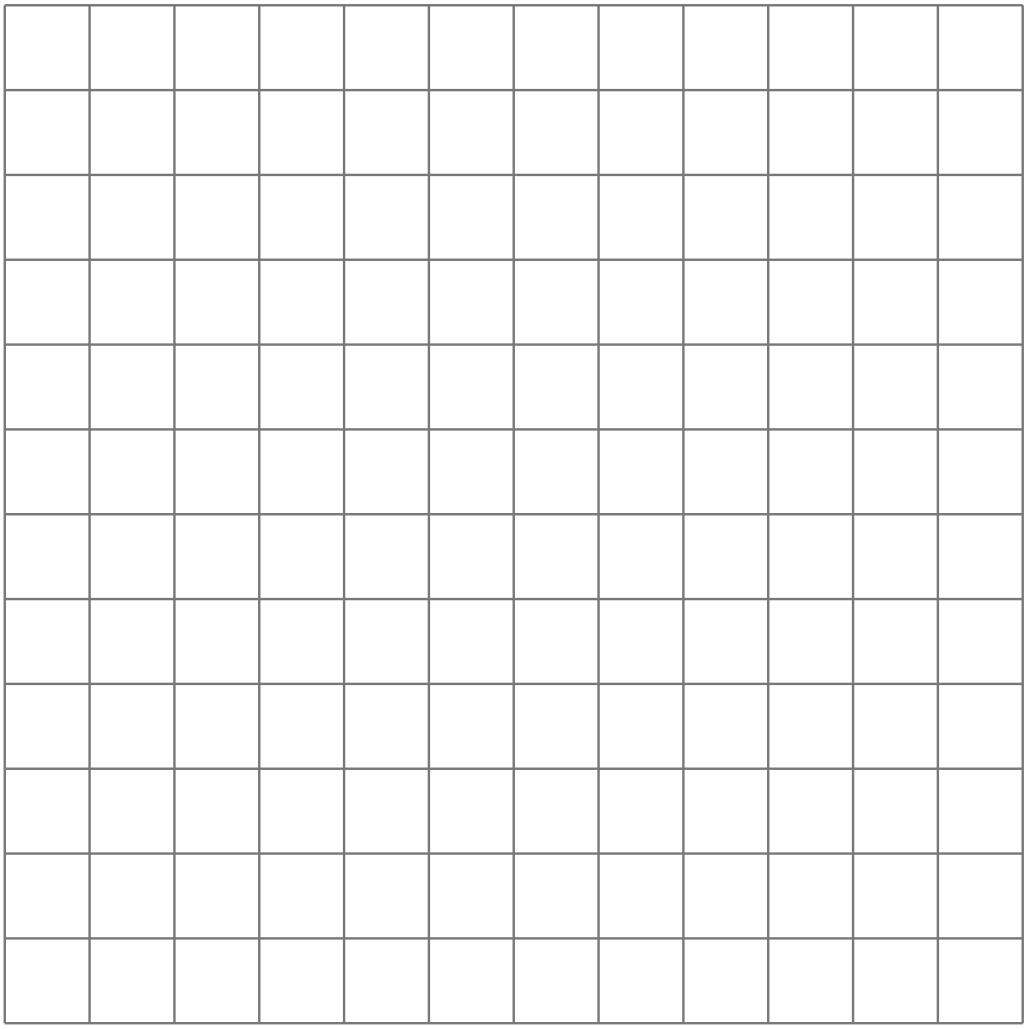


Name _____ Date _____

What Did I Create? (continued)

3 **Partner B:** Draw a rectangle on the grid.
Describe it to your partner *without giving the total number of squares.*

Partner A: Draw the rectangle your partner describes to you.



4 **Discuss**

Place your 2 rectangles next to each other. What is similar? What is different?

Activity 2

Name _____ Date _____

Introducing the Center, Compare

Stage 3

2 6

Pairs Let's compare the areas of different rectangles.

You'll need: Areas of Rectangles Cards

Set Up Divide the area cards between both players. Place your cards facedown in a pile.

How to Play

1. Each player flips over a card. Compare the areas. One □ is 1 square unit.
2. The player with the greater area keeps both cards. Place the cards you win faceup in another pile.
3. If the areas are equivalent, each player flips over 1 more card. The player with the greater area keeps all 4 cards.
4. Play until you run out of facedown cards.

How to Win The player with more cards at the end of the game wins.

Name _____ Date _____

Compare (continued)

5 Draw a pair of cards that you and your partner turned over and record their areas. Circle the card that has the greater area.

Partner A's card

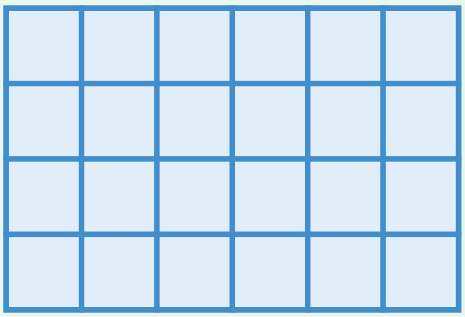
answer: _____

Partner B's card

answer: _____

Summary 2.05

When a rectangle is filled with square units, its area can be determined using the same strategies used for counting the number of objects in arrays.



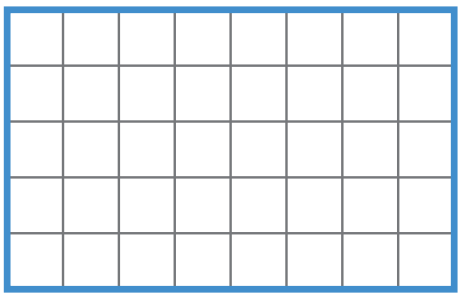
Area: 24 square units

Practice 2.05

For Problems 1 and 2, determine the area of the rectangle.

Show or explain your thinking.

1

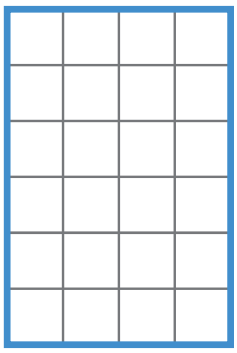


answer: _____

Name _____ Date _____

Show or explain your thinking.

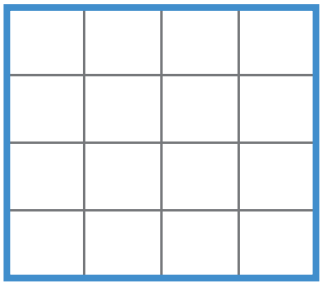
2



answer: _____

3 Which has a greater area — Rectangle A or Rectangle B?

Rectangle A



Rectangle B



Show or explain your thinking.

answer: _____

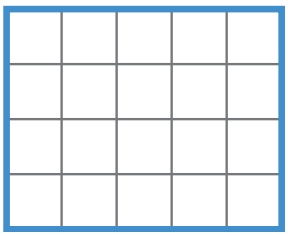
For Problems 4 and 5, determine the value of the expression.

4 1×4 _____

5 3×2 _____

Name _____ Date _____

6 What is the area of the rectangle?



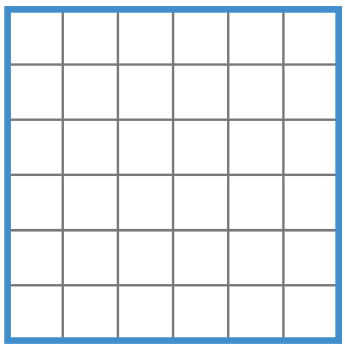
(A) 24 square units

(B) 22 square units

(C) 20 square units

(D) 16 square units

7 What is the area of the rectangle?



(A) 24 square units

(B) 30 square units

(C) 36 square units

(D) 40 square units

Spiral Review

For Problems 8 and 9, solve the riddle and write the three-digit number in standard form.

8 I have 5 tens, 5 ones, and 4 hundreds.

_____

9 I have 7 hundreds and 14 ones.

_____

Sub-Unit 2

Relating Area to Multiplication

Unit Story: Cheri's New Home



gamespirit/Shutterstock.com

How could wooden floorboards be used to describe the area of a room? How could they be used to compare the areas of 2 different rooms?

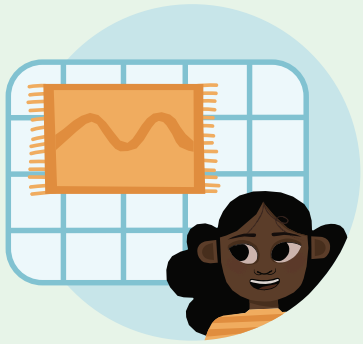
Unit 2
Lesson
6

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.7.b, 3.MD.7.a, 3.OA.5, 3.OA.7, SMP.2, SMP.7

Rectangular Rugs

Let's look at the structures of expressions and areas of rectangles.



We are a math community.
How can you talk respectfully through a difference of opinion with others?

Warm-Up

eyes on teacher

Activity 1

Introducing the Center, Rectangle Rumble

Stage 1

Pairs Let's represent the product of two numbers on a rectangular grid.

You'll need: coloring tools, 1 number cube, 1 paper clip, Gameboard, Spinner

Set Up Choose a color for your rectangles that is different from your partner.

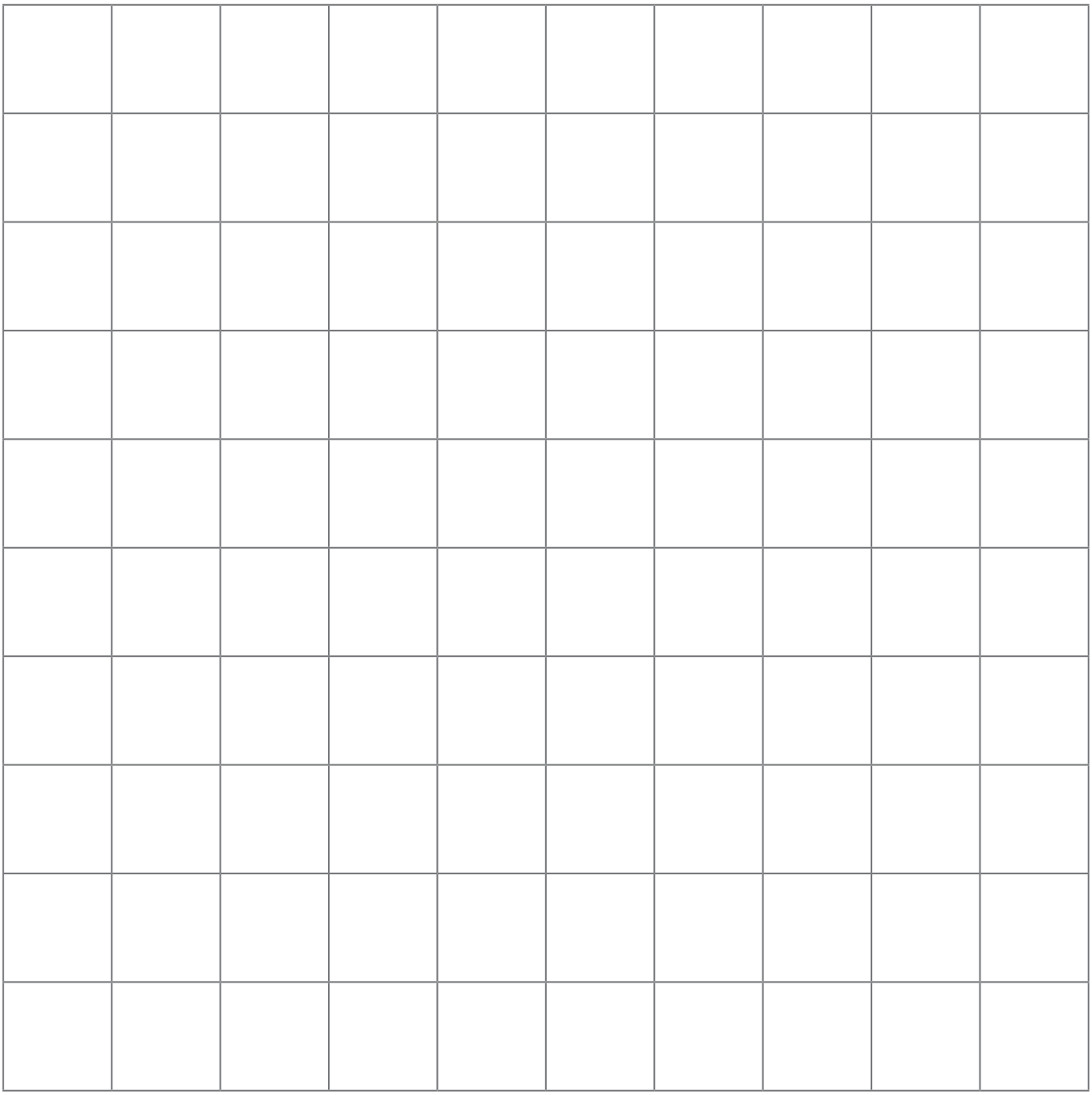
How to Play

1. Spin the Spinner and roll the number cube.
2. Shade the rectangular area that represents the product.
3. Label the rectangle to represent the area.
4. Take turns until the grid cannot fit any more rectangles. Player with greatest total area wins.

CENTER
Gameboard

Name _____ Date _____

Rectangle Rumble (continued)



Activity 2

Name _____ Date _____

Expressions and Areas

Ms. Sarah used many different rugs to cover up stains in the room rented by the painter. Each expression represents the area of 1 rectangular rug in square feet. Each small square on the grids represents an area of 1 square foot.

For each expression, write the letter of the rug it represents. Then determine the area of each rug. Be prepared to explain your thinking.

Expression	Rug	Area
1 9×5		
2 8×2		
3 7×10		
4 3×3		
5 2×6		
6 8×4		
7 5×7		
8 1×9		

Name _____ Date _____

Expressions and Areas (continued)

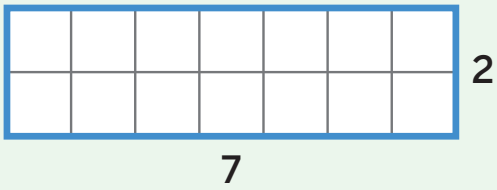
9 Discuss

What is similar about the square units in a rectangle and an array?



Summary 2.06

You can write an expression to represent the area of a rectangle. The factors describe the number of rows and the number of square units in each row, similar to the structure of arrays.

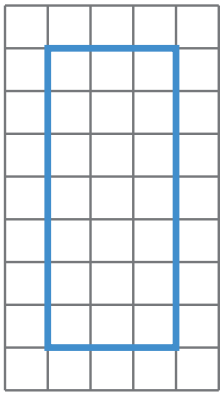


$$2 \times 7$$

Practice 2.06

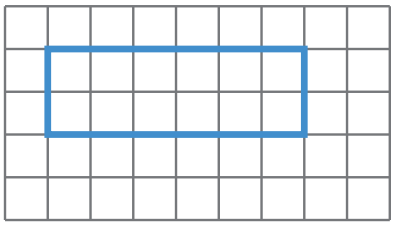
For Problems 1 and 2, write a multiplication expression that represents the area of the rectangle.

1



_____

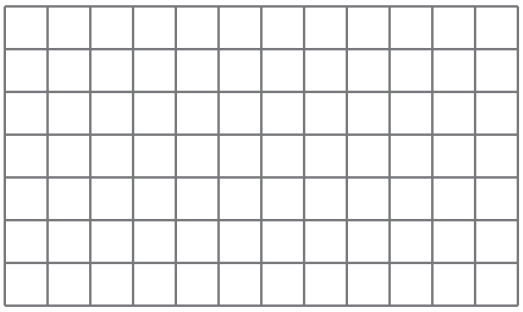
2



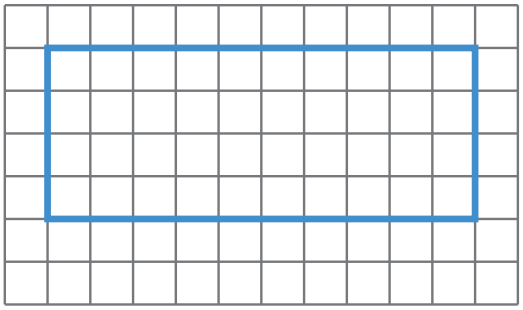
_____

Name _____ Date _____

3 Use the grid to create a rectangle whose area can be represented by the expression 5 × 8. Explain your thinking.



4 Jada drew the rectangle shown. She said the area can be represented by the expression 3 × 10. Is she correct? If not, draw the correct rectangle. Explain your thinking.



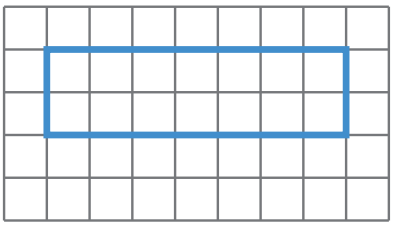
For Problems 5 and 6, determine the value of the expression.

5 2 × 1 _____

6 10 × 5 _____

Name _____ Date _____

7 Which expression can be used to determine the area of the rectangle in square units?



(A) 2 × 5

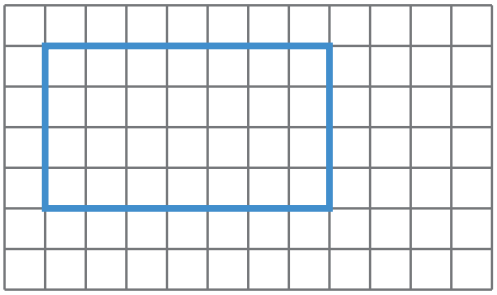
(B) 2 × 4

(C) 2 × 7

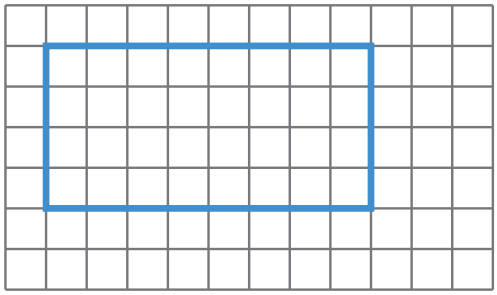
(D) 2 × 6

8 Which rectangle's area can be represented by the expression 4 × 7?

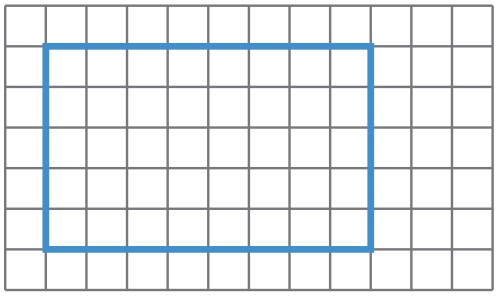
(A)



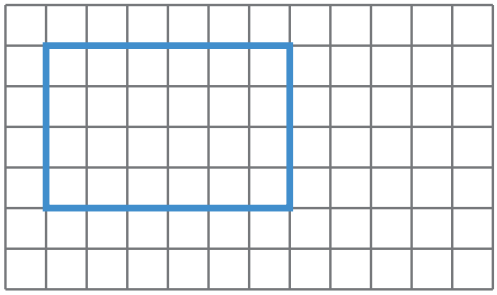
(B)



(C)



(D)



Spiral Review

9 The table shows the number of votes for an elementary school's new mascot. How many *more* students voted for the lion than the ram?

_____

Mascot	Votes
bobcat	87
lion	92
ram	63

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.7.a, 3.MD.7.b, 3.OA.5, 3.OA.7, SMP.1, SMP.2, SMP.3, SMP.7

Toying With Tiles

Let's use what we know about area to solve problems.



I can be all of me in math class.
What can you do if you have a question about what someone said in math class?

Warm-Up

1 eyes on teacher

Activity 1

Partially Tiled

You will be given tiles and drawings of Cheri's kitchen floor and bathroom floor.

2 Cheri has 6 tiles for her kitchen floor. Each tile has an area of 1 square foot. Using the drawing of her kitchen floor and only 6 tiles, what is the area of the entire kitchen floor?

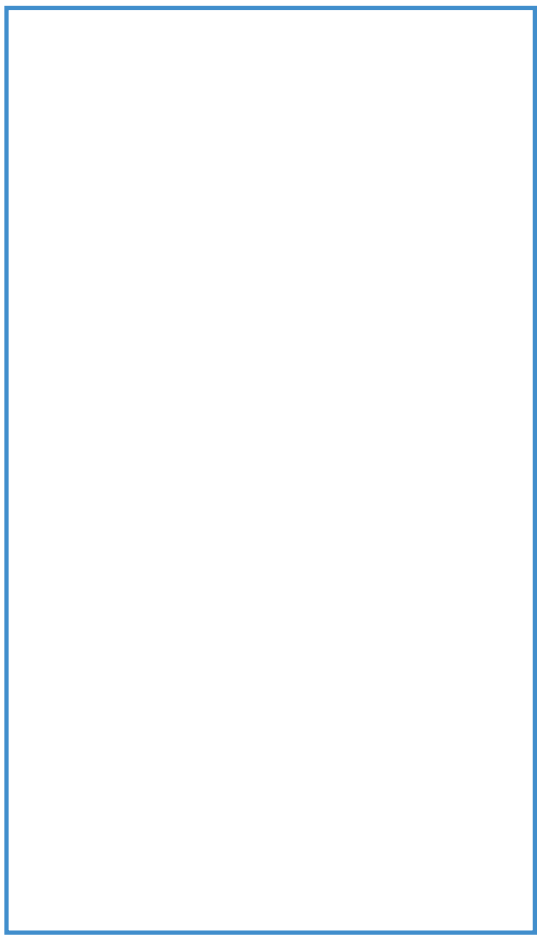
3 Cheri has 10 tiles for her bathroom floor. Each tile has an area of 1 square foot. Using the drawing of her bathroom floor and only 10 tiles, what is the area of the entire bathroom floor?

Name _____ Date _____

Partially Tiled (continued)

4 Discuss

Cheri has 10 tiles. Each tile has an area of 1 square foot. How could she use the 10 tiles to find the information she needs for determining the area of the rectangle?



Activity 2

Name _____ Date _____

Disappearing Tiles

5 Discuss

Cheri has 5 tiles. Each tile has an area of 1 square foot. How could she use the 5 tiles to determine the area of the rectangle?

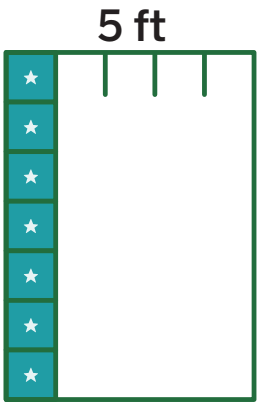


6

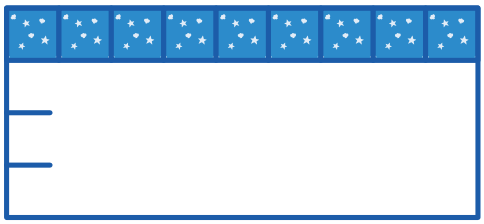
Each tile represents 1 square foot. The space between 2 tick marks represents 1 foot.

Determine the area of each rectangle. Complete as many challenges as you have time for.

Show your thinking.



area: _____

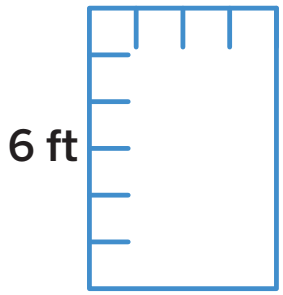


area: _____

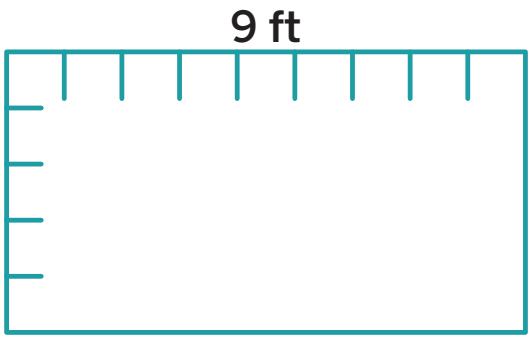
Name _____ Date _____

Disappearing Tiles (continued)

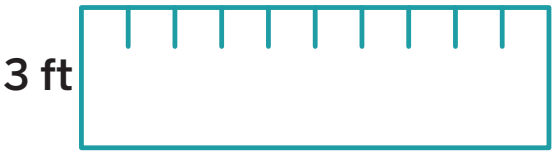
6 Show your thinking.



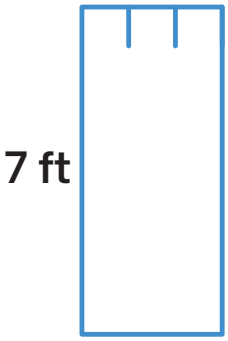
area: _____



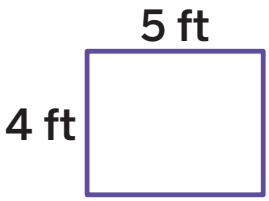
area: _____



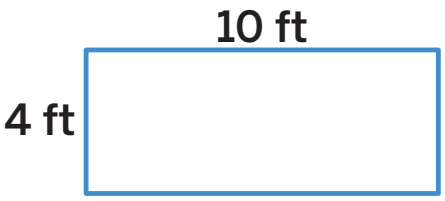
area: _____



area: _____



area: _____

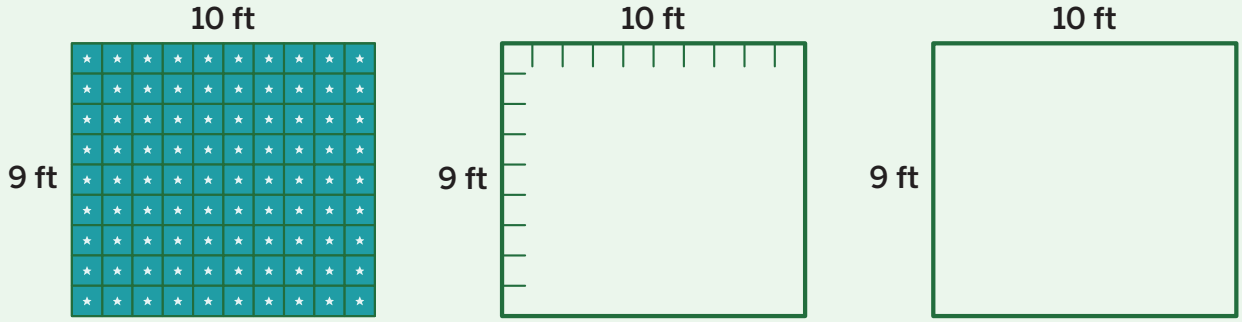


area: _____

7 Let's compare ways for determining the area of rectangles.

Summary 2.07

The area of a rectangle can be determined by multiplying the 2 side lengths.



$9 \times 10 = 90$

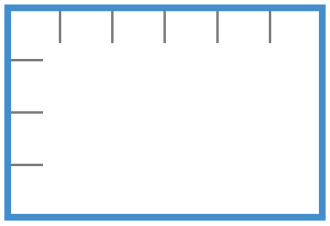
90 square feet

Practice 2.07

For Problems 1–3, write an expression that represents the area of the rectangle. Then determine the area.

Show your thinking.

1 The space between 2 tick marks represents 1 centimeter.



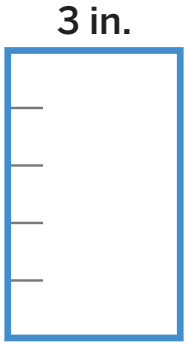
expression: _____

area: _____

Name _____ Date _____

Show your thinking.

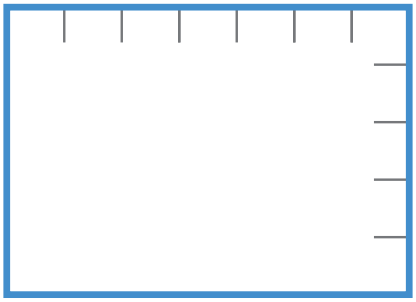
2 The space between 2 tick marks represents 1 inch.



expression: _____

area: _____

3 The space between 2 tick marks represents 1 meter.



expression: _____

area: _____

For Problems 4–7, determine the value of the expression.

4 10×2 _____

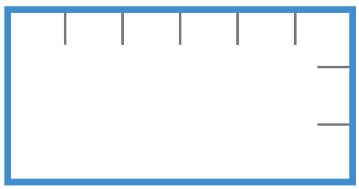
5 2×5 _____

6 1×5 _____

7 5×5 _____

Name _____ Date _____

8 The space between 2 tick marks represents 1 centimeter. Which expression represents the area of the rectangle?



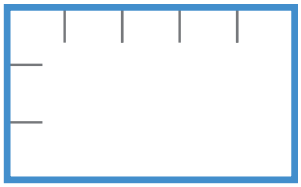
(A) 6 × 2

(B) 7 × 3

(C) 7 × 2

(D) 6 × 3

9 The space between 2 tick marks represents 1 foot. What is the area of the rectangle?



(A) 8 square feet

(B) 15 square feet

(C) 16 square feet

(D) 18 square feet

Spiral Review

For Problems 10 and 11, solve the riddle and write the three-digit number in standard form.

10 I have 8 tens, 1 ones, and 2 hundreds.

_____

11 I have 10 tens, 2 ones, and 3 hundreds.

_____

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.7.b, 3.OA.1, 3.OA.5, 3.OA.7, SMP.5, SMP.6, SMP.7

Using a Ruler

Let's use rulers to measure rectangles and determine their areas.



Warm-Up

eyes on teacher

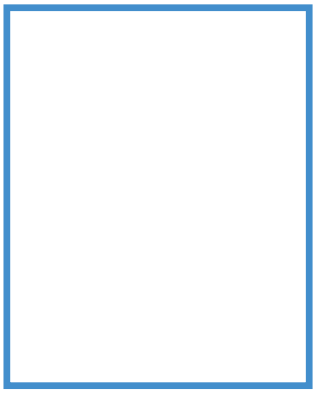
I am a doer of math.
How can you help someone else in math class today?

Activity 1 Using a Ruler to Determine Area

Hands-On

Use a ruler to measure the side lengths of the rectangles in centimeters. Then determine the areas.

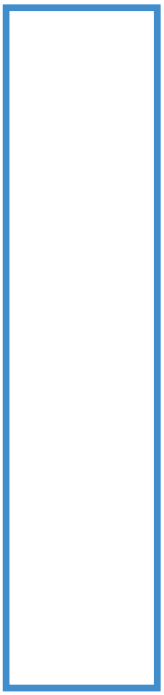
A



B



C



Name _____ Date _____

Using a Ruler to Determine Area (continued)

1 Write an equation that represents the area of each rectangle and record the area using the appropriate units.

Rectangle	Equation	Area
A		
B		
C		

2 Choose 5 rectangular objects or spaces in the room. Choose an appropriate unit and tool to measure the side lengths and then determine the area. Write an equation that represents the area and record the area.

Object or space	Equation	Area

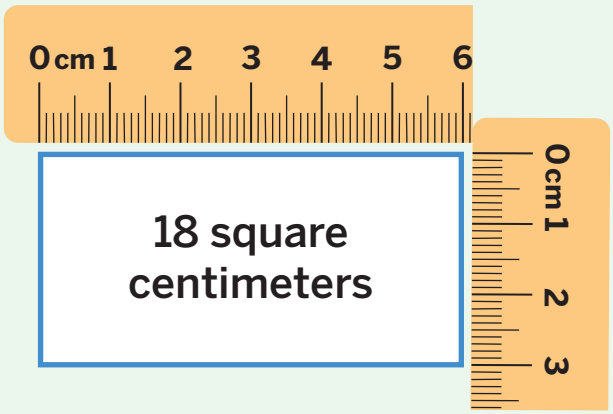
3 **Discuss**

For each object you measured, justify the unit and tool you used to measure the side lengths.

Summary 2.08

The areas of rectangular objects can be determined by measuring and multiplying the 2 side lengths.

$6 \times 3 = 18$



Practice 2.08

1 Use a centimeter ruler to measure the side lengths of the rectangle. Then write an equation that represents the area of the rectangle.



Name _____ Date _____

For Problems 2 and 3, use a ruler to draw a rectangle with the given area. Then write an equation that represents the area of the rectangle.

Draw

2 The area is 18 square centimeters.

equation: _____

3 The area is 32 square centimeters, and 1 side length is 4 centimeters.

equation: _____

For Problems 4–7, determine the value of the expression.

4 5×4 _____

5 5×10 _____

6 10×3 _____

7 2×4 _____

Name _____ Date _____

8 Use a centimeter ruler to measure the side lengths of the rectangle. Which equation represents the area of the rectangle?



(A) $3 \times 7 = 21$

(B) $4 \times 6 = 24$

(C) $4 \times 7 = 28$

(D) $3 \times 6 = 18$

9 A rectangle has an area of 16 square centimeters. Which equation could represent the area of the rectangle?

(A) $4 \times 4 = 16$

(B) $8 \times 8 = 16$

(C) $2 \times 6 = 16$

(D) $2 \times 7 = 16$

Spiral Review

For Problems 10 and 11, determine the sum or difference.

10 $57 - 8 =$ _____

11 $32 + 59 =$ _____

Unit 2
Lesson
9

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.7.b, 3.OA.3, 3.OA.5, 3.OA.7, SMP.1, SMP.4, SMP.7, SMP.8

Painting and Planting With Cheri

Let's look at problems involving unknown areas and side lengths.



We are a math community. How are you contributing to discussions in your math community?

Warm-Up

eyes on teacher

Activity 1 Painting a Wall

1 Cheri and her mom are going to paint a wall in the kitchen. The wall is a rectangle with a height of 4 meters.

Cheri's mom bought 2 cans of paint. Each can of paint can be used to cover 12 square meters with 1 coat of paint. If they used both full cans of paint to cover the wall with 1 coat of paint, what is the length of the wall?

Show or explain your thinking.



answer: _____

Name _____ Date _____

Painting a Wall (continued)

2 The next day, Cheri and her mom paint another wall in the living room. This time, they know that the length of the wall is 6 meters, and they have 4 cans of paint.

If they use all 4 cans of paint to cover the wall with 1 coat of paint, what is the height of the wall?

Show or explain your thinking.

answer: _____

Activity 2

Name _____ Date _____

Planning a Garden

3 Cheri and her mom want to repair one of Ms. Sarah's rectangular garden beds.

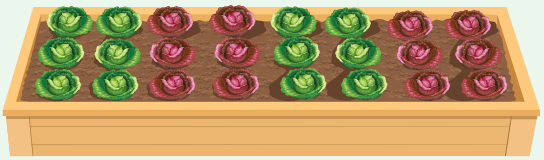
- There is 1 side of the garden bed left, which is 3 feet long.
- They need *at least* 20 square feet of space to plant all their seeds.
- They only have enough soil to cover 30 square feet.

What could the garden bed look like? Be sure to include the side lengths and area of each possible garden bed.

Show or explain your thinking.

Summary 2.09

One-step and two-step real-world area problems can be solved with 1 or more unknown measurements.

3 ft  3 ft

24 square feet

$$3 \times ? = 24$$

Practice 2.09

1 Han has 40 carpet squares that are 1 foot on each side. He wants to use all of them to make a rectangular carpet for his room. For the carpet to fit in the room, the longest side cannot be more than 12 feet. What side lengths could Han's carpet have?

Show or explain your thinking.

answer: _____

Name _____ Date _____

2 A sticker has an area of 35 square centimeters, and the length of the shorter side of the sticker is 5 centimeters. What is the length of the other side of the sticker?

Show or explain your thinking.

answer: _____

3 The art teacher painted a rectangular mural with an area of 72 square feet, and the length of the longer side of the mural is 9 feet. What is the length of the shorter side of the mural?

Show or explain your thinking.

answer: _____

For Problems 4–7, determine the value of the expression.

4 3×5 _____

5 2×1 _____

6 10×5 _____

7 5×6 _____

Name _____ Date _____

8 Diego has 24 square planter boxes that measure 1 foot on each side. He wants to use all of them to make a rectangular garden. Select *all* the possible side lengths Diego's garden could have.

- ☐ **A.** 6 feet and 4 feet
- ☐ **B.** 3 feet and 9 feet
- ☐ **C.** 3 feet and 8 feet
- ☐ **D.** 4 feet and 7 feet
- ☐ **E.** 2 feet and 10 feet

9 A rectangular tabletop has an area of 30 square feet, and the length of the longer side of the tabletop is 6 feet. What is the length of the other side of the tabletop?

Ⓐ 4 feet Ⓑ 5 feet Ⓒ 6 feet Ⓓ 7 feet

Spiral Review

For Problems 10 and 11, write a multiplication expression to represent the story problem. Then complete the statement.

10 Wolves typically live in packs of 8. How many wolves are in 2 typical packs?

multiplication expression: _____

There are _____ wolves total.

11 A typical hedgehog hibernates for 4 months of the year. How many months will a typical hedgehog hibernate in 3 years?

multiplication expression: _____

It will hibernate for _____ months total.

Sub-Unit

3

Determining Area of Figures Composed of Rectangles

Unit Story: Cheri's New Home



Ground Picture/Shutterstock.com

The walls in Cheri and her mom's new house, like most walls, are rectangular. What parts of a house that someone might want to know the area of are not rectangular? What shapes are they?

Unit 2
Lesson
10

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.7.d, SMP.6, SMP.7

A Missing Puzzle Piece

Let's determine the areas of figures made of rectangles.



Warm-Up

eyes on teacher

We are a math community.
What can you do to be a good math community member today?

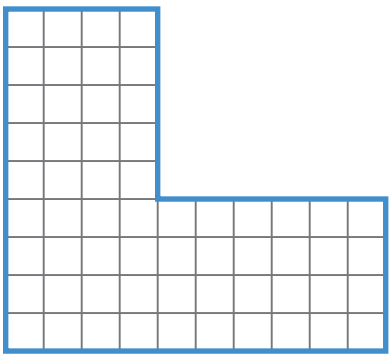
Activity 1 Area of the Puzzle Piece

In the living room, Cheri found a puzzle piece left behind by the inventor who once lived with Ms. Sarah.

Each small square represents an area of 1 square centimeter.

1 Determine the area of the puzzle piece in square centimeters. Organize your work so others can follow it.

Show or explain your thinking.



answer: _____

Name _____ Date _____

Area of the Puzzle Piece (continued)

2 Discuss

Discuss with your partner how determining the area of this puzzle piece is different from determining the area of a rectangle.

Activity 2

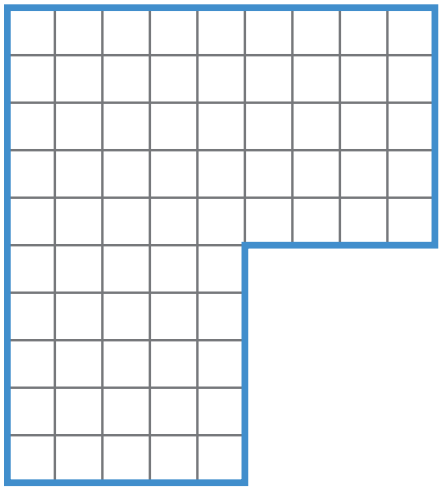
Name _____ Date _____

Finding the Rectangles

Determine the area of each figure. Each small square represents an area of 1 square centimeter.

Show or explain your thinking.

3



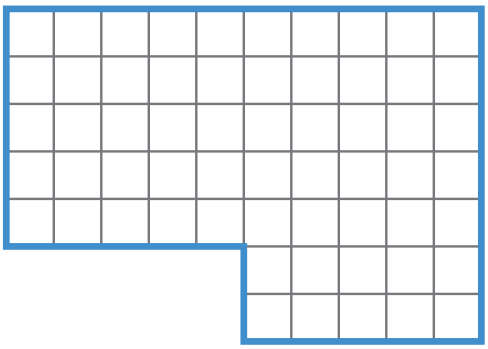
answer: _____

Name _____ Date _____

Finding the Rectangles (continued)

Show or explain your thinking.

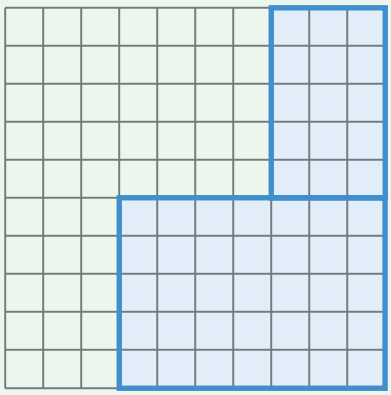
4



answer: _____

Summary 2.10

The area of a figure composed of rectangles can be calculated by decomposing it into rectangles, determining the area of each rectangle, and adding the areas of the rectangles.



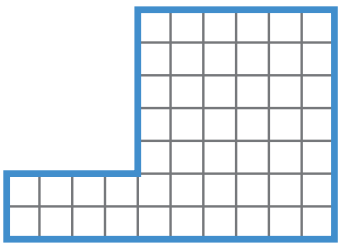
15 + 35 = 50,
so 50 square units

Practice 2.10

For Problems 1–3, determine the area of the figure in square units.

Show or explain your thinking.

1

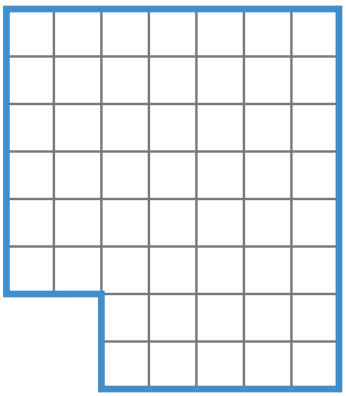


answer: _____

Name _____ Date _____

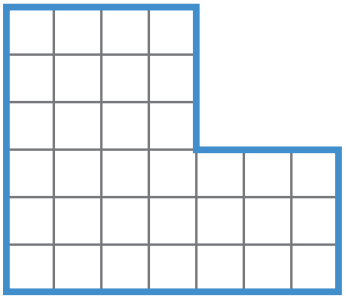
Show or explain your thinking.

2



answer: _____

3



answer: _____

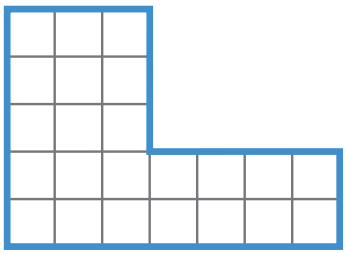
For Problems 4 and 5, determine the value of the expression.

4 2×4 _____

5 5×5 _____

Name _____ Date _____

6 What is the area of the figure?



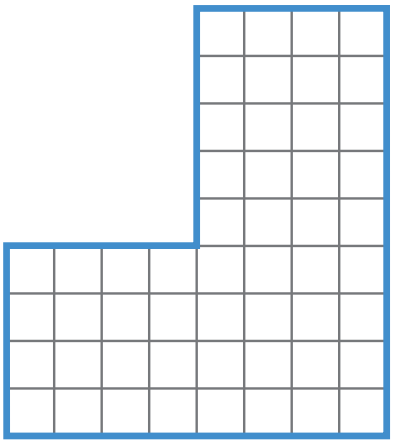
(A) 24 square units

(B) 23 square units

(C) 14 square units

(D) 9 square units

7 What is the area of the figure?



(A) 20 square units

(B) 32 square units

(C) 52 square units

(D) 54 square units

Spiral Review

For Problems 8 and 9, determine the sum.

8 33 + 77 = _____

9 46 + 54 = _____

Unit 2
Lesson
11

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.7.d, 3.OA.7, SMP.1, SMP.2, SMP.3, SMP.7

Painting Cheri's House

Let's determine the areas of figures without grids.



I am a doer of math.
When is a time you did not understand something right away in math? How did you persevere?

Warm-Up

1 eyes on teacher

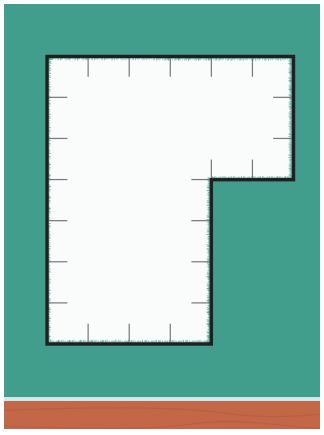
Activity 1

An Unpainted Wall Space

2 Cheri used a ruler to mark the sides of the unpainted wall space. The distance between 2 tick marks is 1 foot.

What is the area of the unpainted wall space?

Show your thinking.



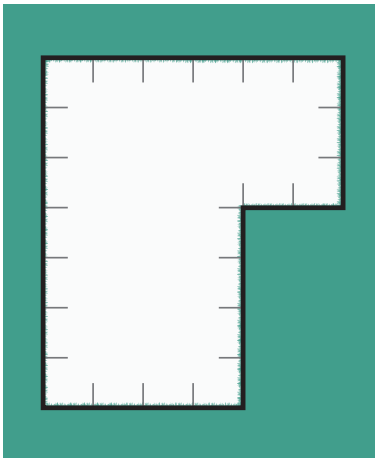
answer: _____

Name _____ Date _____

An Unpainted Wall Space (continued)

3-4 Discuss

Diego and Clare also determined the area of the same unpainted wall space.



- Diego wrote the expression (4 × 7) + (3 × 2) to determine the area.
- Clare wrote the expression (3 × 6) + (4 × 4) to determine the area.

Who do you agree with? Why?

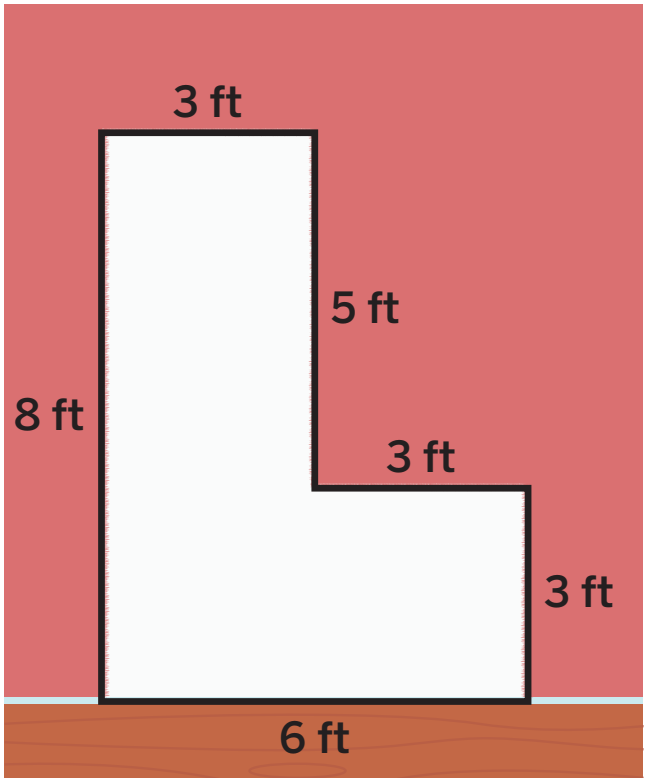
Activity 2

Name _____ Date _____

Side Lengths Only

5 Determine the area of each unpainted wall space.
Complete as many challenges as you have time for.

Show your thinking.



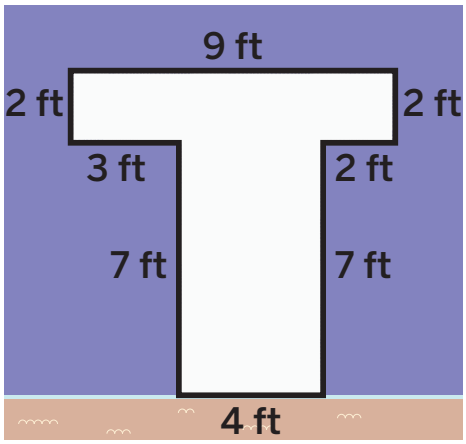
answer: _____

Name _____ Date _____

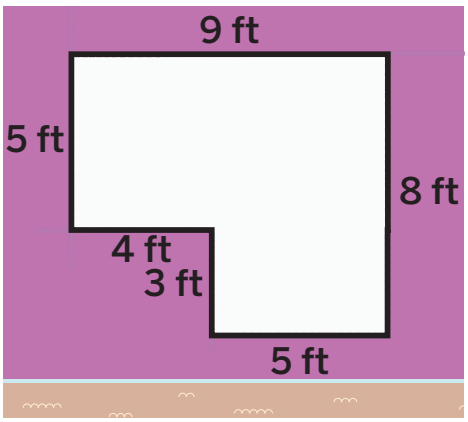
Side Lengths Only (continued)

5 Determine the area of each unpainted wall space. Complete as many challenges as you have time for.

Show or explain your thinking.



area: _____

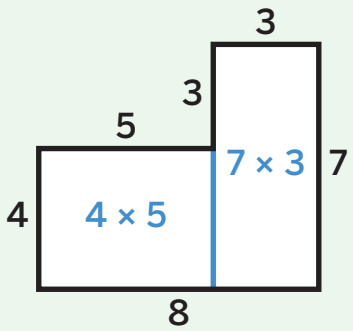


area: _____

6 Let's look at how Priya determined the area of a figure.

Summary 2.11

Parentheses can be used in an expression or equation to represent how a figure made of non-overlapping rectangles has been decomposed to determine its area.



(4 × 5) + (7 × 3)

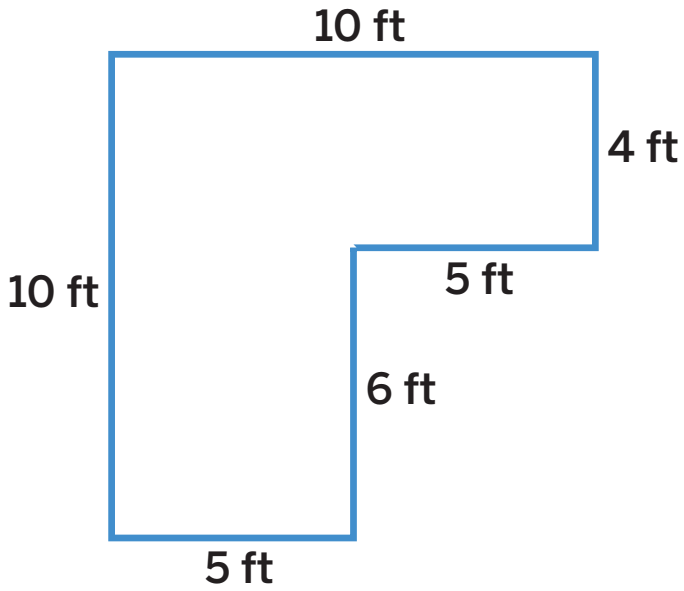
parentheses Grouping symbols that can be used in expressions or equations, such as (3 × 5) + (2 × 10).

Practice 2.11

For Problems 1 and 2, determine the area of the figure.

Show or explain your thinking.

1

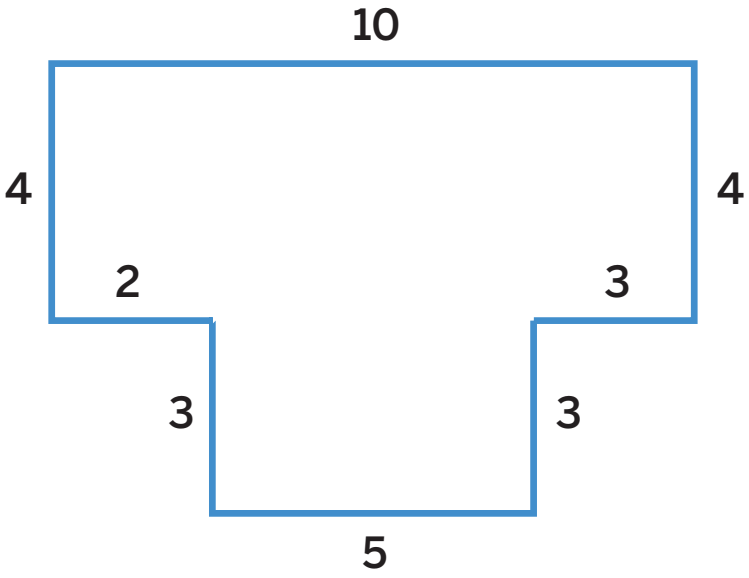


answer: _____

Name _____ Date _____

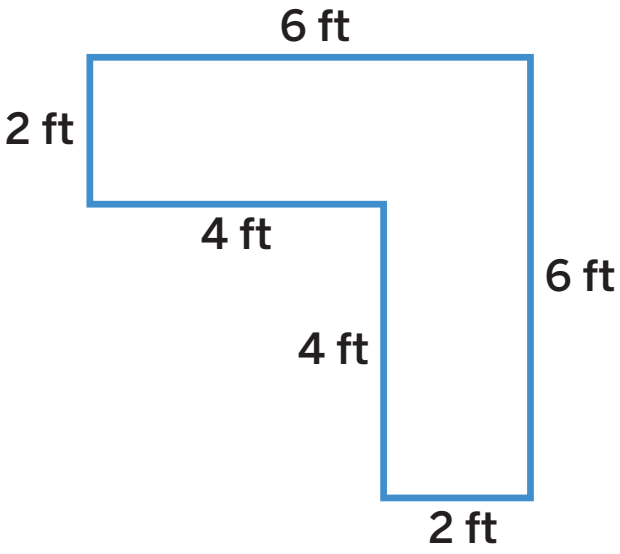
Show or explain your thinking.

2



answer: _____

The figure represents a garden. Use the figure for Problems 3 and 4.



3 Write an expression to determine the area of the garden.

_____

4 Calculate the area of the garden.

_____

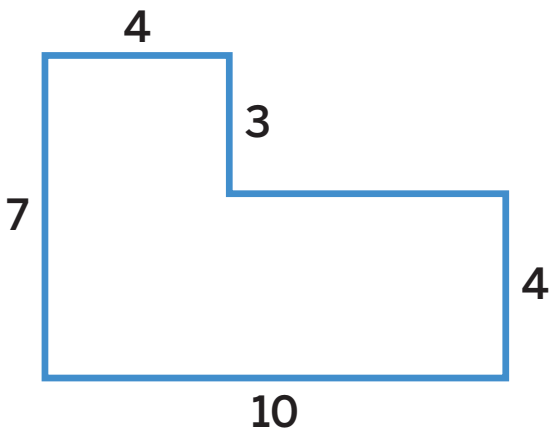
For Problems 5 and 6, determine the value of the expression.

5 5×5 _____

6 2×10 _____

Name _____ Date _____

7 Which expression can be used to determine the area of the figure?



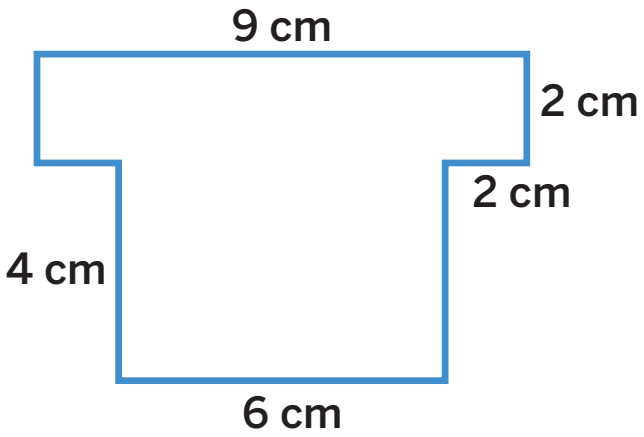
(A) $(4 \times 7) + (10 \times 4)$

(B) $4 + 3 + 4 + 10 + 7$

(C) $(4 \times 3) + (10 \times 4)$

(D) $(4 \times 3) + (6 \times 4)$

8 What is the area of the figure?



(A) 40 square centimeters

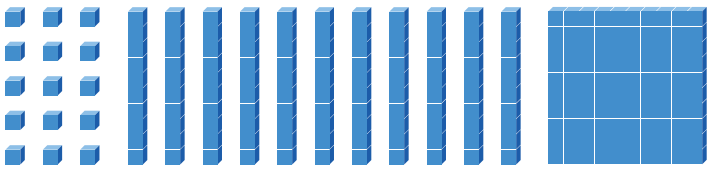
(B) 42 square centimeters

(C) 46 square centimeters

(D) 48 square centimeters

Spiral Review

9 A base-ten block representation is shown. Draw the same value with the *fewest* number of blocks possible.



Draw

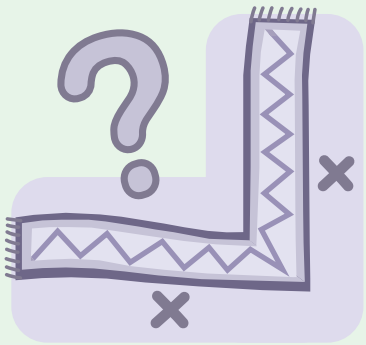
Unit 2
Lesson
12

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.7.d, 3.OA.3, SMP.3, SMP.7

What Do We Need to Know?

Let's calculate the area of a figure when some side lengths are not labeled.



Warm-Up

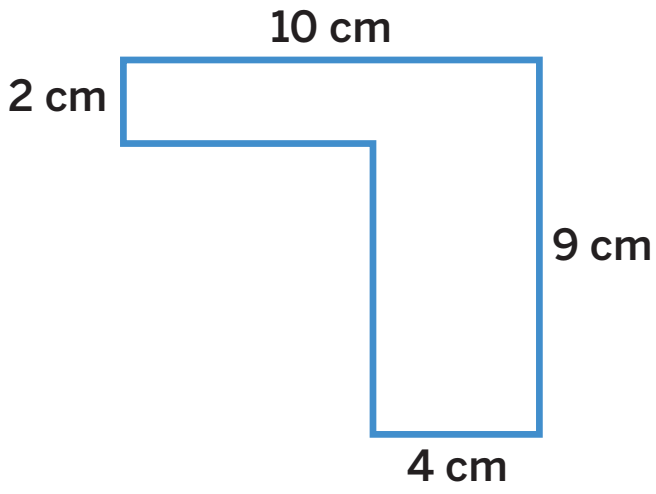
eyes on teacher

We are a math community.
How does listening to others help your thinking in math class?

Activity 1 Unknown Side Lengths

1 Determine the area of the figure.

Show your thinking.



answer: _____

Name _____ Date _____

Unknown Side Lengths (continued)

2 Explain how you determined the area of the figure in Problem 1.

Activity 2

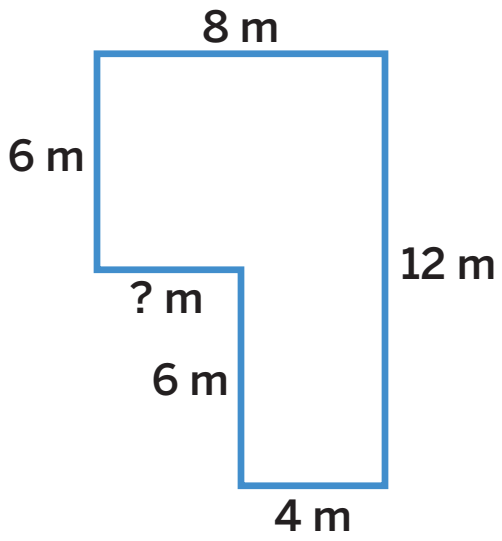
Name _____ Date _____

Determining Area

Determine the area of each figure.

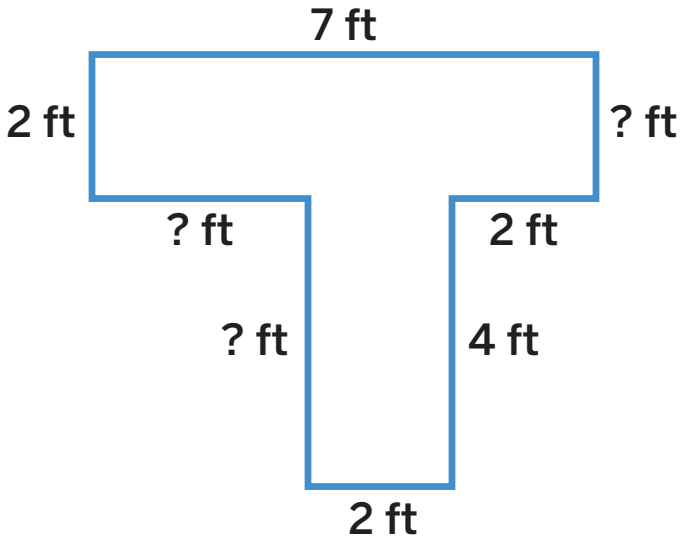
Show or explain your thinking.

3



answer: _____

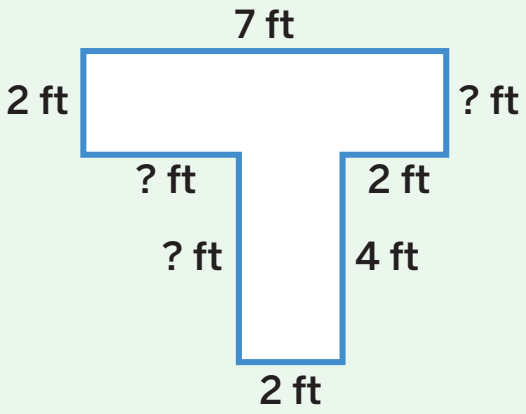
4



answer: _____

Summary 2.12

You can determine the area of a figure with an unknown side length by decomposing the figure into rectangles. Then you can use the structure of the figure to calculate the unknown side length.

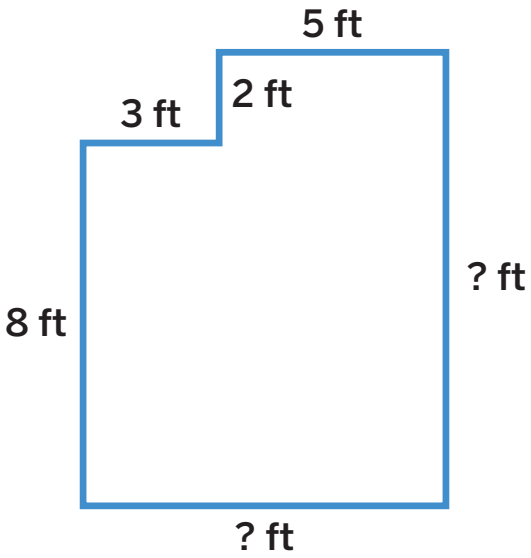


Practice 2.12

For Problems 1–3, determine the area of the figure.

Show or explain your thinking.

1

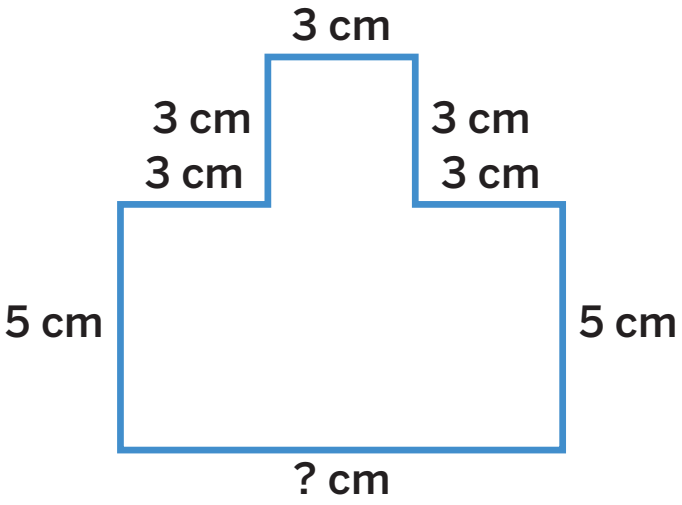


answer: _____

Name _____ Date _____

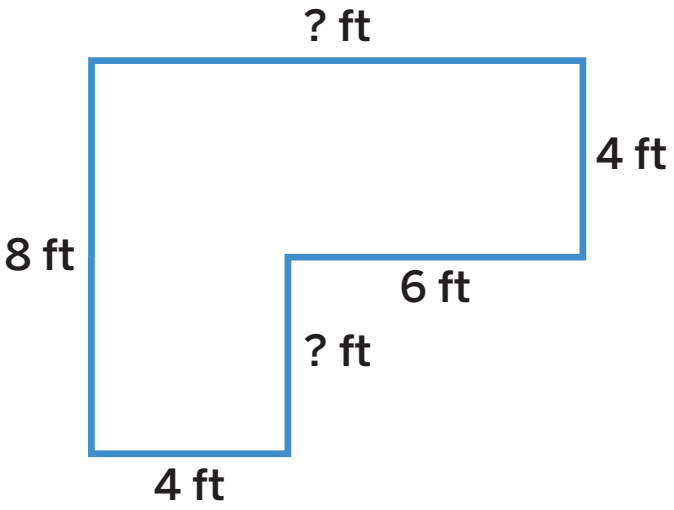
Show or explain your thinking.

2



answer: _____

3



answer: _____

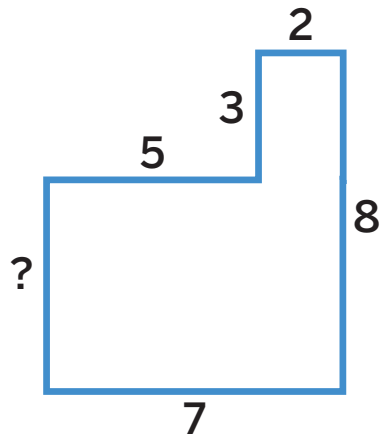
For Problems 4 and 5, determine the value of the expression.

4 2×3 _____

5 5×5 _____

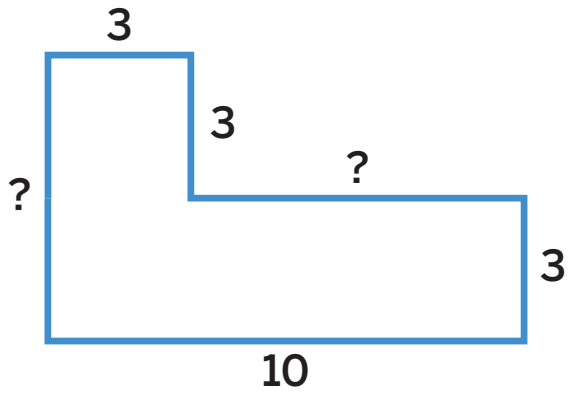
Name _____ Date _____

6 Which expressions can be used to determine the area of the figure? Select *all* that apply.



- ☐ **A.** $(3 \times 2) + (5 \times 7)$
- ☐ **B.** $(2 \times 8) + (8 \times 7)$
- ☐ **C.** $(2 \times 8) + (5 \times 5)$
- ☐ **D.** $(7 \times 8) + (2 \times 3)$
- ☐ **E.** $(2 \times 8) + (2 \times 3)$

7 What is the area of the figure?



- (A) 30 square units
- (B) 33 square units
- (C) 36 square units
- (D) 39 square units

Spiral Review

8 There were 29 fewer people who attended the International School Festival on Sunday than on Saturday. A total of 82 people attended the festival on Sunday. Determine how many people attended the festival on Saturday. Then write an equation that represents the problem.

Show your thinking.

answer: _____ **equation:** _____

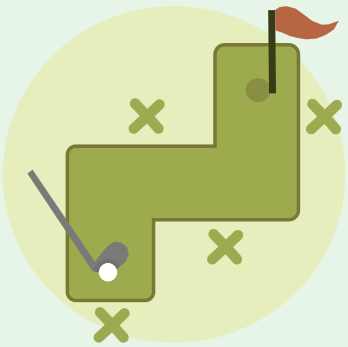
Unit 2
Lesson
13

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.5, 3.MD.6, 3.MD.7.b, 3.MD.7.d, 3.OA.3, SMP.1, SMP.4

Designing a Putting Green

Let's apply what we know about area to design a hole for a mini-golf course.



Warm-Up eyes on teacher

I am a doer of math.
How can you be a creative thinker while doing math?

Activity
1

Area on the Green

Your group has been named as the landscape architects for the course for the next mini-golf world championship.

Hands-On

You will be given materials to create 1 putting green.

Requirements for your putting green:

- The side lengths must be measured in whole feet.
- There must be *at least* 1 bend — remember, these are professional mini-golfers.
- The area must be *at least* 15 square feet.

Draw a model of your putting green on the next page. You may draw your design first or create your putting green first.

Name _____ Date _____

Area on the Green (continued)

Determining your hole's target score:

If it has an area of . . .	It starts as . . .	For . . .	Add . . .
15–18 square feet	par 1	1–2 bends	1 to par
19–21 square feet	par 2	3–4 bends	2 to par
22–24 square feet	par 3	5 or more bends	3 to par

1 Draw a model of your design and determine the area and par of your putting green.

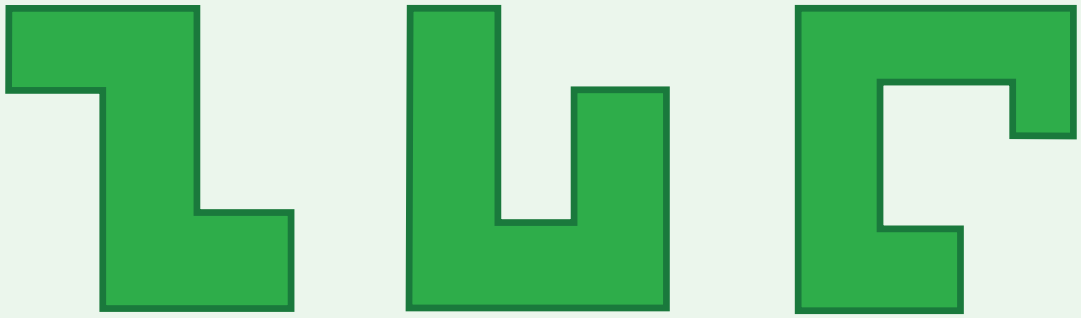
Draw

area: _____

par: _____

Summary 2.13

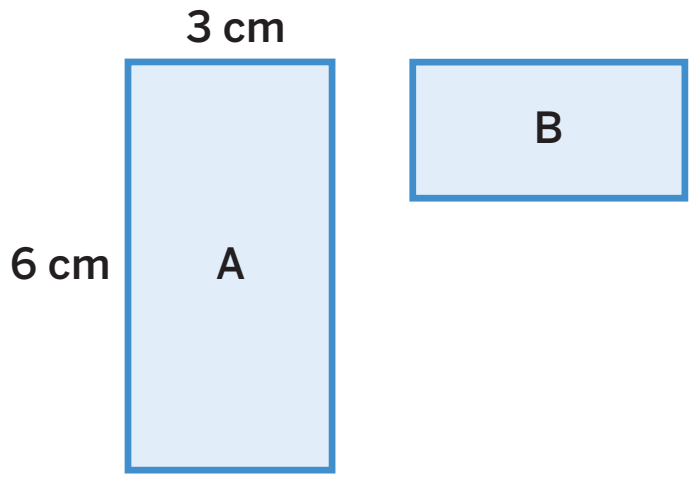
Area can be used to describe the size of many objects in the world. It can also be used to help design those objects. No matter the shape of the object, it is important to use square units when calculating its area.



Practice 2.13

1 Priya wants to combine Rectangles A and B into 1 figure that has a total area of 30 square centimeters. What could the dimensions of Rectangle B be?

Show your thinking.

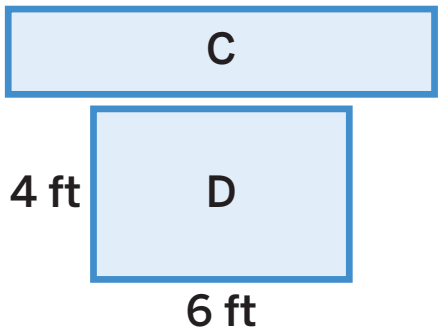


answer: _____

Name _____ Date _____

2 Suppose you combine Rectangles C and D into 1 figure that has a total area of 44 square feet. What could the dimensions of Rectangle C be?

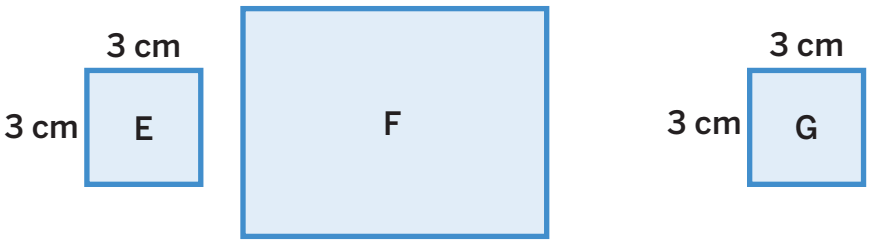
Show your thinking.



answer: _____

3 Diego combines Rectangles E, F, and G into 1 figure that has a total area of 66 square centimeters. What could the dimensions of Rectangle F be?

Show your thinking.



answer: _____

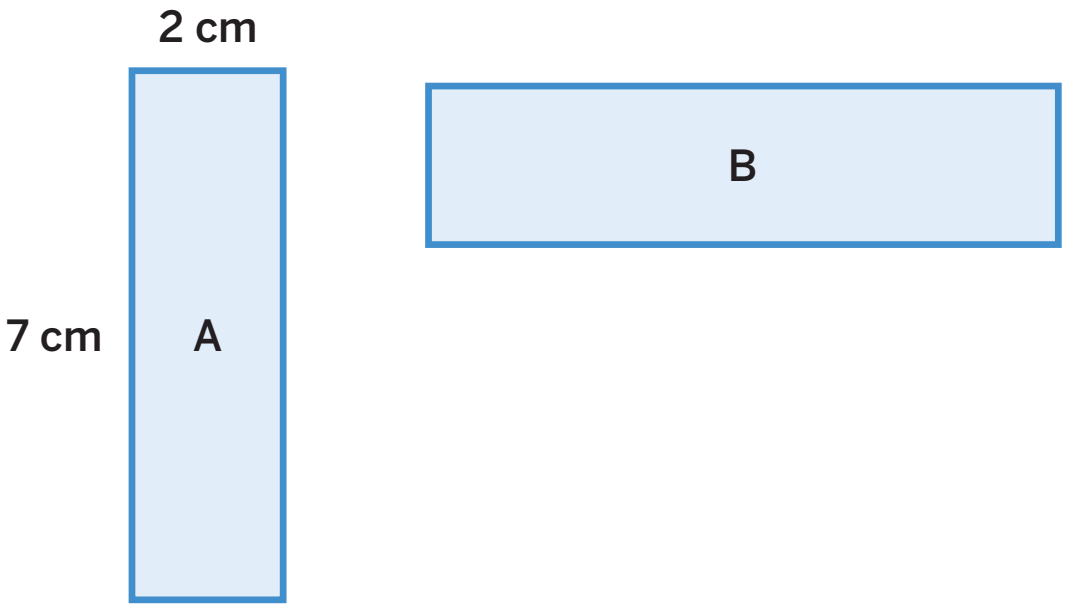
Name _____ Date _____

For Problems 4 and 5, determine the value of the expression.

4 2×4 _____

5 5×4 _____

6 Clare wants to combine Rectangles A and B into 1 figure that has a total area of 34 square centimeters. What are the dimensions of Rectangle B?



(A) 6 cm by 5 cm

(B) 3 cm by 6 cm

(C) 5 cm by 5 cm

(D) 2 cm by 10 cm

Spiral Review

For Problems 7 and 8, solve the riddle and write the three-digit number in standard form.

7 I have 20 tens, 21 ones, and 6 hundreds. _____

8 I have 10 tens, 10 ones, and 1 hundred. _____

Notes:

Math at Work

Mirrors, mirrors, on the walls – they help the room seem bigger for all. Mirrors help make a room feel brighter and create illusions of more space. The bigger the area of a mirror, the bigger the room will feel. Are there mirrors in your home?

Interior designers design plans for living or working spaces. They find the areas of *many* rectangles! They also figure out what materials they need and how much those cost.



PeopleImages.com - Yuri A/Shutterstock.com. New Africa/Shutterstock.com.

Math in the World

Solar panels convert light from the sun into energy. How many solar panels are shown on this building?



Smileus/Shutterstock.com

Math Mindset

What units measure area? Why is it important to include units when stating a measurement?

Unit 3

Wrapping Up Addition and Subtraction Within 1,000

Big Ideas in This Unit

CC1 Represent Multivariable Data

CC2 Addition and Subtraction Patterns | Number Flexibility to 100

Questions for Investigation

- How do you use place value for addition and subtraction?
- How do you know if an answer is reasonable?

Explore: Creating a Photo Gallery

How can you represent 999?



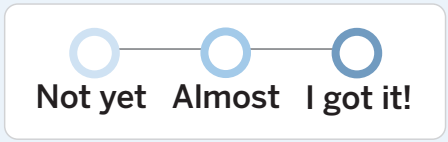
Unit Story: The View From up Here

In this story, Max climbs monuments, step by step, to photograph new perspectives.

Resul Muslu/Shutterstock.com

Watch Your Knowledge Grow

This is the math you'll explore in this unit. Rate your understanding to see how your knowledge grows!



I can . . .	Before	After
Round whole numbers to the nearest ten or hundred using place value.		
Use a strategy to add numbers within 1,000.		
Use a strategy to subtract numbers within 1,000.		
Understand the products of whole numbers.		
Solve two-step story problems using all 4 operations.		
Represent a two-step story problem with a letter for an unknown quantity.		
Decide the reasonableness of answers using mental strategies.		
Identify number patterns.		
Explain number patterns.		

Sub-Unit 1

Adding Within 1,000

Unit Story: The View From up Here



anutr tosirikul/Shutterstock.com

During his trip to New York City, Max was reminded of the importance of welcoming new challenges.

What new mathematical challenges might come up in this unit?

Name _____ Date _____

Addition and Subtraction Patterns | Building Toward 3.NBT.2, SMP.1, SMP.2, SMP.4

Explore: Creating a Photo Gallery

How can you represent 999?



Warm-Up

eyes on teacher

I am a doer of math.
How do you see hundreds, tens, and ones represented around you?

Discuss What do you notice? What do you wonder?



Activity

Name _____ Date _____

How can Max display his 999 photos?

- Photos can be displayed in 10 × 10 grids, 1 × 10 rows, or individually.
- Photos must be placed in 2 rooms.
- There are only 8 posters that can fit the 10 × 10 grids of photos.

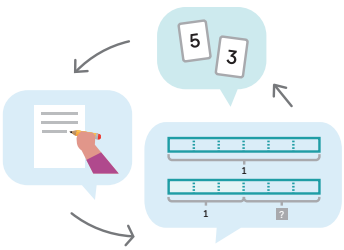
Ways to be a mathematician

1 I can take my time to think about a challenging problem before trying to solve it.



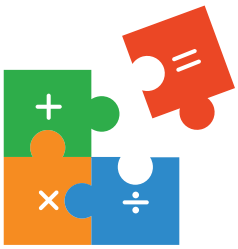
Not yet Almost I got it!

2 I can use numbers, words, and diagrams to make sense of math ideas and situations.



Not yet Almost I got it!

3 I can use math to help solve real-world problems.



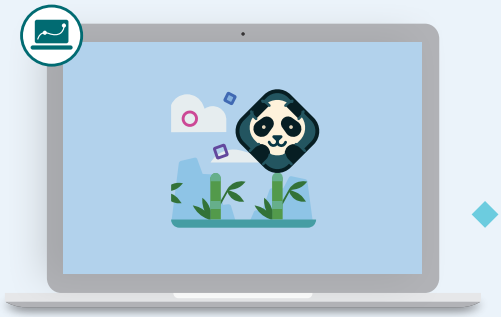
Not yet Almost I got it!

Name _____ Date _____

Addition and Subtraction Patterns 3.NBT.2, 3.OA.9, SMP.7, SMP.8

Panda Patterns

Let's explore addition patterns.



Warm-Up

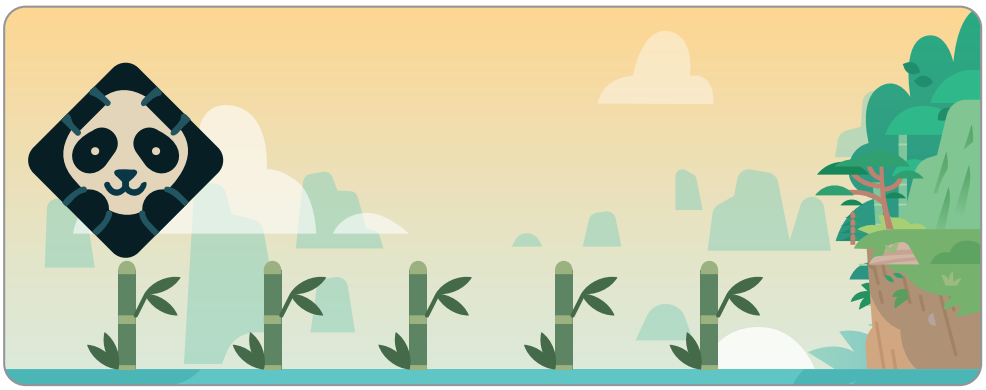
1 eyes on teacher

I am a doer of math.
Where have you seen patterns of numbers?

Activity 1 Adding 11 or 9

Help the panda reach the island by continuing the pattern.

2 Continue the pattern by adding 11.



46 ____ ____ ____ ____

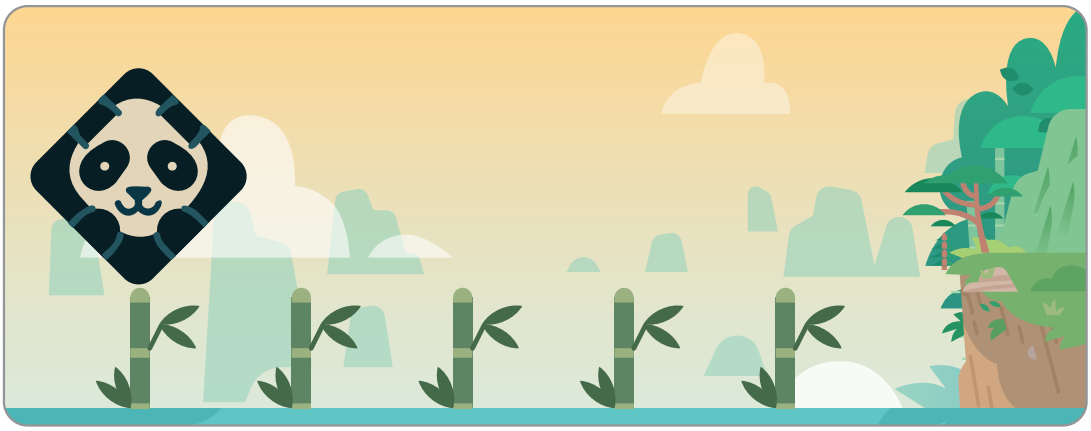
3 **Discuss**

What patterns do you notice when adding 11?

Name _____ Date _____

Adding 11 or 9 (continued)

4 Continue the pattern by adding 9.



46 ____ ____ ____ ____

5 **Compare**

Let's compare patterns when adding 11 and 9.

6 **Discuss**

Let's look at an addition table. Where do you see the patterns for adding 11 and adding 9?

Activity 2

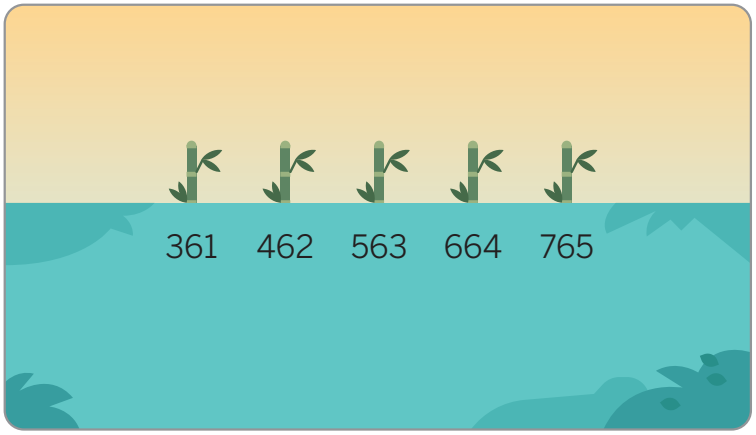
Name _____ Date _____

Adding 101 or 99

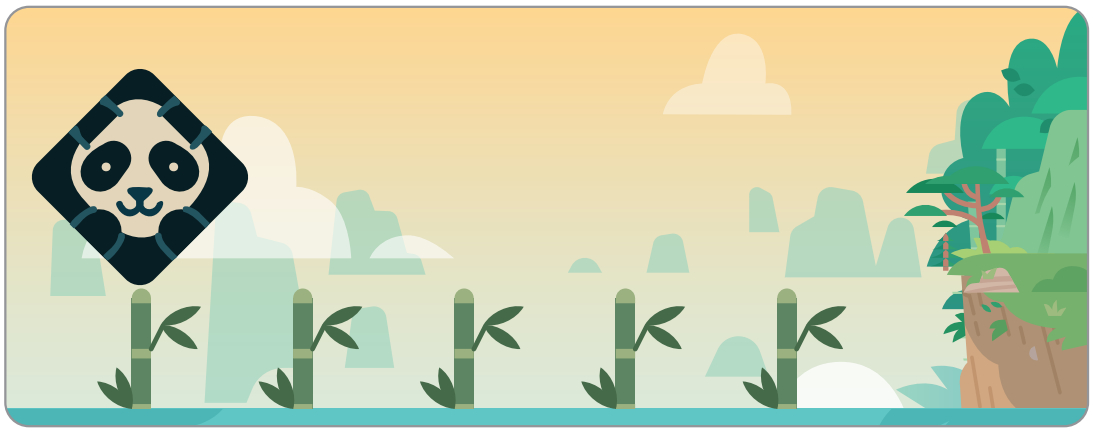
Help the panda reach the island by continuing the pattern.

7 Discuss

What do you notice? What do you wonder?



8 Continue the pattern by adding 101.



207 ____ ____ ____ ____

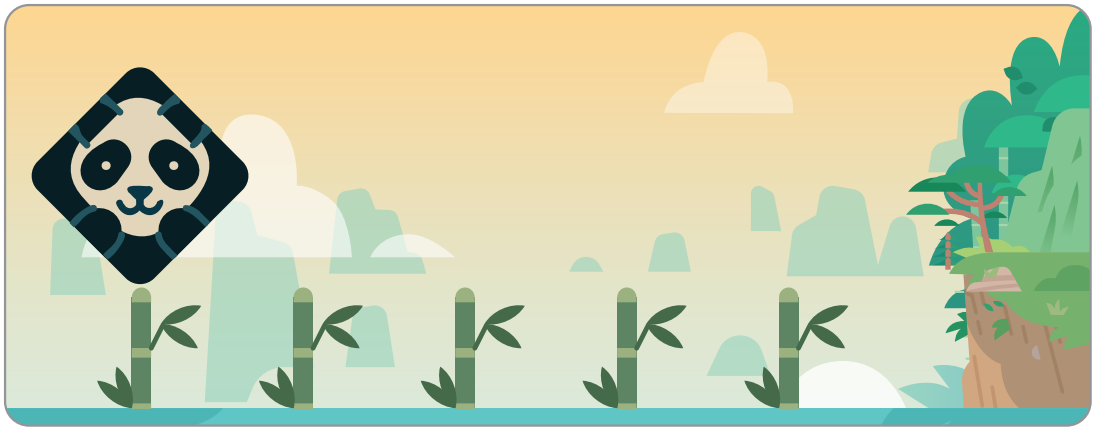
Name _____ Date _____

Adding 101 or 99 (continued)

9 **Describe**

What patterns do you notice when adding 101?

10 Continue the pattern by adding 99.



207 ___ ___ ___ ___

11 **Compare**

Let's compare patterns when adding 101 and 99.

Summary 3.02

You can use addition patterns to help you determine unknown sums by relating them to known sums.

207 308 409 510 611 712

+101

611 + 100
611 + 100 + 1
711 + 1 = 712

207 307 407 507 607 707

+100

607 + 100 = 707

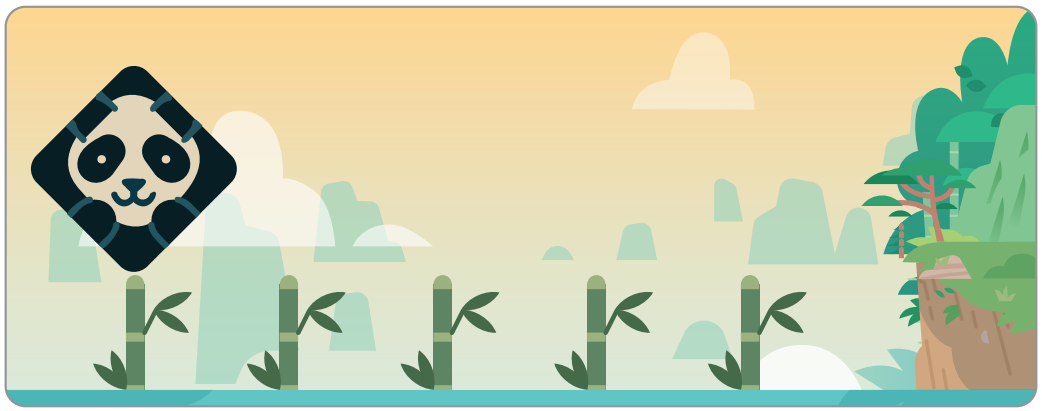
207 306 405 504 603 702

+99

603 + 99
603 + 100 − 1
703 − 1 = 702

Practice 3.02

1 Continue the pattern by adding 101.



311 _____ _____ _____ _____

Name _____ Date _____

2 Parts of an addition table are shown. What numbers correctly complete the pattern in the table?

501	699	798

For Problems 3–7, determine the value of the expression.

3 345 + 99 _____

4 345 + 101 _____

5 499 + 101 _____

6 787 + 99 _____

7 865 + 99 _____

Name _____ Date _____

Spiral Review

For Problems 8–15, determine the value of the expression.

8 2×8 _____

9 4×4 _____

10 10×4 _____

11 6×3 _____

12 9×3 _____

13 2×7 _____

14 6×5 _____

15 10×8 _____

For Problems 16–23, determine the value that makes the equation true.

16 $6 + 8 =$ _____

17 $9 - 3 =$ _____

18 $15 - 4 =$ _____

19 $11 + 4 =$ _____

20 $7 +$ _____ $= 10$

21 $6 -$ _____ $= 4$

22 _____ $+ 3 = 13$

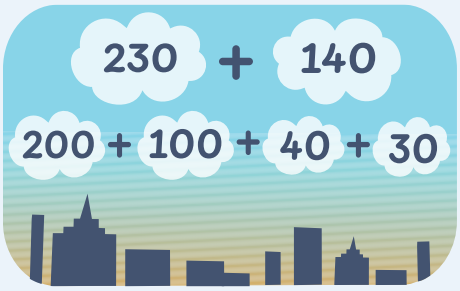
23 _____ $- 6 = 4$

Name _____ Date _____

Addition and Subtraction Patterns | 3.NBT.2, SMP.2, SMP.5, SMP.7, SMP.8

How Would You Solve It?

Let's flexibly decompose and add numbers within 1,000.



Warm-Up

eyes on teacher

I am a doer of math.
What do you already know about addition?

Activity 1 Decompose to Add

Decompose 1 or both of the addends to determine the sum.

Show or explain your thinking.

1 260 + 453

answer: _____

Name _____ Date _____

Decompose to Add (continued)

Show or explain your thinking.

2 353 + 102

answer: _____

3 Discuss

Discuss with your partner how you decomposed an addend or addends to determine the sum.

Activity 2

Name _____ Date _____

Any Strategy

Determine each sum in any way that makes sense to you.
Be prepared to share your strategies and explain your thinking.

Show or explain your thinking.

4 716 + 135

answer: _____

Name _____ Date _____

Any Strategy (continued)

Show or explain your thinking.

5 578 + 394

answer: _____

6 149 + 372

answer: _____

Summary 3.03

You may choose to use a different addition strategy depending on the addends in the expression.

195 + 287	215 + 543
195 + 5 = 200 200 + 282 = 482	200 + 500 = 700 10 + 40 = 50 5 + 3 = 8 700 + 50 + 8 = 758

Practice 3.03

1 What unknown number makes this equation true?

832 + 113 = ☐

Show or explain your thinking.

answer: _____

Name _____ Date _____

For Problems 2 and 3, determine the sum in a way that makes sense to you.

Show or explain your thinking.

2 572 + 128

answer: _____

3 346 + 378

answer: _____

Name _____ Date _____

Spiral Review

For Problems 4–11, determine the value of the expression.

4 5 × 6 _____

5 2 × 7 _____

6 10 × 6 _____

7 5 × 9 _____

8 4 × 1 _____

9 2 × 8 _____

10 6 × 2 _____

11 10 × 7 _____

For Problems 12–19, determine the value that makes the equation true.

12 6 + 7 = _____

13 7 − 3 = _____

14 18 − 6 = _____

15 12 + 7 = _____

16 3 + _____ = 8

17 9 − _____ = 5

18 _____ + 9 = 17

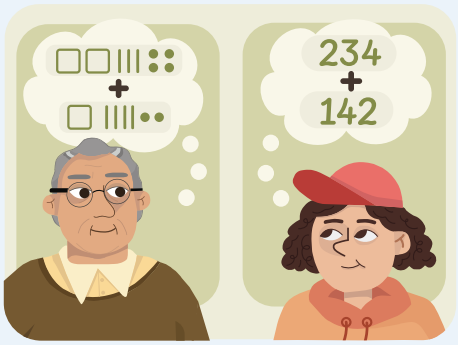
19 _____ − 8 = 7

Name _____ Date _____

Addition and Subtraction Patterns 3.NBT.2, SMP.1, SMP.3, SMP.6, SMP.7

Adding Your Way

Let's add numbers within 1,000.



Warm-Up

eyes on teacher

I am a doer of math.
What strategy or strategies do you like to use when you add?

Activity 1 Addition Strategies

Add by place to determine each sum. Be prepared to share your representations and explain your thinking.

Show or explain your thinking.

1 186 + 203

answer: _____

Name _____ Date _____

Addition Strategies (continued)

Show or explain your thinking.

2 248 + 325

answer: _____



Activity 2

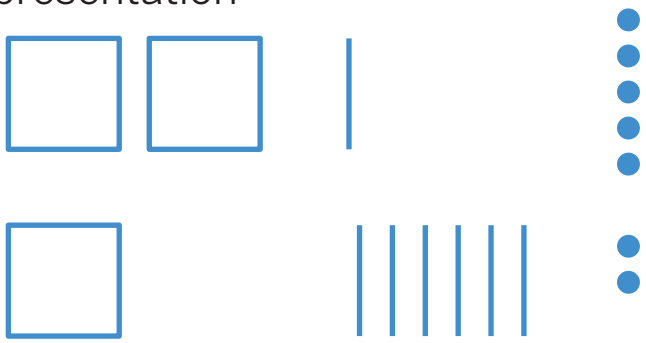
Name _____ Date _____

From Blocks to Numbers

Priya, Clare, and Jada determined the sum 215 + 162 using 3 different representations of adding by place. Part of their work is shown. Complete all 3 representations.

Show your thinking.

3 Priya's representation



answer: _____

4 Clare's representation

200 + 100 =

10 + 60 =

5 + 2 =

answer: _____

Name _____ Date _____

From Blocks to Numbers (continued)

Show your thinking.

5 Jada's representation

$$\begin{array}{r} 200 + 10 + 5 \\ + \ 100 + 60 + 2 \\ \hline \end{array}$$

answer: _____

6 **Discuss**

How are the 3 representations similar? How are they different?

Summary 3.04

You can write addition expressions in expanded form to add by place.

$$215 + 162 = 377$$

$$\begin{array}{r} 200 + 10 + 5 \\ +\ 100 + 60 + 2 \\ \hline 300 + 70 + 7 \end{array}$$

Practice 3.04

1 What unknown number makes this equation true?

$593 + 368 = \square$

Show or explain your thinking.

answer: _____

Name _____ Date _____

For Problems 2 and 3, add by place to determine the sum.

Show your thinking.

2 382 + 174

answer: _____

3 419 + 225

answer: _____

Name _____ Date _____

Spiral Review

For Problems 4–11, determine the value of the expression.

4 5×5 _____

5 2×4 _____

6 10×2 _____

7 5×3 _____

8 9×1 _____

9 2×6 _____

10 3×2 _____

11 10×8 _____

For Problems 12–19, determine the value that makes the equation true.

12 $6 + 5 =$ _____

13 $9 - 5 =$ _____

14 $12 - 4 =$ _____

15 $14 + 6 =$ _____

16 $6 +$ _____ $= 9$

17 $8 -$ _____ $= 5$

18 _____ $+ 6 = 15$

19 _____ $- 6 = 1$

Name _____ Date _____

Addition and Subtraction Patterns | 3.NBT.2, SMP.1, SMP.2, SMP.7, SMP.8

What Is an Algorithm?

Let's look at addition algorithms.



Warm-Up

eyes on teacher

I am a doer of math.
What do you enjoy most about math class?

Activity 1 Adding It Up

Han and Clare each represented adding 362 + 354 by place. Their first steps are shown.

1 Complete each representation.

Han's representation	Clare's representation
300 + 60 + 2 + 300 + 50 + 4 + 6 answer: _____	3 6 2 + 3 5 4 6 1 1 0 + □ □ □ □ □ □ answer: _____

Name _____ Date _____

Adding It Up (continued)

2 Discuss

How are the representations similar? How are they different?

3 Try using one of the representations to calculate the sum.

Show your thinking.

514 + 236

answer: _____

Activity 2

Name _____ Date _____

Adding With Algorithms

In his exhibit, Max wants to include pictures and information about the heights of waterfalls and other structures he has visited.

Use the partial sums algorithm or expanded form algorithm to complete each problem.

Show your thinking.

4 Iguazu Falls in South America marks the border between Argentina and Brazil. One of the tallest drops along the falls is made up of 2 steps. The first step is 115 feet, and the second step is 131 feet. How tall is this drop altogether?

answer: _____

Name _____ Date _____

Adding With Algorithms (continued)

Show your thinking.

5 Victoria Falls is a waterfall on the Zambezi River in southern Africa. After the falls, water flows through a zigzag of 7 gorges. If a bird were to fly along the 492-foot length of the first gorge and then straight up the 350-foot tall face of the falls, how far would the bird fly?

answer: _____

6 The Skylon Tower is a revolving restaurant and observation deck above Niagara Falls. The height from the base of the tower to the roof is 489 feet. The antenna is 36 feet. How tall is the Skylon Tower from the base to the top of the antenna?

answer: _____

Summary 3.05

To use a **partial sums algorithm**, add each part of the numbers by place.

Partial sums algorithm

$$\begin{array}{rl} & 239 \\ + & 143 \\ \hline & 12 \quad = 9 + 3 \\ & 70 \quad = 30 + 40 \\ + & 300 \quad = 200 + 100 \\ \hline & 382 \end{array}$$

algorithm A set of steps that can be followed when making calculations.

partial sum The sum of 1 place value column in an addition problem with at least 1 multi-digit number.

Practice 3.05

1 Fill in the unknown numbers that complete the expression for 271 + 384 and then solve it.

Show your thinking.

$$\begin{array}{rrrrrr} & 200 & + & \square & + & \square \\ + & \square & + & 80 & + & \square \\ \hline \end{array}$$

answer: _____

Name _____ Date _____

The table shows the typical yearly rainfall in centimeters for several of the wettest U.S. cities. Use the table for Problems 2 and 3.

City	Rainfall (cm)
Annette Island, AK	259
Hilo, HI	323
Quillayute, WA	254

Show your thinking.

2 What is the combined typical yearly rainfall for Hilo and Annette Island?

answer: _____

3 What is the combined typical yearly rainfall for Quillayute and Annette Island?

answer: _____

Name _____ Date _____

Spiral Review

For Problems 4–11, determine the value of the expression.

4 2×5 _____

5 10×5 _____

6 1×10 _____

7 2×3 _____

8 4×5 _____

9 6×5 _____

10 10×3 _____

11 2×8 _____

For Problems 12–19, determine the value that makes the equation true.

12 $12 + 8 =$ _____

13 $13 - 4 =$ _____

14 $7 - 4 =$ _____

15 $8 + 2 =$ _____

16 $12 +$ _____ $= 15$

17 $12 -$ _____ $= 8$

18 _____ $- 2 = 16$

19 _____ $+ 6 = 11$

Name _____ Date _____

Addition and Subtraction Patterns 3.NBT.2, SMP.3, SMP.6

Using Fewer Digits

Let's look at another addition algorithm.



I am a doer of math.
Max uses addition to determine the height of the Statue of Liberty. When have you had to add outside of school?

Warm-Up

eyes on teacher

Activity 1 A New Algorithm

Look at the algorithms in your Activity 1 handout.

1 Discuss

How are the partial sums algorithm and the standard algorithm alike? How are they different?

Name _____ Date _____

A New Algorithm (continued)

2 Use the partial sums algorithm to calculate the sum.

Show your thinking.

461 + 21

answer: _____

3 Use the standard algorithm to calculate the sum.

Show your thinking.

461 + 21

answer: _____

Activity 2

Name _____ Date _____

Composed Units

4 When Max stood in front of the Statue of Liberty, he was surprised by its height. He read a sign that said the pedestal is 154 feet tall and the statue is 151 feet tall. What is the height of the entire sculpture? Use the standard algorithm to calculate the sum.

Show your thinking.

answer: _____



Name _____ Date _____

Composed Units (continued)

Use the standard algorithm to calculate each sum.

Show your thinking.

5 413 + 258

answer: _____

6 724 + 136

answer: _____

Summary 3.06

In the standard algorithm, single digits are used to record composed units when determining place value sums.

$$\begin{array}{r} {\scriptstyle 1} \\ 367 \\ +\,125 \\ \hline 492 \end{array}$$

Practice 3.06

1 Use an algorithm of your choice to calculate the sum 839 + 34.

Show your thinking.

answer: _____

Name _____ Date _____

The table shows the amount of snowfall in inches for several U.S. cities from 1971 to 1980. Use the table for Problems 2 and 3.

City	Snowfall (in.)
Burlington, VT	92
Donner Summit, CA	396
Flagstaff, AZ	117
Lander, WY	127

Show your thinking.

2 What was the combined snowfall for Donner Summit and Burlington from 1971 to 1980?

answer: _____

3 What was the combined snowfall for Lander and Flagstaff from 1971 to 1980?

answer: _____

Name _____ Date _____

4 What is the value of 345 + 87?

Ⓐ 432 Ⓑ 332 Ⓒ 422 Ⓓ 258

5 What unknown number makes this equation true?

Show your thinking.

$$\begin{array}{r} 315 \\ +\ \square \\ \hline 479 \end{array}$$

answer: _____

Spiral Review

For Problems 6–11, determine the value of the expression.

6 10 × 10 _____

7 3 × 5 _____

8 10 × 6 _____

9 2 × 4 _____

10 2 × 6 _____

11 5 × 1 _____

Name _____ Date _____

Addition and Subtraction Patterns 3.NBT.2, SMP.6, SMP.7, SMP.8

Determining Sums of 2 or More Addends

Let's practice using algorithms to add three-digit numbers.



Warm-Up

eyes on teacher

I am a doer of math.
What addition strategies would you like to learn more about?

Activity 1 Composing Units

Use an algorithm to determine each sum.

Show your thinking.

1. 373 + 252

answer: _____

2. 547 + 176

answer: _____

Name _____ Date _____

Composing Units (continued)

3 Discuss

Compare Problem 1 and Problem 2. How are they similar? How are they different?

4 Use an algorithm to determine the sum.

Show your thinking.

158 + 644

answer: _____

Activity 2

Name _____ Date _____

Three Addends

Use an algorithm to determine each sum.

Show your thinking.

5 239 + 529

answer: _____

6 239 + 529 + 123

answer: _____

Name _____ Date _____

Three Addends (continued)

Show your thinking.

7 239 + 529 + 153

answer: _____

8 **Discuss**

Compare your work in Problems 6 and 7. When did you have to compose 1 unit? When did you have to compose more than 1 unit? Why?

Summary 3.07

You can use any algorithm to add by place. When you add by place, sometimes you need to compose units in more than 1 place, and sometimes you need to compose more than 1 of the same unit.

$$\begin{array}{r} {\scriptstyle 1\,1} \\ 547 \\ +\ 176 \\ \hline 723 \end{array} \qquad \begin{array}{r} {\scriptstyle 2} \\ 239 \\ 529 \\ +\ 123 \\ \hline 891 \end{array}$$

Practice 3.07

1 Clare was adding 284 + 122. Her work is shown. Complete her work.

Show your thinking.

$$\begin{array}{r} 284 \\ +\ 122 \\ \hline 6 \end{array}$$

answer: _____

Name _____ Date _____

For Problems 2–4, use an algorithm of your choice to determine the sum.

Show your thinking.

2 526 + 297

answer: _____

3 462 + 459

answer: _____

4 329 + 113 + 229

answer: _____

Name _____ Date _____

Show your thinking.

5 What unknown number makes this equation true?

$306 + 147 = 300 + \square$

answer: _____

6 What unknown number makes this equation true?

$$\begin{array}{r} 445 \\ +\ 372 \\ \hline \square \end{array}$$

answer: _____

Spiral Review

For Problems 7–10, determine the value of the expression.

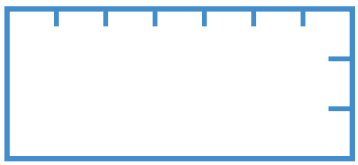
7 2×2 _____

8 1×9 _____

9 5×7 _____

10 10×8 _____

11 Write an expression that represents the area of the rectangle. Then determine the area of the rectangle. The space between 2 tick marks represents 1 meter.



expression: _____

area: _____

Name _____ Date _____

Addition and Subtraction Patterns | 3.NBT.2 SMP.1, SMP.5, SMP.7, SMP.8

Adding Strategically

Let's use strategies and algorithms to add.



I am a doer of math.
When Max practiced taking photos, he felt successful at photography. When have you felt successful in math class?

Warm-Up

eyes on teacher

Activity 1 Is Your Answer Reasonable?

1 Circle a reasonable estimate for the sum 359 + 113.

500 100 400 350

2 **Discuss**
Share your estimate for Problem 1 with your partner.
Explain your thinking.

3 Use any strategy to determine the sum 359 + 113.

Show your thinking.

answer: _____

Name _____ Date _____

Is Your Answer Reasonable? (continued)

4 What is a reasonable estimate for the sum 492 + 283?

_____

5 Use any strategy to determine the sum 492 + 283.

Show your thinking.

answer: _____

6 **Discuss**

Compare your estimates at Problems 1 and 4 to your answers at Problems 3 and 5. How does estimating help you decide whether your answer is reasonable?

Activity 2

Name _____ Date _____

Greatest Sum, Least Sum

Hands-On

You and your partner will be given a Spinner.

1. Decide with your partner if you are playing for the *greatest* sum or the *least* sum. If playing for the *greatest* sum, the player with the sum closer to 999 without going over wins each round.
2. Take turns spinning the Spinner. Record each spin as a digit in the hundreds, tens, or ones place of one of your numbers.
3. Continue spinning until each player has created 2 three-digit numbers.
4. Determine the sum of your numbers using any strategy or algorithm.
5. Discuss with your partner who has the greatest/least sum based on what you decided in Step 1.
6. Circle the winning sum. That player gets 1 point.
7. Play again until you have completed 4 rounds. The player with more points wins.

My numbers

☐☐☐ ☐☐☐

My sum ☐☐☐

My partner's sum ☐☐☐

Show your thinking.

Name _____ Date _____

Greatest Sum, Least Sum (continued)

My numbers

□□□ □□□

My sum □□□ My partner's sum □□□

Show your thinking.

My numbers

□□□ □□□

My sum □□□ My partner's sum □□□

Show your thinking.

My numbers

□□□ □□□

My sum □□□ My partner's sum □□□

Show your thinking.

Summary 3.08

It is helpful to think about the addends in an addition expression before choosing a strategy or algorithm. Making an estimate before determining a sum is a good way to check the reasonableness of your answer.

$$198 + 512 = 710$$

198 is close to 200. 512 is close to 500. 700 is a reasonable estimate for the sum, and 710 is close to 700.

Practice 3.08

1 What is a reasonable estimate for 588 + 221?

_____

2 Determine the sum 588 + 221.

Show your thinking.

answer: _____

Name _____ Date _____

3 Here are your numbers.

My numbers

2	4	1		3	1	5

How would you arrange your numbers to make the *greatest* sum? The *least* sum?

Show your thinking.

+				+				
greatest sum:				**least sum:**				

4 Han says a reasonable estimate for 318 + 384 is 600.
Do you agree with Han? Explain your thinking.

Name _____ Date _____

5 About how much is the value of 426 + 211?

(A) 600 (B) 700 (C) 500 (D) 550

6 Which addition expression would *not* have 400 as a reasonable estimate for the sum?

(A) 175 + 201 (B) 212 + 198

(C) 284 + 189 (D) 320 + 99

Spiral Review

For Problems 7 and 8, determine the value of the expression.

7 5 × 8 _____

8 10 × 4 _____

9 At a museum, Han saw 4 dinosaur fossils. Each fossil had 3 toenails. Determine how many toenails there were altogether. Then write an equation that represents the situation.



toenails: _____ **equation:** _____

Sub-Unit

2

Subtracting Within 1,000

Unit Story: The View From up Here



Ankshuman Baruah/Shutterstock.com

Max encountered many volunteers helping to keep trails safe and enjoyable.

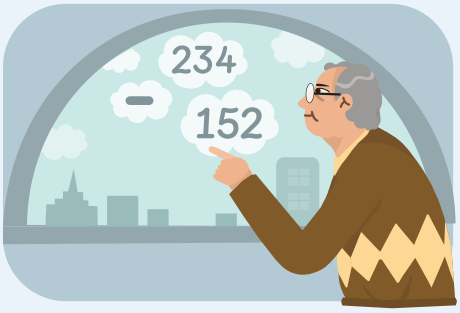
How does working with others make math enjoyable?

Name _____ Date _____

Addition and Subtraction Patterns 3.NBT.2, SMP.1, SMP.2, SMP.5, SMP.7, SMP.8

Subtracting Your Way

Let's subtract numbers within 1,000.



I am a doer of math.
Think of a time when you needed to use subtraction. What strategy did you use?

Warm-Up

eyes on teacher

Activity 1 Subtraction Strategies

Max went down 102 of the 495 steps of the Niagara Gorge Trail, which is where he met Nicole, searching for her walkie-talkie. Together, they retraced 265 more of Nicole's steps before hearing what they thought was water from the falls but was actually static coming from the walkie-talkie.

Name _____ Date _____

Subtraction Strategies (continued)

These expressions represent the difference between the number of steps. Calculate each difference in any way that makes sense to you.

Show or explain your thinking.

1. 495 – 102

answer: _____

2. 393 – 265

answer: _____

Activity 2

Name _____ Date _____

Subtracting by Place

Hands-On

Subtract by place to determine each difference. Be prepared to share your representations and explain your thinking.

Show your thinking.

3 253 – 132

answer: _____

Name _____ Date _____

Subtracting by Place (continued)

Show your thinking.

4 343 – 134

answer: _____

5 521 – 372

answer: _____

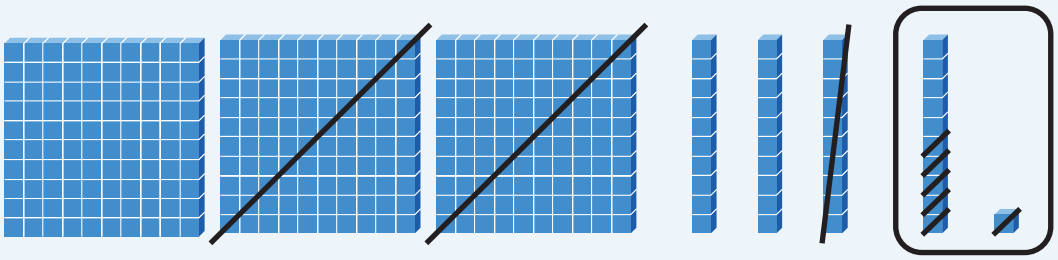
6 Discuss

Discuss with your partner how each of you represented Problem 4. How are your representations similar and different?

Summary 3.09

You can solve and represent subtraction in a variety of ways.

341 – 216



300 – 200 = 100

41 – 16 = 25

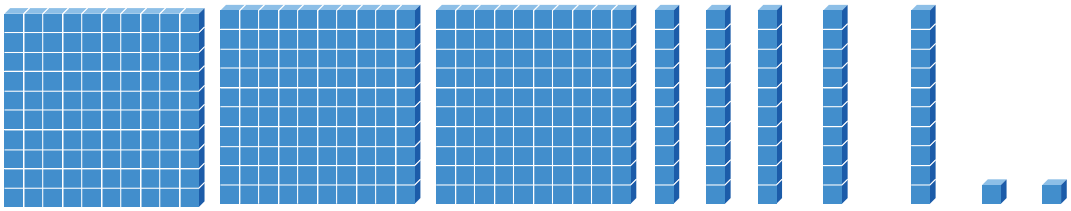
100 + 25 = 125

341 = 300 + 30 + 11
300 – 200 = 100
30 – 10 = 20
11 – 7 = 5
100 + 20 + 5 = 125

Practice 3.09

1 The base-ten diagram represents 352. Use the diagram to evaluate the expression 352 – 225.

Show your thinking.



answer: _____

Name _____ Date _____

For Problems 2 and 3, evaluate the expression in any way that makes sense to you.

Show or explain your thinking.

2 472 – 152

answer: _____

3 548 – 242

answer: _____

4 What is the value of 247 – 135?

(A) 382

(B) 113

(C) 102

(D) 112

Name _____ Date _____

Spiral Review

For Problems 5–10, determine the value of the expression.

5 2×3 _____

6 8×10 _____

7 5×9 _____

8 2×6 _____

9 6×5 _____

10 3×4 _____

For Problems 11–14, determine the value that makes the equation true.

11 $4 + _____ = 8$

12 $12 - _____ = 9$

13 $_____ + 9 = 14$

14 $_____ - 8 = 2$

15 An octopus has 3 hearts. A zoo exhibit has 3 octopuses. Determine how many octopus hearts there are. Then write an equation to represent the situation.

Show or explain your thinking.

hearts: _____ **equation:** _____

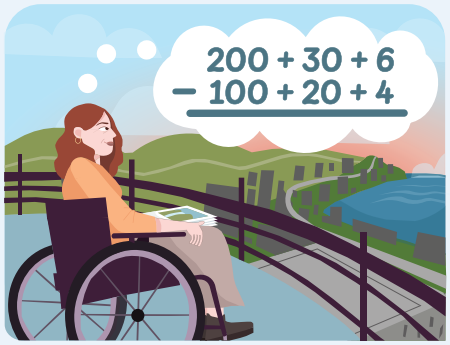
Unit 3
Lesson
10

Name _____ Date _____

Addition and Subtraction Patterns | 3.NBT.2, SMP.1, SMP.6, SMP.7, SMP.8

Subtracting With an Algorithm

Let's use what we know about place value to explore a new way to subtract.



I am a doer of math.
When have you used step-by-step instructions? How are they helpful?

Warm-Up

eyes on teacher

Activity 1 From Diagrams to an Algorithm

Shawn and Jada were subtracting 398 – 215. Part of their work is shown. Complete their representations.

Show your thinking.

1 Shawn's representation



2 Jada's representation

$$\begin{array}{r} 300 + 90 + 8 \\ -\ 200 + \ 10 + 5 \\ \hline \end{array}$$

Name _____ Date _____

From Diagrams to an Algorithm (continued)

3 What is similar and different about how Shawn and Jada represented subtraction?

Activity 2

Name _____ Date _____

Using an Algorithm to Subtract

Hands-On

4 Calculate the difference using the expanded form algorithm.

Show your thinking.

373 – 236

$$\begin{array}{r} 300 + 70 + 3 \\ -\ 200 + 30 + 6 \\ \hline \end{array}$$

answer: _____

5 **Discuss**

Discuss with your partner how you represented decomposing a ten in Problem 4.

Name _____ Date _____

Using an Algorithm to Subtract (continued)

Use the expanded form algorithm to calculate each difference.

Show your thinking.

6 256 – 138

answer: _____

7 333 – 292

answer: _____

Summary 3.10

The expanded form algorithm can be used to calculate differences when subtracting by place value.

478 – 132

$$\begin{array}{r} 400+70+8 \\ -\ 100+30+2 \\ \hline 300+40+6 \end{array}$$

391 – 215

$$\begin{array}{r} \overset{80}{\not{9}\not{0}}\ \overset{11}{\not{1}} \\ 300+90+1 \\ -\ 200+10+5 \\ \hline 100+70+6 \end{array}$$

Practice 3.10

1 Diego was subtracting 273 – 146. His work is shown. Complete his work.

Show your thinking.

$$\begin{array}{r} \overset{60}{\not{7}\not{0}}\ \overset{13}{\not{3}} \\ 200+70+3 \\ -\ 100+40+6 \\ \hline \end{array}$$

answer: _____

Name _____ Date _____

For Problems 2–4, evaluate the expression using the expanded form algorithm.

Show your thinking.

2 864 – 346

answer: _____

3 576 – 368

answer: _____

4 624 – 457

answer: _____

Name _____ Date _____

5 What is the next step when completing this problem?

$$\begin{array}{r} 300 + \overset{40}{\cancel{5}}0 + \overset{12}{\cancel{2}} \\ -\ 100 + 40 + 9 \\ \hline \end{array}$$

(A) Add 100 to 300.

(B) Decompose a hundred.

(C) Subtract 50 from 40 in the tens place.

(D) Subtract 9 from 12 in the ones place.

6 What is the value of 423 – 235?

(A) 100 + 80 + 8

(B) 100 + 70 + 8

(C) 200 + 80 + 8

(D) 200 + 70 + 8

Spiral Review

For Problems 7–12, determine the value of the expression.

7 10 × 9 _____

8 2 × 8 _____

9 6 × 4 _____

10 5 × 7 _____

11 3 × 3 _____

12 4 × 4 _____

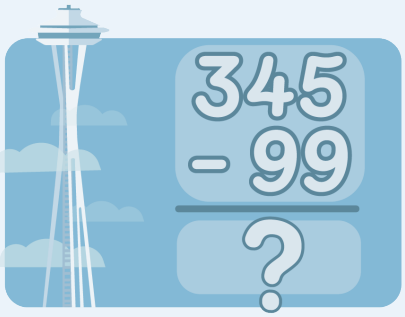
Unit 3
Lesson
11

Name _____ Date _____

Addition and Subtraction Patterns | 3.NBT.2, SMP.3, SMP.5, SMP.6, SMP.7

A New Algorithm

Let's explore another way to subtract using an algorithm.



Warm-Up

eyes on teacher

I am a doer of math.
When might you use subtraction outside of school?

Activity 1 Tens and Ones

The expanded form algorithm and the standard algorithm were used to calculate the difference 363 – 48. Complete both algorithms to calculate the difference.

Show your thinking.

1 Expanded form algorithm

$$\begin{array}{rr} & \overset{50}{\cancel{60}} \quad \overset{13}{\cancel{3}} \\ 300 + & \cancel{60} + \cancel{3} \\ - & 40 + 8 \\ \hline \end{array}$$

answer: _____

2 Standard algorithm

$$\begin{array}{r} \overset{5}{\cancel{3}}\overset{13}{\cancel{6}}\cancel{3} \\ - \quad 48 \\ \hline \end{array}$$

answer: _____

Name _____ Date _____

Tens and Ones (continued)

3 Discuss

How did the way each algorithm was set up affect the steps needed to calculate the difference?

Use an algorithm to calculate each difference.

Show your thinking.

4 671 – 358

answer: _____

5 492 – 325

answer: _____

Activity 2

Name _____ Date _____

Hundreds and Tens

Here is another example of each algorithm. Complete both algorithms to calculate the difference.

Show your thinking.

6 Expanded form algorithm

$$\begin{array}{r} \overset{400}{\cancel{500}} + \overset{130}{\cancel{30}} + 8 \\ -\ 100 + 50 + 6 \\ \hline 2 \end{array}$$

answer: _____

7 Standard algorithm

$$\begin{array}{r} \overset{4}{\cancel{5}}\overset{13}{\cancel{3}}8 \\ -\ 156 \\ \hline 2 \end{array}$$

answer: _____



Name _____ Date _____

Hundreds and Tens (continued)

Choose 1 problem to use the expanded form algorithm to solve. Use the standard algorithm to solve the other problem.

Show your thinking.

8 926 – 584

answer: _____

9 317 – 182

answer: _____

10 Discuss

How are the 2 algorithms similar? How are they different?

Summary 3.11

The standard algorithm for subtraction follows the same process as the expanded form algorithm, but decompositions and the final difference are written using fewer digits.

$$\begin{array}{r} \overset{400}{\cancel{500}} + \overset{130}{\cancel{30}} + 8 \\ -\ 100 + 50 + 6 \\ \hline 300 + 80 + 2 \end{array} \qquad \begin{array}{r} \overset{413}{\cancel{5}\cancel{3}8} \\ -\ 156 \\ \hline 382 \end{array}$$

Practice 3.11

1 Jada was subtracting 349 – 167 using the standard algorithm. Her work is shown. Complete her work.

$$\begin{array}{r} \overset{14}{3\cancel{4}9} \\ -\ 167 \\ \hline \end{array}$$

answer: _____

Name _____ Date _____

For Problems 2 and 3, calculate the difference using an algorithm of your choice.

Show your thinking.

2 416 – 136

answer: _____

3 547 – 238

answer: _____

Name _____ Date _____

4 What is the next step when completing this problem?

$$\begin{array}{r} {}^{1}\not{2}\,{}^{13}\not{3}\,6 \\ -\ 1\,5\,2 \\ \hline \end{array}$$

(A) Subtract 13 from 5.
(B) Decompose a group of 100.
(C) Subtract 2 from 6 in the ones place.
(D) Decompose a group of 10.

5 What is the value of 356 – 137?

(A) 229 (B) 119 (C) 493 (D) 219

Spiral Review

For Problems 6 and 7, determine the value of the expression.

6 2 × 9 _____

7 5 × 5 _____

8 Typically, a lion pride has 8 adult female lions. How many adult female lions are there in 3 typical prides? Write a multiplication equation with a symbol for the unknown to represent the situation. Then complete the statement.

multiplication equation: _____

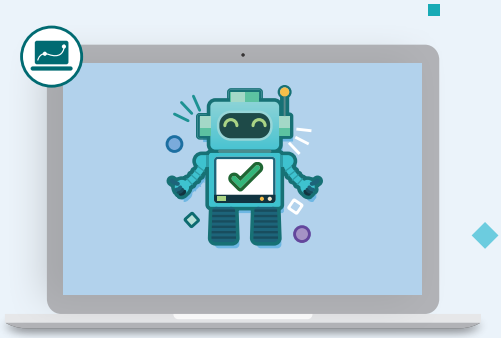
There are _____ **adult female lions in total.**

Name _____ Date _____

Addition and Subtraction Patterns | 3.NBT.2, SMP.6, SMP.7

Dynamic Decompositions

Let's consider when it is necessary to decompose to subtract by place.



I can be all of me in math class.
Do you prefer to work alone or with others during math class? Why?

Warm-Up

1 eyes on teacher

Activity 1 Expressions That Decompose

2 Fill in the boxes to create an expression that does not require decomposing.

Show your thinking.

$$\begin{array}{r} 5\ \ 4\ \ 7 \\ -\ \square\ \square\ \square \\ \hline \end{array}$$

3 Fill in the boxes to create an expression that requires decomposing 1 unit.

Show your thinking.

$$\begin{array}{r} 5\ \ 4\ \ 7 \\ -\ \square\ \square\ \square \\ \hline \end{array}$$

Name _____ Date _____

Expressions That Decompose (continued)

3 **Explain**

How did you create an expression that decomposes 1 unit?

5 Fill in the boxes to create an expression that requires decomposing 2 units.

Show your thinking.

$$\begin{array}{r} 5\ \ 4\ \ 7 \\ -\ \square\ \square\ \square \\ \hline \end{array}$$

6 Let's look at some expressions.

Activity 2

Name _____ Date _____

Making Equations True

Fill in the boxes to make the equation true.

Show your thinking.

7

$$\begin{array}{rccc} & 9 & 6 & 8 \\ - & 3 & 7 & \square \\ \hline & \square & \square & 4 \end{array}$$

8

$$\begin{array}{rccc} & 7 & 2 & \square \\ - & 5 & 3 & 7 \\ \hline & \square & 8 & 9 \end{array}$$

9

$$\begin{array}{rccc} & 5 & 7 & 1 \\ - & 1 & 7 & \square \\ \hline & \square & \square & 3 \end{array}$$

Name _____ Date _____

Making Equations True (continued)

Show your thinking.

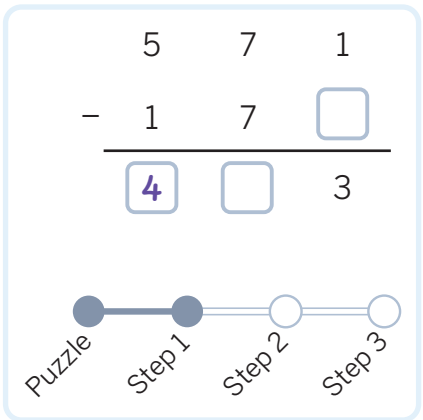
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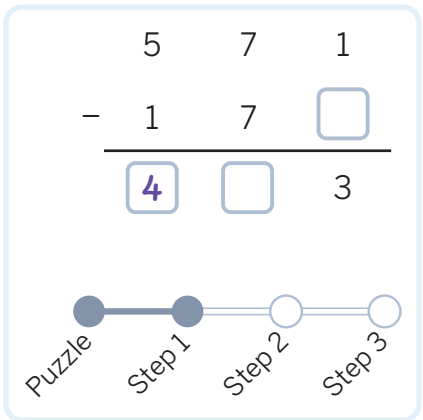
$$\begin{array}{r} 8\ 9\ \square \\ -\ \square\ 6\ 8 \\ \hline 5\ \square\ 3 \end{array}$$

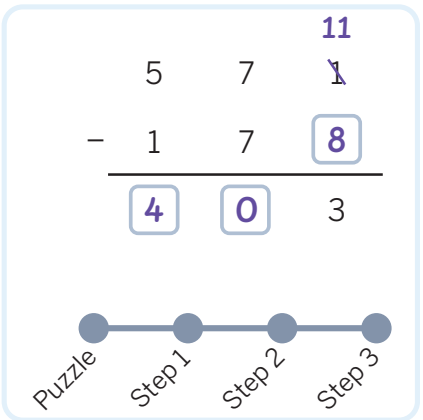
11

$$\begin{array}{r} 8\ 4\ \square \\ -\ 5\ \square\ \square \\ \hline 2\ 5\ 7 \end{array}$$

12 Let's look at each step of Diego's work.







Summary 3.12

When subtracting by place, sometimes you need to decompose more than 1 unit. If you start subtracting in the ones place, you can look at 1 unit at a time and decompose as you go.

$$\begin{array}{r} {\scriptstyle 16} \\ 4\,\cancel{6}^{\,11}\,\cancel{1} \\ -\ 1\,7\,8 \\ \hline 3\,9\,3 \end{array}$$

Practice 3.12

1 Jada was subtracting 222 – 127. Her work is shown. Is her work correct? Explain your thinking.

$$\begin{array}{r} {\scriptstyle 11} \\ 2\,\cancel{2}^{\,1}\,\cancel{2}^{\,12} \\ -\ 1\,2\,7 \\ \hline 1\,9\,5 \end{array}$$

Name _____ Date _____

For Problems 2 and 3, calculate the difference using an algorithm of your choice. Use addition to check your work.

Show your thinking.

2 673 – 245

answer: _____

3 454 – 367

answer: _____

4 What is the value of 592 – 247?

(A) 245 (B) 355 (C) 839 (D) 345

Name _____ Date _____

5 What is the value of 412 – 356?

(A) 50 + 6

(B) 100 + 50 + 6

(C) 60 + 6

(D) 60 + 5

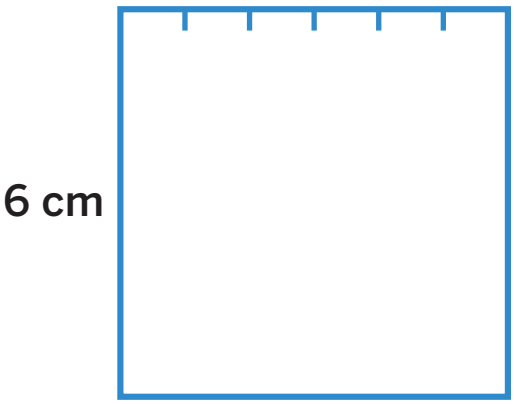
Spiral Review

For Problems 6 and 7, determine the value of the expression.

6 2 × 7 _____

7 5 × 6 _____

8 Write an expression that represents the area of the rectangle. Then determine the area of the rectangle. The space between 2 tick marks represents 1 centimeter.



expression: _____

area: _____

Unit 3
Lesson
13

Name _____ Date _____

Addition and Subtraction Patterns | 3.NBT.2, SMP.3, SMP.6, SMP.7, SMP.8

Subtracting From Zero?

Let's think about subtraction algorithms in more detail.



Warm-Up

eyes on teacher

I am a doer of math.
How has your thinking about math changed so far this year?

Activity 1 Zero in the Tens Place

Use an algorithm to calculate each difference.

Show your thinking.

1. 616 – 293

answer: _____

Name _____ Date _____

Zero in the Tens Place (continued)

Use an algorithm to calculate each difference.

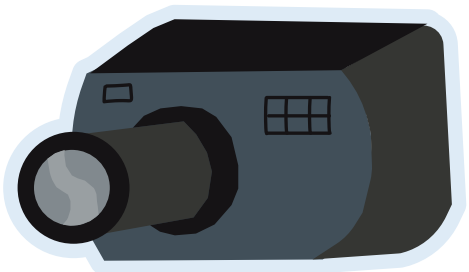
Show your thinking.

2 804 – 521

answer: _____

3 508 – 146

answer: _____



Activity 2

Name _____ Date _____

An Algorithm Problem

Clare wanted to calculate the difference 301 – 167. Here is how she set up the numbers to use the standard algorithm.

$$\begin{array}{r} 3\ 0\ 1 \\ -1\ 6\ 7 \\ \hline \end{array}$$

Priya said, "You cannot subtract these numbers using an algorithm because you would need more ones to subtract 7 ones, but there is a 0 in the tens place and that cannot be decomposed."

4 Discuss

Do you agree with Priya's statement?



Name _____ Date _____

An Algorithm Problem (continued)

5 Use an algorithm to calculate the difference.

Show your thinking.

301 – 167

answer: _____

Summary 3.13

Sometimes you need to decompose hundreds first in order to have enough tens to make 10 ones.

$$\begin{array}{r} {\scriptstyle 200}\quad {\scriptstyle 90}\quad {\scriptstyle 11} \\ 3\,0\,0 + \quad 0 + 1 \\ -\ 1\,0\,0 + 6\,0 + 7 \\ \hline 1\,0\,0 + 3\,0 + 4 \end{array} \qquad \begin{array}{r} {\scriptstyle 9} \\ {\scriptstyle 2\,10\,11} \\ 3\,0\,1 \\ -\ 1\,6\,7 \\ \hline 1\,3\,4 \end{array}$$

Practice 3.13

1 Diego determined the value of 403 – 197. His work is shown. Is his work correct? Explain your thinking.

$$\begin{array}{r} {\scriptstyle 300}\quad {\scriptstyle 120}\quad {\scriptstyle 10} \\ 4\,0\,0 + \quad 3 + 0 \\ -\ 1\,0\,0 + 9\,0 + 7 \\ \hline 2\,0\,0 + 3\,0 + 3 \end{array}$$

Name _____ Date _____

For Problems 2 and 3, evaluate the expression using an algorithm.

Show your thinking.

2 608 – 347

answer: _____

3 530 – 356

answer: _____

4 What is the value of 305 – 186?

(A) 219 (B) 109 (C) 119 (D) 129

Name _____ Date _____

5 What is the value of 450 – 224?

(A) 674 (B) 236 (C) 262 (D) 226

Spiral Review

For Problems 6 and 7, determine the value of the expression.

6 10 × 6 _____

7 5 × 5 _____

8 There are 4 chairs at each table. There are 3 tables. How many chairs are there? Write an equation that represents the situation.

Show or explain your thinking.

chairs: _____ **equation:** _____

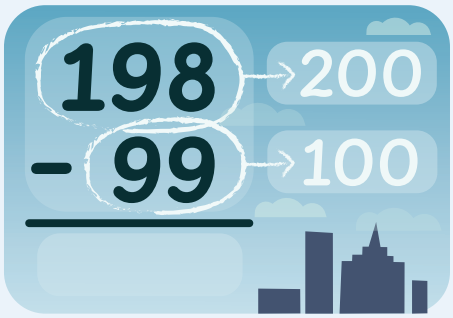
Unit 3
Lesson
14

Name _____ Date _____

Addition and Subtraction Patterns | 3.NBT.2, 3.OA.8, SMP.1, SMP.5, SMP.7, SMP.8

Subtracting Strategically

Let's use strategies or algorithms to subtract.



I can be all of me in math class. Max was curious about photographing places and people around the world. What sparks your curiosity in math?

Warm-Up

eyes on teacher

Activity 1

Is Your Answer Reasonable?

1 Circle a reasonable estimate for the difference 582 – 390.

100 500 200 20

2 **Discuss**

Share your estimate for Problem 1 with your partner. Explain your thinking.

Name _____ Date _____

Is Your Answer Reasonable? (continued)

3 Use any strategy to determine the difference 582 – 390.

Show or explain your thinking.

answer: _____

4 What is a reasonable estimate for the difference 612 – 488?

_____

5 Use any strategy to determine the difference 612 – 488.

Show or explain your thinking.

answer: _____

Activity 2

Name _____ Date _____

Greatest Difference, Least Difference

Hands-On

You and your partner will be given a Spinner.

1. Decide with your partner if you are playing for the *greatest* difference or the *least* difference.
2. Take turns spinning the Spinner. Record each spin as a digit in the hundreds, tens, or ones place of one of your numbers.
3. Continue spinning until each player has created 2 three-digit numbers.
4. Determine the difference between your numbers using any strategy or algorithm.
5. Discuss with your partner who has the greatest/least difference based on what you decided in Step 1.
6. Circle the winning difference. That player gets 1 point.
7. Play again until you have completed 4 rounds.
8. The player with more points wins.

My numbers

☐☐☐ ☐☐☐

My difference ☐☐☐

My partner's difference ☐☐☐

Show your thinking.

Activity 2

Name _____ Date _____

Greatest Difference, Least Difference (continued)

My numbers

□□□ □□□

My difference □□□

My partner's difference □□□

Show your thinking.

My numbers

□□□ □□□

My difference □□□

My partner's difference □□□

Show your thinking.

My numbers

□□□ □□□

My difference □□□

My partner's difference □□□

Show your thinking.

Summary 3.14

It is helpful to think about the numbers in a subtraction expression before choosing a strategy or algorithm. Making an estimate before determining a difference is a good way to check the reasonableness of your answer.

$$808 - 498 = 310$$

498 is close to 500, and 808 is close to 800. 300 is a reasonable estimate for the difference, and 310 is close to 300.

Practice 3.14

1 What is a reasonable estimate for the difference 392 – 211?

_____

2 Determine the difference 392 – 211.

Show your thinking.

answer: _____

Name _____ Date _____

For Problems 3–5, evaluate the expression using an algorithm or strategy of your choice.

Show or explain your thinking.

3 511 – 191

answer: _____

4 706 – 493

answer: _____

5 890 – 342

answer: _____

Name _____ Date _____

6 What is a reasonable estimate for the value of 809 – 596?

(A) 200 (B) 300 (C) 150 (D) 400

7 What is the value of 796 – 406?

(A) 396 (B) 390 (C) 490 (D) 406

Spiral Review

For Problems 8–11, determine the value of the expression.

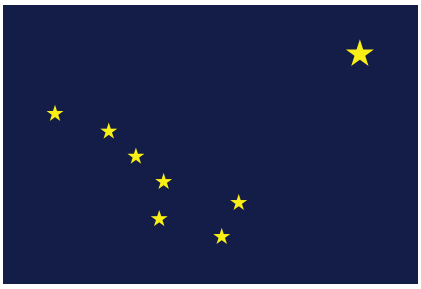
8 2 × 2 _____

9 10 × 3 _____

10 5 × 9 _____

11 2 × 7 _____

12 The state flag of Alaska is shown. Han drew 2 exact copies of the flag. How many stars did he draw in all? Write an equation that represents the situation.



stars: _____ **equation:** _____

Notes:

Sub-Unit 3

Rounding Within 1,000

Unit Story: The View From up Here



Kit Leong/Shutterstock.com

Max climbed a lot of steps on his adventures.

How could Max use rounding to share the number of steps he climbed with others?

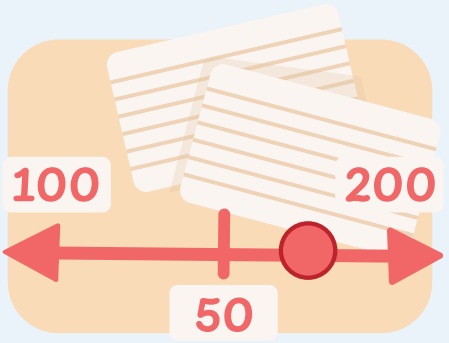
Unit 3
Lesson
15

Name _____ Date _____

Number Flexibility to 100 3.NBT.1, SMP.6, SMP.7

Nearest on a Number Line

Let's explore hundreds and how other numbers relate to them.



I am a doer of math.
When might you want to know about how many of something there are but not exactly how many?

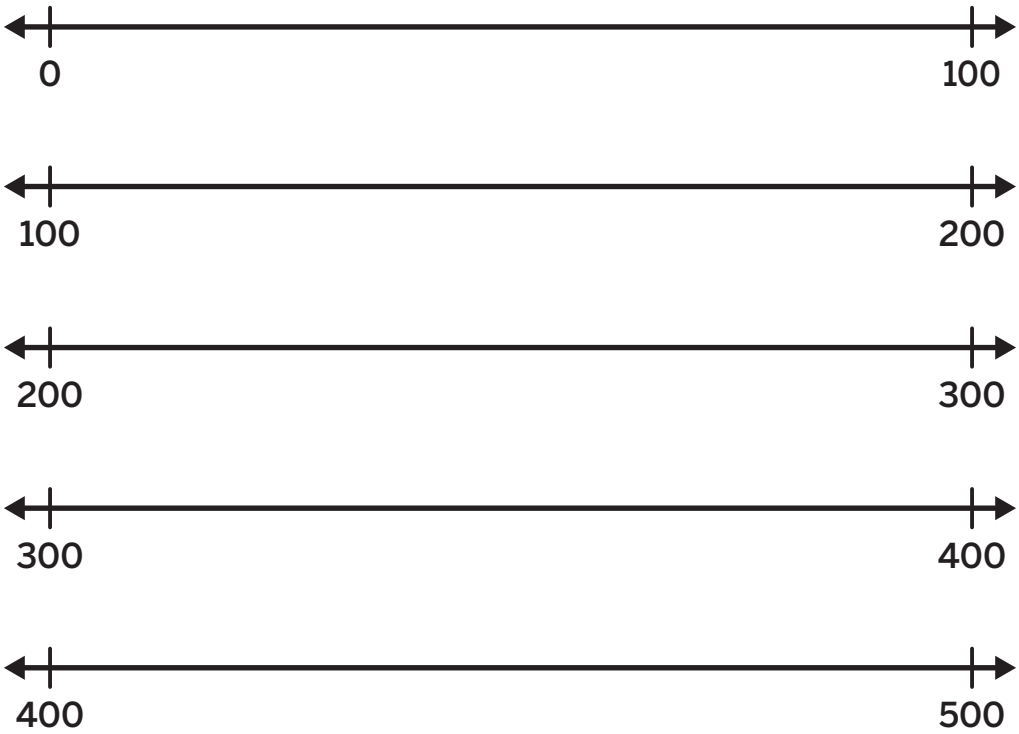
Warm-Up

eyes on teacher

Activity 1 Numbers on a Number Line

You and your partner will be assigned a set of numbers.

1 Locate and label each number in your set on one of the number lines.



Name _____ Date _____

Numbers on a Number Line (continued)

2 Discuss

Join a pair with a different set of numbers. Explain how you located and labeled your numbers on the number lines.

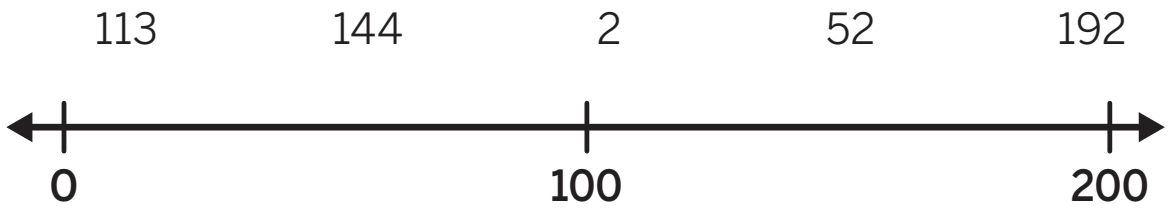


Activity 2

Name _____ Date _____

Nearest Hundred

3 Determine whether each of the following numbers is *closer to 0*, *closer to 100*, or *closer to 200*. Record the numbers in the table. Use the number line if it is helpful.



Closer to 0	Closer to 100	Closer to 200

4 Determine the nearest hundred to each number.

Number	113	144	2	52	192
Nearest hundred					

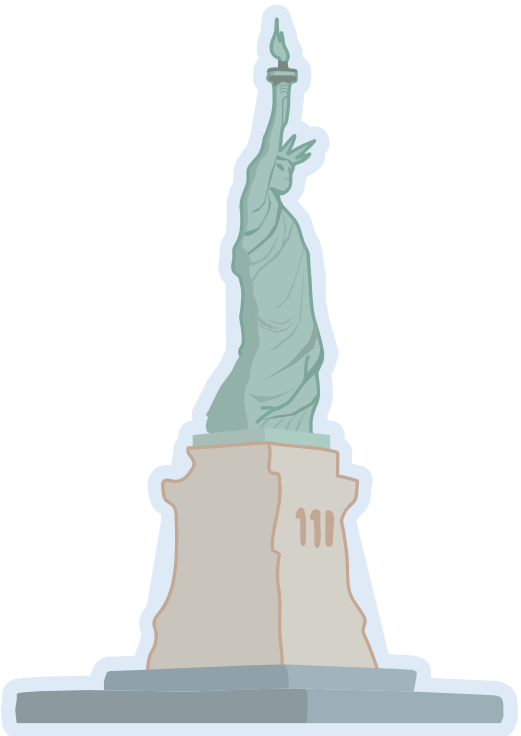


Name _____ Date _____

Nearest Hundred (continued)

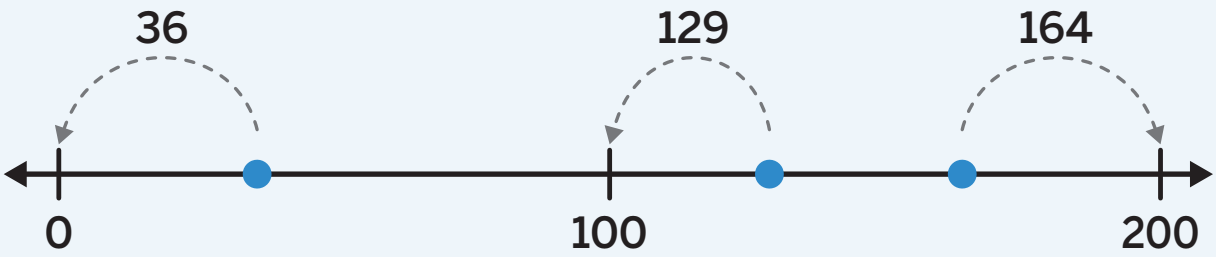
5 Discuss

Explain to your partner how you determined the nearest hundred to each number in Problem 4.



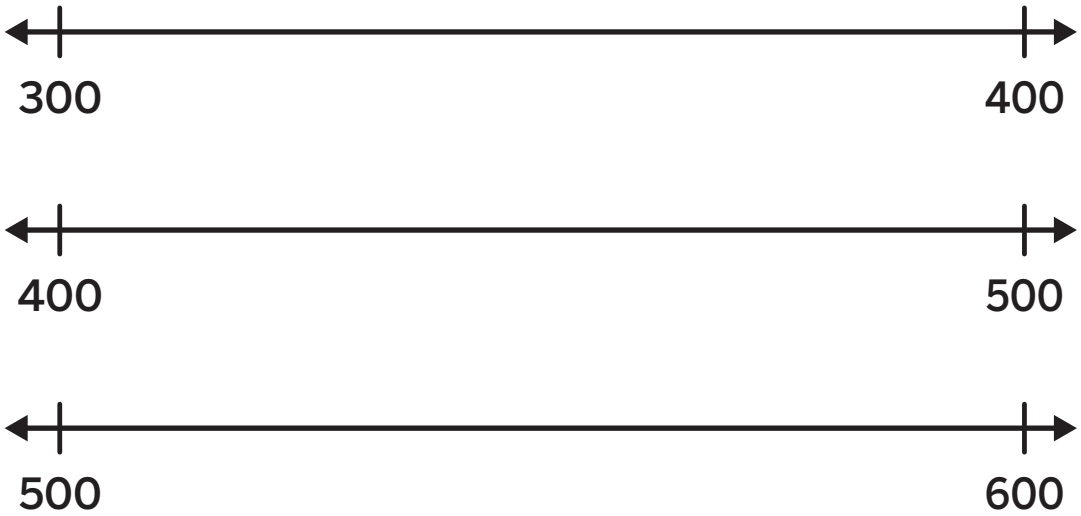
Summary 3.15

Every number has a nearest hundred. A number line is a useful tool to help determine the nearest hundred.



Practice 3.15

1 Identify which number line would be used to locate 539. Then plot and label 539 on that number line.



2 What is the nearest hundred to 539? _____

Name _____ Date _____

3 Determine the nearest hundred to each number.

Number	438	9	327	285	164
Nearest hundred					

4 Choose one of the numbers from Problem 3. How did you determine its nearest hundred? You can show your thinking on the number line if it helps.

Show or explain your thinking.



5 What is the nearest hundred to 123?

_____

6 Determine the numbers that have 600 as their nearest hundred. Select Yes or No for each number.

	Yes	No
542		
621		
586		

Name _____ Date _____

For Problems 7 and 8, determine the value of the expression.

7 200 + 300 _____

8 600 + 250 _____

Spiral Review

For Problems 9–11, determine the missing value.

Show or explain your thinking.

9 3 × ? = 18

answer: _____

10 ? × 4 = 16

answer: _____

11 ? × 5 = 25

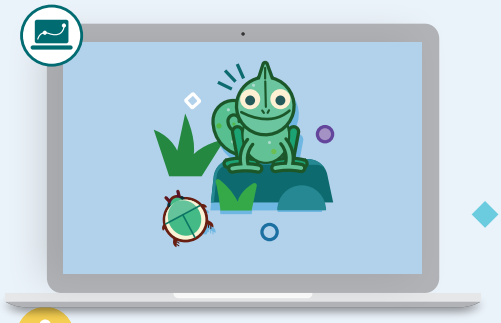
answer: _____

Name _____ Date _____

Number Flexibility to 100 3.NBT.1, SMP.7, SMP.8

Close Catch

Let's explore tens and how other numbers relate to them.



I am a doer of math.
When have you used different strategies to solve the same problem? What strategies did you use?

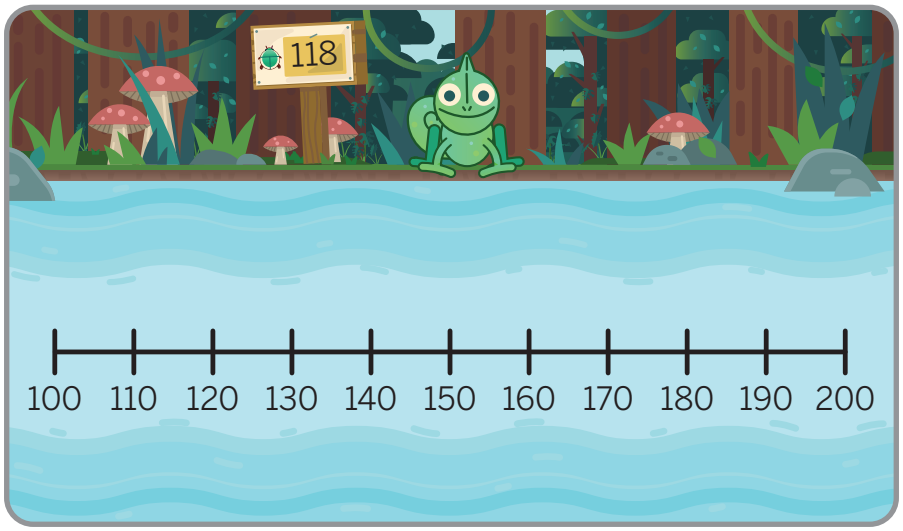
Warm-Up

1 eyes on teacher

Activity 1

Leaping Lizard

2 There is a bug at 118. Locate and label the bug on the number line.



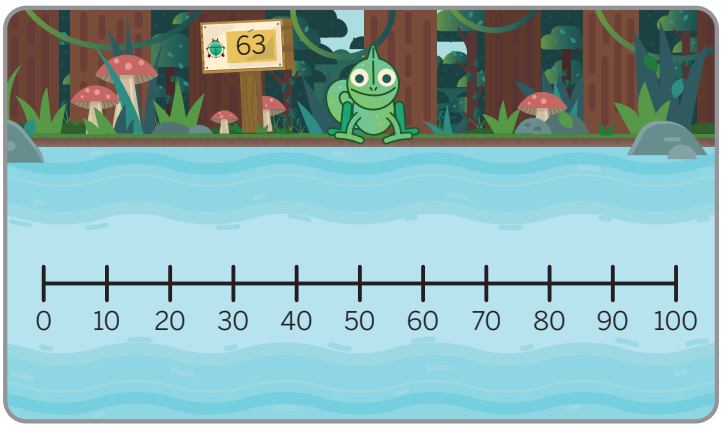
Explain

How did you determine which 2 tens the bug was between?

Name _____ Date _____

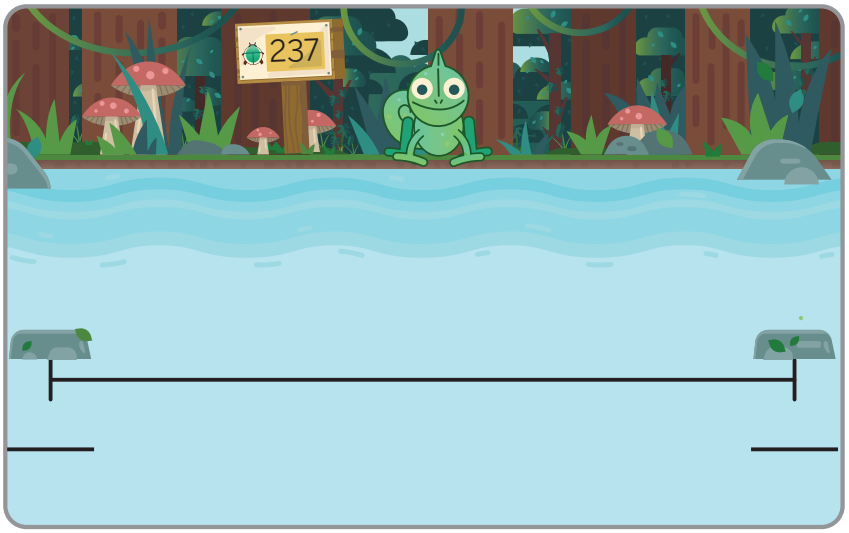
Leaping Lizard (continued)

3 There is a bug at 63. Locate and label the bug on the number line.



4 Justify

There is a bug at 237. Which 2 tens is the bug between? How do you know?

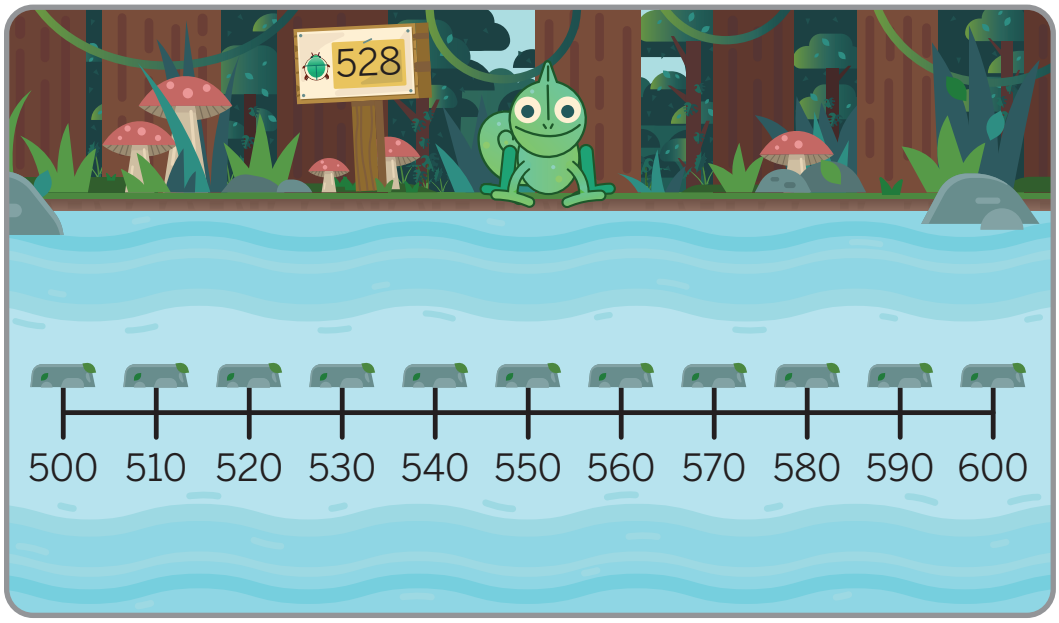


Activity 2

Name _____ Date _____

Bug Buffet

5 There is a bug at 528. Circle the rock nearest to the bug.



6 There is a bug at 374. Circle the rock nearest to the bug.



Name _____ Date _____

Bug Buffet (continued)

7 The table shows locations of bugs. Determine the nearest ten to each bug.

Location of bug	Nearest ten
	
	
	
	
	
	
	
	
	

8 Explain

Let's talk about ways to determine the nearest ten.

Summary 3.16

Every number is between 2 tens. Place value can be used to determine the nearest ten to a given number.



Practice 3.16

For Problems 1 and 2, determine the nearest ten and the nearest hundred to the number.

1 661

nearest ten: _____

nearest hundred: _____

2 26

nearest ten: _____

nearest hundred: _____

Name _____ Date _____

For Problems 3 and 4:

- **Complete the table by writing the 2 hundreds and the 2 tens between which the number is located.**
- **Circle the *nearest hundred* and the *nearest ten* to the number.**

3 237

Hundreds		
Tens		

4 78

Hundreds		
Tens		

For Problems 5–8, determine the value of the expression.

5 210 – 100 _____

6 550 – 230 _____

7 620 + 180 _____

8 270 + 230 _____

9 Which number has 110 as the nearest ten?

(A) 108

(B) 116

(C) 104

(D) 100

Name _____ Date _____

10 Which number has 400 as the nearest hundred?

(A) 325

(B) 451

(C) 389

(D) 483

Spiral Review

11 A tray of watercolor paints has 18 colors arranged in an array. Each row has 9 colors. Write an equation that represents the situation. Then determine how many rows of colors the tray has.

Show or explain your thinking.

equation: _____ **answer:** _____

Unit 3
Lesson
17

Name _____ Date _____

Represent Multivariable Data | Addition and Subtraction Patterns | Number Flexibility to 100

3.NBT.1, 3.NBT.2, 3.OA.8, SMP.6, SMP.7

What's the Goal?

Let's round numbers to the nearest ten and hundred to estimate.



Warm-Up

eyes on teacher

I am a doer of math.
How can estimating help you solve problems in real life?

Activity
1

What About the Middle?

Max and a maintenance worker at Gateway Arch National Park were talking about how busy the park seemed one day.

1 The table shows how many people were in each part of the park that day. Complete the table by rounding each number to the nearest hundred and nearest ten.

2 **Discuss**

How would you explain to someone how to round to the nearest ten or nearest hundred?

Activity 2

Name _____ Date _____

Rounding to Estimate

Max and a maintenance worker at Gateway Arch National Park wanted to determine the total number of people at the park.

Show or explain your thinking.

3 Max estimated the total number of people by adding the numbers rounded to the nearest hundred. Determine Max's estimate using the nearest hundreds from the table in Activity 1.

answer: _____

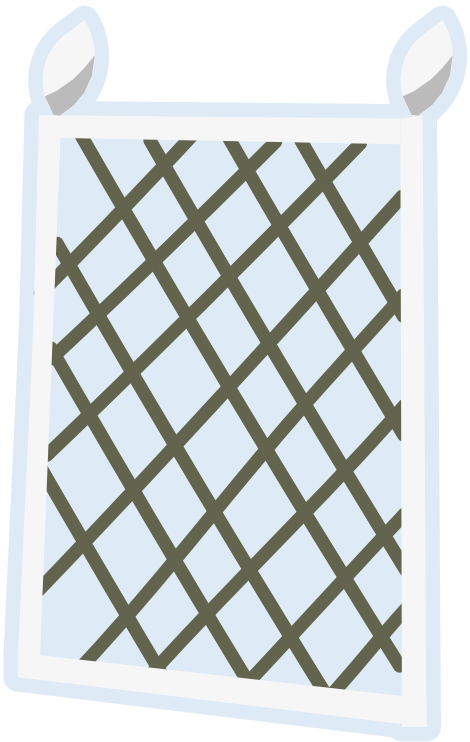
4 The maintenance worker used the nearest tens to estimate the total number of people. Determine the worker's estimate using the nearest tens from the table in Activity 1.

answer: _____

Name _____ Date _____

Rounding to Estimate (continued)

5 The actual number of people at Gateway Arch National Park that day was 668 people. Whose strategy for estimating do you prefer — Max's or the maintenance worker's? Explain your thinking.



Summary 3.17

You can round a number to the nearest ten or the nearest hundred. When a number is exactly in the middle of 2 tens or hundreds, you always round up.

Location	Number of people	Nearest hundred	Nearest ten
common area	95	100	100
mezzanine	150	200	150
tram	36	0	40
café	13	0	10
park grounds	215	200	220
observation deck	109	100	110
tram lobby	50	100	50
Total	668	700	680

rounding A way to estimate the value of a number by determining the nearest ten, hundred, or other place value.

Practice 3.17

1. Round 145 to the nearest ten. _____

2. Round 145 to the nearest hundred. _____

3. Round 350 to the nearest hundred. _____

4. Round 350 to the nearest ten. _____

Name _____ Date _____

5 The table shows how many people rented fishing poles to stream fish in Rocky Mountain National Park one week. Complete the table by rounding each number to the nearest hundred and nearest ten.

Day	Number of people	Nearest hundred	Nearest ten
Sunday	414		
Monday	251		
Tuesday	150		
Wednesday	97		
Thursday	45		
Friday	182		
Saturday	325		

For Problems 6 and 7, determine the value of the expression.

6 345 + 143 _____

7 321 + 228 _____

Name _____ Date _____

8 Which number would round to 230 when rounded to the nearest ten?

(A) 224 (B) 228

(C) 222 (D) 236

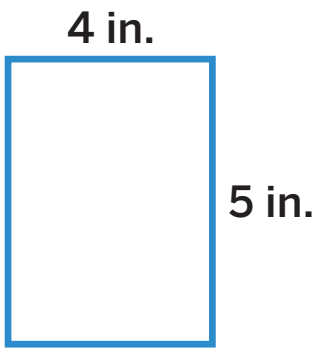
9 Which number would round to 500 when rounded to the nearest hundred?

(A) 550 (B) 445

(C) 549 (D) 449

Spiral Review

10 Write an expression that represents the area of the rectangle. Then determine the area of the rectangle, in square inches.



expression: _____

area: _____

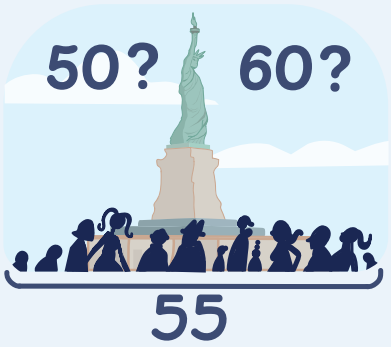
Unit 3
Lesson
18

Name _____ Date _____

Number Flexibility to 100 3.NBT.1, SMP.7, SMP.8

Mystery Numbers

Let's use what we know about rounding to determine unknown numbers.



I am a doer of math.
When is it helpful to be more precise in math class? When is it helpful to be less precise?

Warm-Up

eyes on teacher

Activity 1 All the Numbers

1 Write *all* the numbers between 41 and 69 that round to each ten in the table. You can use the number line if it is helpful.

40	50	60	70



2 **Discuss**

What do you notice about the numbers that round to the same ten?

Name _____ Date _____

All the Numbers (continued)

3 What are the least and greatest numbers that would round to 600 when rounded to the nearest hundred?

Show or explain your thinking.

least number: _____

greatest number: _____

4 **Discuss**

How do you know when a number rounds up or down to the nearest 10? Nearest 100?

Activity 2

Name _____ Date _____

What's My Mystery Number?

Hands-On

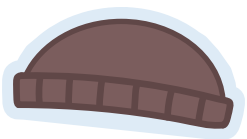
You will be given a sticky note.

5 Write a number between 100 and 1,000 on your sticky note. This is your mystery number.

6 Fold your sticky note in half so no one can see your mystery number.

7 Write 3 clues about your mystery number by completing these sentences.

- My mystery number is (odd or even) _____.
- My mystery number rounds to _____.
- My mystery number is between _____ and _____.



Name _____ Date _____

What's My Mystery Number? (continued)

Play "What's My Number?"

1. Read the clues for your mystery number.

2. Starting with the person on your right, have every person in your group try to guess your mystery number and explain their reasoning.

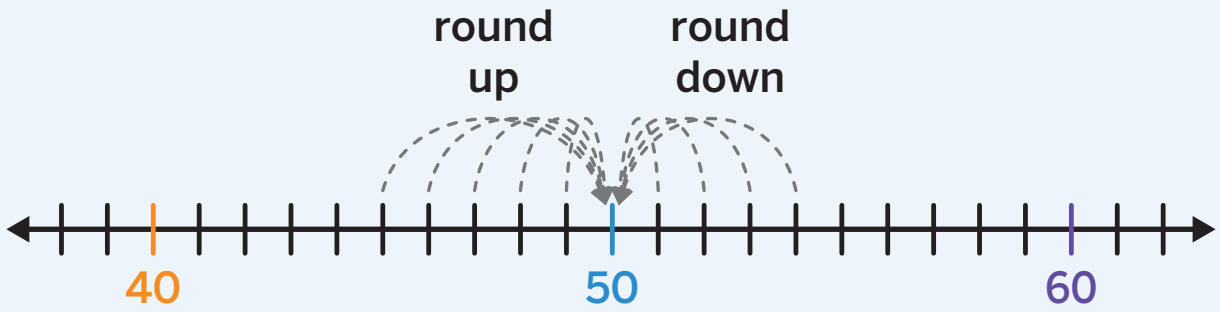
3. If they have not guessed the mystery number by the time the last person shares, reveal the mystery number.

4. Repeat Steps 1–3 with the next person in the group reading the clues for their mystery number.



Summary 3.18

Every ten or hundred has many numbers that could round to it. Some numbers round up to a given number, while other numbers round down to the same number.



Practice 3.18

1 When rounded to the nearest ten, what are *all* the numbers that would round to 70?

2 When rounded to the nearest hundred, what are *all* the numbers that would round to 700?

Name _____ Date _____

3 Here are some clues about a mystery number.

- The number is odd.
- To the nearest hundred, the number rounds to 600.
- To the nearest ten, the number rounds to 560.

Write *all* the numbers that the mystery number could be.

_____

4 Jada thinks of a mystery number and gives these clues.

- The number is even.
- The number rounded to the nearest ten is 440.
- The number is between 430 and 450.

Write *all* the numbers that the mystery number could be.

_____

For Problems 5–8, determine the value of the expression.

5 189 – 142 _____

6 278 – 175 _____

7 241 + 152 _____

8 216 + 230 _____

Name _____ Date _____

9 Select *all* the numbers that are *odd* and would round to 120 when rounded to the nearest ten.

- ☐ **A.** 121
- ☐ **B.** 118
- ☐ **C.** 122
- ☐ **D.** 119
- ☐ **E.** 127

10 Select *all* the numbers that are *even* and would round to 300 when rounded to the nearest hundred.

- ☐ **A.** 265
- ☐ **B.** 350
- ☐ **C.** 348
- ☐ **D.** 358
- ☐ **E.** 294

Spiral Review

11 The flag of the District of Columbia is shown. As Diego created exact copies of the flag, he drew 10 red stripes. Determine how many flags he drew. Then write an equation to represent the situation.



flags: _____ **equation:** _____

Sub-Unit

4

Solving Two-Step Problems

Unit Story: The View From up Here



Lifestyle Travel Photo/Shutterstock.com

Max traveled many places, seeing different sights and meeting different people.

How did Max use what he knew about math to solve problems during his trip?

Name _____ Date _____

Addition and Subtraction Patterns | 3.OA.8, SMP.1, SMP.3, SMP.5, SMP.6, SMP.7

Does It Make Sense?

Let's decide what answers would make sense.



I am a doer of math.
Max estimated the number of photos he needed to take. When might you use estimation to help make a decision?

Warm-Up

eyes on teacher

Activity 1 Does It Make Sense?

Max is visiting Seattle and San Francisco to take photos to present at his next art show.

1 In Seattle, Max needs to take 832 photos. On the first day, he took 212 photos and deleted 98 photos that were blurry. He estimates he needs to take 700 more photos to be ready for his art show. Does Max's estimate make sense? Explain your thinking.

Name _____ Date _____

Does It Make Sense? (continued)

2 In San Francisco, Max took 454 photos at the Golden Gate Bridge and 302 photos at a nearby beach. At the end of the day, he deleted 183 photos. What is a reasonable estimate for the number of photos in San Francisco that Max will have for his art show?

Show or explain your thinking.

answer: _____

3 **Discuss**

Compare your response with your partner. Are your answers reasonable? How can you tell?

Activity 2

Name _____ Date _____

Introducing the Center, How Close? Stage 5

Pairs Let's add numbers within 1,000.

You'll need: Number Cards, 0–9, Recording Sheet

Set Up Shuffle the Number Cards and lay them in a stack facedown.

How to Play

1. Each player draws 6 cards.
2. Arrange the cards to create 2 three-digit numbers to fill in the equation. Find the sum.
3. Use estimation to check the reasonableness of your sum.
4. Your score is the difference between your sum and 1,000.
5. Draw 6 new cards, and play again until the Recording Sheet is full.

How to Win The player who earns fewer points wins.

CENTER
Recording Sheet

Name _____ Date _____

How Close? (continued)

Addition equation	Points
☐☐☐ + ☐☐☐ = ☐☐☐☐	
☐☐☐ + ☐☐☐ = ☐☐☐☐	
☐☐☐ + ☐☐☐ = ☐☐☐☐	
☐☐☐ + ☐☐☐ = ☐☐☐☐	
☐☐☐ + ☐☐☐ = ☐☐☐☐	

Summary 3.19

Estimating is helpful when solving two-step problems involving addition and subtraction.

$$483 + 162 - 65 = ?$$

$$500 + 200 - 100 = ?$$

483 can be rounded to 500. 162 can be rounded to 200. 65 can be rounded to 100. 500 + 200 = 700. 700 – 100 = 600. 600 is a reasonable estimate.

Practice 3.19

1 There are 708 students at a school. 394 students are in the cafeteria and the rest are in class. Han estimates that 400 students are in class. Do you agree with Han's estimate? Explain your thinking.

Name _____ Date _____

2 The table shows the number of students who plan to attend the school's International Festival. Make a reasonable estimate for how many *more* students in Grades 3 and 4 combined plan to attend than students in Grade 5.

Grade	Number of students
3	226
4	189
5	247

Show or explain your thinking.

answer: _____

For Problems 3 and 4, determine the value of the expression.

3 207 + 103 _____

4 149 + 251 _____

Name _____ Date _____

5 There are 781 students at a school. 178 students are at lunch, 142 are at recess, and the rest are in class. Which is the *best* estimate for how many students are in class?

(A) 350 students

(B) 450 students

(C) 300 students

(D) 550 students

6 Jada has 315 blue beads, 224 black beads, and 272 white beads. Which is the *best* estimate for the total number of beads Jada has?

(A) 900 beads

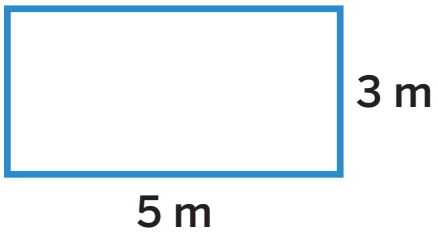
(B) 725 beads

(C) 800 beads

(D) 700 beads

Spiral Review

7 Write an expression that represents the area of the rectangle. Then determine the area of the rectangle in square meters.



expression: _____

area: _____

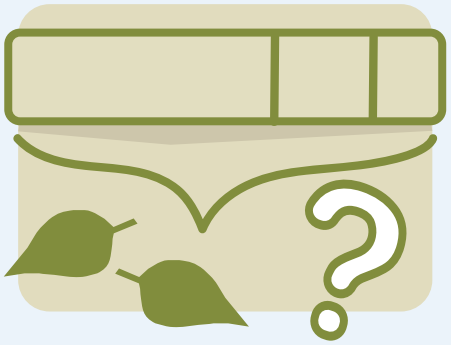
Unit 3
Lesson
20

Name _____ Date _____

Addition and Subtraction Patterns | Number Flexibility to 100 | 3.OA.1, 3.OA.8, SMP.2, SMP.3, SMP.5

Rep-re-sent!

Let's use diagrams and equations to solve problems with more than 1 operation.



We are a math community.
How can you be a good collaborator during math class today?

Warm-Up

eyes on teacher

Activity 1

Card Sort: Situations, Diagrams, and Equations

Hands-On You and your partner will be given a set of cards with situations, tape diagrams, and equations.

1 **Sort** Match each situation with a diagram and equation that represents it. Be ready to explain your thinking.

Situation	Diagram	Equation

2 **Describe** Discuss with your partner how the diagrams and equations represent the matching situations.

Activity 2

Name _____ Date _____

Now Solve It!

Determine each solution.

Show your thinking.

3 Shawn has 225 crayons. Shawn buys 6 more packs, and each pack has 10 crayons. How many crayons does Shawn have now?

answer: _____

4 Han has 225 beads. Then he makes 6 bracelets for his friends. Each bracelet has 10 beads. How many beads does Han have now?

answer: _____

Summary 3.20

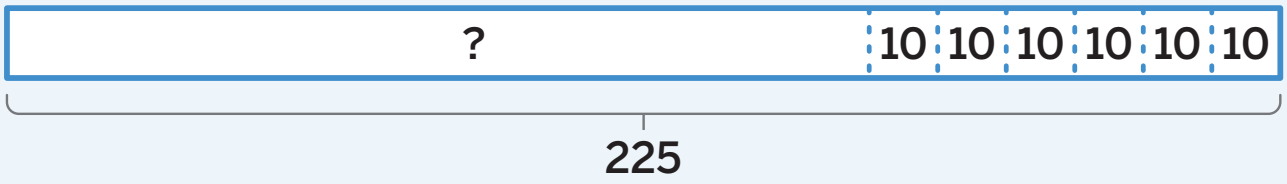
Representing a problem with a diagram or an equation helps show what is known, what is missing, and how they go together to solve a two-step problem.

Han has 225 beads. Then he makes 6 bracelets for his friends. Each bracelet has 10 beads. How many beads does Han have now?

$225 - (6 \times 10) = ?$

$6 \times 10 = 60$

$225 - 60 = ?$



Practice 3.20

1 Diego has a collection of 345 football cards. His mother buys him 120 more. Then he gives away 32 of his football cards. How many cards does Diego have now?

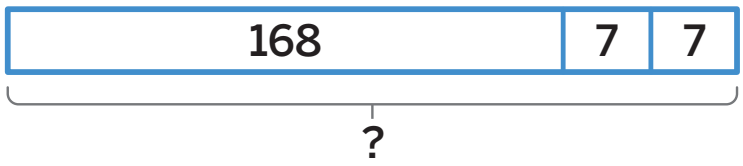
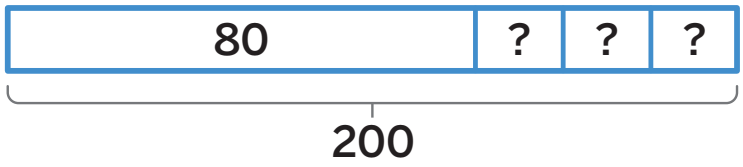
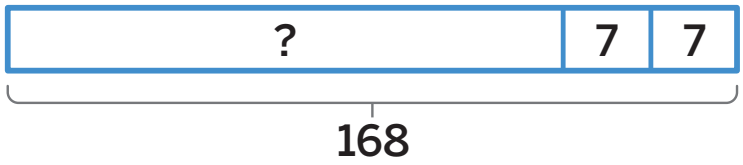
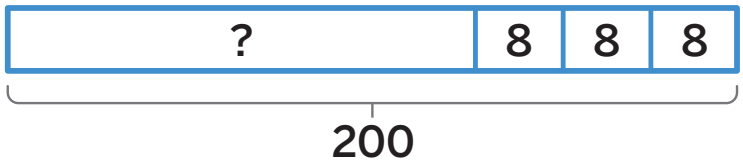
Which equation represents the situation? Explain your thinking.

(A) $345 + 120 + 32 = ?$

(B) $345 + 120 - 32 = ?$

Name _____ Date _____

2 Match each diagram with the equation it represents.

Diagram	Equation
A 	_____ ? + (2 × 7) = 168
B 	_____ ? + (3 × 8) = 200
C 	_____ 168 + (2 × 7) = ?
D 	_____ 80 + (3 × ?) = 200

For Problems 3–6, determine the value of the expression.

3 412 + 119 _____

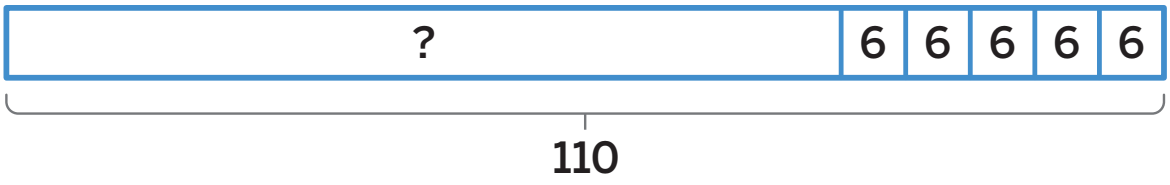
4 249 + 151 _____

5 250 – 101 _____

6 305 – 190 _____

Name _____ Date _____

7 Select *all* the equations that represent the tape diagram.



- ☐ **A.** 110 + (5 × 6) = ?
- ☐ **B.** ? + (5 × 6) = 110
- ☐ **C.** 110 + ? = (5 × 6)
- ☐ **D.** 110 − (5 × 6) = ?
- ☐ **E.** 110 = (6 + 6 + 6 + 6 + 6) + ?

Spiral Review

For Problems 8 and 9, determine the missing value in the equation.

Show or explain your thinking.

8 3 × ? = 27

answer: _____

9 ? × 8 = 32

answer: _____

Unit 3
Lesson
21

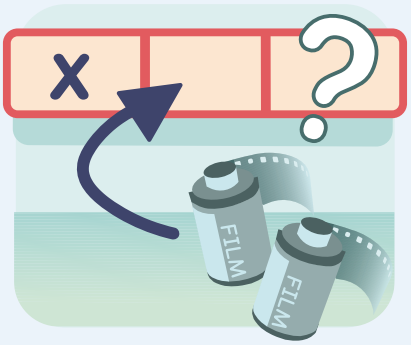
Name _____ Date _____

Addition and Subtraction Patterns | Number Flexibility to 100

3.OA.1, 3.OA.8, SMP.1, SMP.2, SMP.4, SMP.5

Representing Information

Let's represent two-step problems using diagrams and equations.



I am a doer of math.
When have you solved two-step math problems outside of school?

Warm-Up

eyes on teacher

Activity
1

Introducing Info Gap Cards

This is a problem card. Some of the information you need to complete the problem is missing. Your teacher has a data card with the missing information.

Problem Card

Max is planning how to display his photos.

There are some laid out in rows and some still in piles on the table.

How many photos are there?

1 Discuss

What specific information do you need to solve the problem?

Name _____ Date _____

Introducing Info Gap Cards (continued)

2 With your partner, create a list of questions you could ask your teacher to determine the missing information.

_____

_____

_____

3 When you think you have enough information, determine the number of photos.

Show your thinking.

answer: _____

Activity 2

Name _____ Date _____

InstaMax Film

Max takes photographs using instant film. He has sheets of film and packs of film.

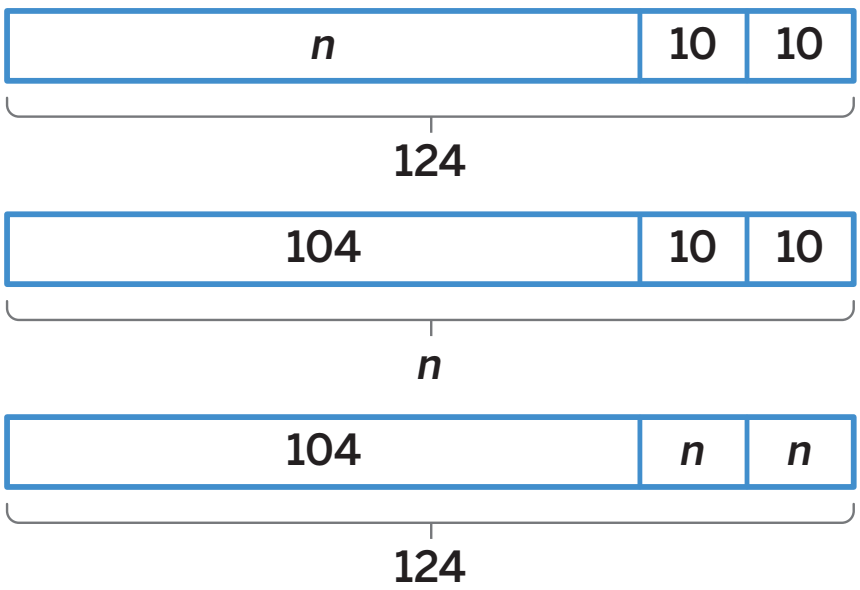
4 Choose one of the situations to read.

Situation A: Max had 104 sheets of film. He bought 2 more packs of film, and each pack has 10 sheets in it. How many sheets does he have now?

Situation B: Max had some sheets of film. He bought 2 more packs, and each pack has 10 sheets in it. Now he has 124 sheets. How many sheets did Max have before?

Situation C: Max had 104 sheets of film. He bought 2 packs of film, and now he has 124 sheets. How many sheets were in each pack?

5 Write the letter of the situation represented by each tape diagram.



Situation _____

Situation _____

Situation _____

Name _____ Date _____

InstaMax Film (continued)

6 Write an equation or equations to represent how you would complete each situation in Problem 4.

Show your thinking.

Situation A:

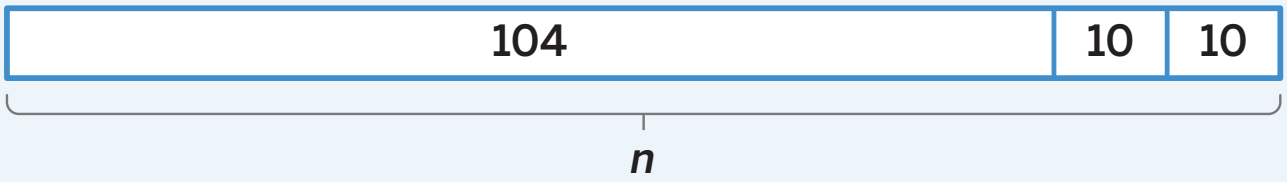
Situation B:

Situation C:

Summary 3.21

Thinking about the information that is known and the information that is missing helps you understand the steps for solving a problem and what to do first.

Mai had 104 beads. She bought 2 more packages of beads, and each package has 10 beads. Mai's brother has 200 beads. How many beads does Mai have now?



$104 + (2 \times 10) = n$

Practice 3.21

There are 240 connecting cubes in a box. 5 students each take 9 connecting cubes from the box. How many connecting cubes are left in the box? Use the situation for Problems 1 and 2.

1. Write an equation to represent the situation. Use a letter for the unknown value.

_____

2. Determine the number of connecting cubes left in the box.

Show or explain your thinking.

answer: _____

Name _____ Date _____

Clare had 285 stickers. She bought 8 more packages of stickers, and each package has 10 stickers. How many stickers does Clare have now? Use the situation for Problems 3–5.

3 Write an equation to represent the situation. Use a letter for the unknown value.

_____

4 What is a reasonable estimate for the number of stickers Clare has now?

Show or explain your thinking.

answer: _____

5 Determine the number of stickers Clare has now.

Show or explain your thinking.

answer: _____

For Problems 6 and 7, determine the value of the expression.

6 419 – 119 _____

7 190 – 142 _____

Name _____ Date _____

8 A teacher has 148 markers. She buys 5 more packages, and each package has 8 markers.

If m represents the number of markers she has now, which equation represents the situation?

(A) $148 + (5 \times 8) = m$

(B) $m + (5 \times 8) = 148$

(C) $148 - (5 \times 8) = m$

(D) $m - (5 \times 8) = 148$

9 Diego bought 116 plants. He buys 2 more packs of plants. Each pack has 4 plants. How many plants does Diego have now?

(A) 122 plants

(B) 124 plants

(C) 150 plants

(D) 120 plants

Spiral Review

10 Clare has 30 photos arranged in an array. Each row has 10 photos. In how many rows did she arrange the photos? Write an equation to represent the situation.

Show your thinking.

equation: _____ **rows:** _____

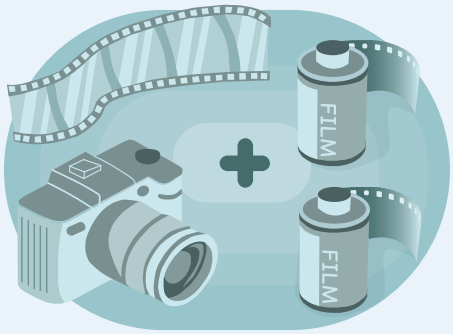
Unit 3
Lesson
22

Name _____ Date _____

Addition and Subtraction Patterns | Number Flexibility to 100 | 3.OA.8, SMP.2, SMP.4, SMP.6

Through the Lens of Numbers

Let's solve problems involving more than 1 step.



I am a doer of math.
How can you be creative in math class?

Warm-Up

eyes on teacher

Activity
1

Lens of Opportunity

1 Max received a grant of $1,000 to purchase new supplies for his next photography trip. He has been hired to take photos of reforestation growth, where trees have been replanted. He purchased a new camera lens for $315 and a new camera bag for $198.

How much grant money does Max have left to purchase supplies? Use a representation to show the situation and then solve the problem.

Show your thinking.

answer: _____

Name _____ Date _____

Lens of Opportunity (continued)

2 Discuss

How did your representation in Problem 1 help you decide which operations to use to solve?

3

Max is taking a road trip to the forest of new trees. It will take him 128 minutes to drive straight to his next destination. He is also planning on stopping 3 times along the way to charge his electric vehicle for 15-minute breaks.

How many minutes will it take Max to travel to his next destination? Use a representation to show the situation and then solve the problem.

Show your thinking.

answer: _____

4 Discuss

How did your representation in Problem 3 help you decide which operations to use to solve?

Activity 2

Name _____ Date _____

The "Makes Sense to Me" Gallery Tour

Your group will be assigned a situation card. Work together to solve the problem.

5 Create a poster showing your group's solution. Organize your work so that it can be followed by others.

6 As you visit other groups' posters, use rounding to consider how each answer makes sense.

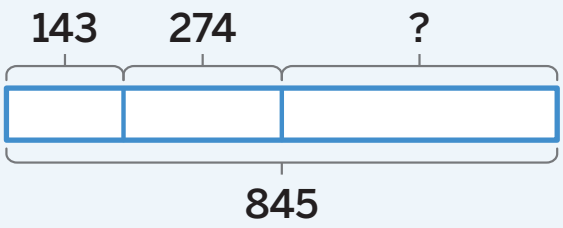
7 Choose 2 posters and make a comment about the solution. On your sticky note, write how you rounded to know the answer makes sense.



Summary 3.22

You can use representations and rounding to help you make sense of two-step problems and check for reasonableness.

845 people attended an art show over 3 days. If 143 people attended on Day 1 and 274 people attended on Day 2, how many people attended on Day 3?



845 – (143 + 274)
800 – (100 + 300)
800 – 400
400

About 400 people attended on Day 3.

Practice 3.22

1 A class would like 10 story books, each costing $8, and a set of history books costing $250. How much money would all the books cost?

Show or explain your thinking.

answer: _____

Name _____ Date _____

2 An art teacher has 280 pieces of modeling clay. In his last class, each of his 10 students used 7 pieces of clay. How many pieces of modeling clay are remaining?

Show or explain your thinking.

answer: _____

For Problems 3 and 4, determine the nearest ten and the nearest hundred for the number.

3 199

nearest ten: _____

nearest hundred: _____

4 54

nearest ten: _____

nearest hundred: _____

For Problems 5 and 6, determine the value of the expression.

5 327 + 183 _____

6 245 + 172 _____

Name _____ Date _____

7 A fitness center membership fee is $150, and then each month is $20. Which problem requires 2 steps to solve?

- (A) What is the difference in cost between the membership fee and 1 month of membership?
- (B) What is the total cost for 1 month of membership?
- (C) What is the membership fee for 2 people?
- (D) What would the total cost be after 6 months of membership?

8 Jada wants to buy a paint set that costs $135. She also wants to buy 4 canvases that each cost $10. What is the total cost of the paint set and the canvases?

(A) $145 (B) $175 (C) $95 (D) $185

Spiral Review

9 Typically, marmots hibernate for 6 months. After 4 years, for how many months did a typical marmot hibernate? Write an equation to represent the situation.

Show or explain your thinking.

months: _____ **equation:** _____

For Problems 10 and 11, determine the value of the expression.

10 2×7 _____

11 5×8 _____

Notes:

Math at Work

Have you seen a video or photo that was taken in super slow motion? Video cameras can capture a different number of pictures in 1 second to show objects moving normally or in slow motion.

Videographers record events using cameras. They use math to determine the number of pictures in 1 second the camera will take.



Prostock-studio/Shutterstock.com, Tanvir Mahmud Hredoy/Shutterstock.com

Math in the World

In 1 second, how many more pictures can a *super* slow-motion camera take than a slow-motion camera?

Pictures in 1 Second	
normal	24
movies	60
slow motion	240
super slow motion	960

Math Mindset

Describe a strategy to subtract 706 – 488. How do you know if your answer is reasonable?

Unit 4

Relating Multiplication to Division

Big Ideas in This Unit

CC2 Number Flexibility to 100 | Addition and Subtraction Patterns

CC3 Square Tiles

Questions for Investigation

- How do we use equal groups to divide?
- How is division related to multiplication?
- How can we use strategies to multiply and divide greater numbers?

Explore: Packing Up Peppers

How can Mateo's peppers be packed equally into boxes?

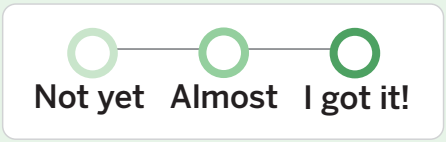
Unit Story: Home Cooking

In this story, Mateo and Amy prepare a surprise birthday meal for their most loyal customer, Mr. Gharbi.

murattellioglu/Shutterstock.com

Watch Your Knowledge Grow

This is the math you'll explore in this unit. Rate your understanding to see how your knowledge grows!



I can . . .	Before	After
Show different ways objects can be separated into equal groups.		
Relate drawings and expressions to division situations.		
Represent and solve division story problems.		
Use the relationship between multiplication and division to solve problems.		
Use multiplication and division to solve problems involving equal groups.		
Identify patterns in multiplication tables.		
Multiply by decomposing numbers.		
Multiply one-digit numbers by two-digit numbers.		
Solve story problems using multiplication or division		
Write equations to represent the unknown value in a story problem.		

Sub-Unit

1

What Is Division?

Unit Story: Home Cooking



Casezy idea/Shutterstock.com

Mr. Gharbi shares fond memories he has of working with his whole family to prepare meals.

When has working with others in math class been an enjoyable experience for you?

Name _____ Date _____

Number Flexibility to 100 Building Toward 3.OA.2, 3.OA.3, SMP.1, SMP.2, SMP.7

Explore: Packing Up Peppers

How can Mateo's peppers be packed equally into boxes?



Warm-Up

eyes on teacher

I am a doer of math.
Where do you see equal groups around our school community?

Discuss What do you notice? What do you wonder?



Activity

Name _____ Date _____

How can Mateo's peppers be packed equally into boxes?

- Mateo is packing peppers into boxes. He puts an equal number of peppers into each box.
- Mateo has less than 40 peppers, but more than 20 peppers.
- Choose a total number of peppers Mateo could have. Then create a visual display to show all the ways your chosen number of peppers can be packed equally into boxes.

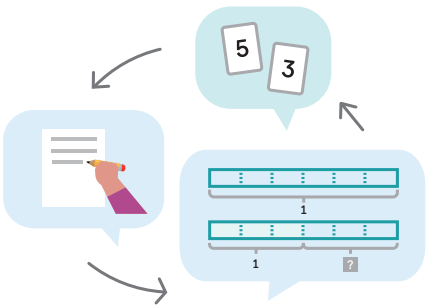
Ways to be a mathematician

1. I can take my time to think about a challenging problem before trying to solve it.



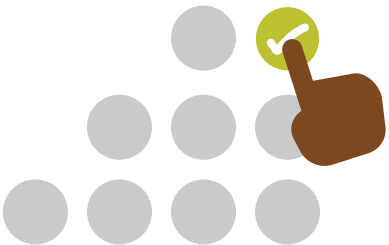
Not yet Almost I got it!

2. I can use numbers, words, and diagrams to make sense of math ideas and situations.



Not yet Almost I got it!

3. I can see how ideas are connected and use patterns to help solve problems.



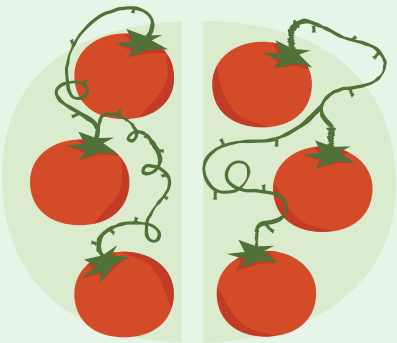
Not yet Almost I got it!

Name _____ Date _____

Number Flexibility to 100 3.OA.2, SMP.2, SMP.6

Representing Division

Let's think about different ways to represent equal groups.



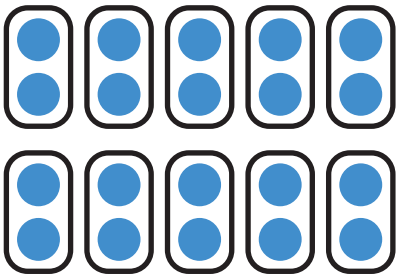
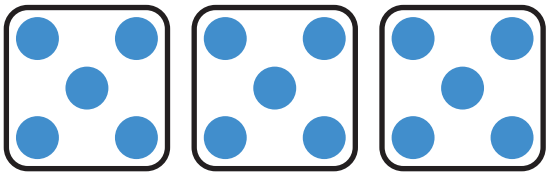
I am a doer of math.
When have you needed to think about making equal groups?

Warm-Up

eyes on teacher

Activity 1 Too Many Tomatoes

Write the letters of the equal-groups problems that represent each drawing. Be prepared to explain your thinking.

Drawing	Equal-groups problem
1 	
2 	
3 	

Name _____ Date _____

Too Many Tomatoes (continued)

Equal-groups problems
A. There are 10 boxes of tomatoes with 2 tomatoes in each box. How many tomatoes are there?
B. There are 3 boxes with 5 tomatoes in each box. How many tomatoes are there?
C. There are 20 tomatoes separated into 10 boxes. How many tomatoes are in each box?
D. There are 8 tomatoes. There are 4 tomatoes in each box. How many boxes are there?
E. There are 15 tomatoes. There are 5 tomatoes in each box. How many boxes are there?
F. There are 4 tomatoes in each box. There are 2 boxes. How many tomatoes are there?

Activity 2

Name _____ Date _____

Visiting the Farmer's Market

Match each expression with the situation or situations it represents. Be prepared to explain your thinking.

$24 \div 6$	$12 \div 6$	$24 \div 4$

Situation	Expression
4 A table has 24 ears of corn arranged in bundles. Each bundle has 4 ears of corn.	
5 There are 24 tomatoes in 6 bags. Each bag has the same number of tomatoes.	
6 Bell peppers come in 4 different colors. There are 24 bell peppers on a table with the same number of peppers of each color.	
7 12 oddly shaped carrots are given to 6 customers for free. Each customer gets the same number of carrots.	
8 12 broccoli heads are displayed in crates. There are 6 broccoli heads in each crate.	

Name _____ Date _____

Visiting the Farmer's Market (continued)

9 Discuss

- What do you notice about the situations in Problems 4 and 6?
- How do the values in the expressions you chose relate to each situation?



Summary 4.02

When a number is **divided**, the first number is the **dividend** and the second number is the **divisor**. The divisor can represent the number of groups or the number of objects in each group.

dividend		divisor
12	÷	2
total number of objects		number of groups or objects in each group

divide Making equal groups from a total amount.

Practice 4.02

For Problems 1 and 2, match the expression with the situation it represents.

54 ÷ 6	54 ÷ 9

1. Priya has 54 game tickets that she wants to share. She gives each friend 9 game tickets.

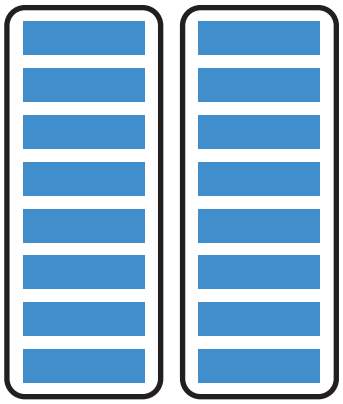
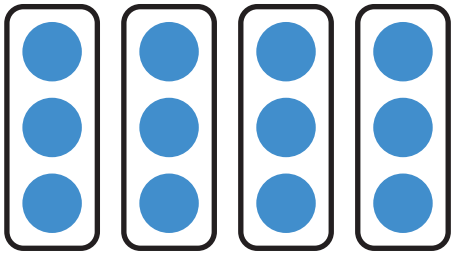
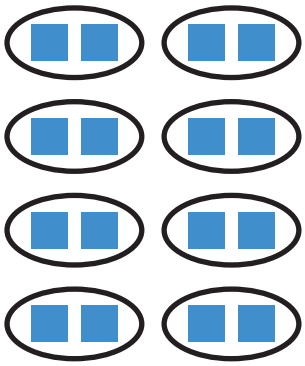
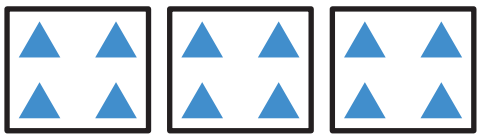
   _____

2. 6 friends share 54 stickers. Everyone receives the same number of stickers.

   _____

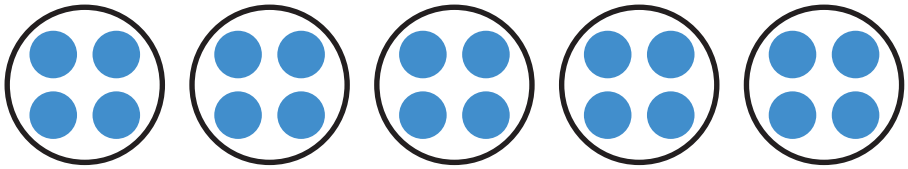
Name _____ Date _____

For Problems 3–6, match the drawing with the division problem it represents.

	Drawing	Division problem
3		_____ There are 16 pears. There are 2 pears in each basket. How many baskets of pears are there?
4		_____ There are 12 pears. There are 4 pears in each basket. How many baskets are there?
5		_____ There are 16 pears. There are the same number of pears in 2 baskets. How many pears are in each basket?
6		_____ There are 12 pears. There are the same number of pears in 4 baskets. How many pears are in each basket?

Name _____ Date _____

7 Which problem could be represented by the drawing?



(A) There are 20 students. There are the same number of students in 4 groups. How many students are in each group?

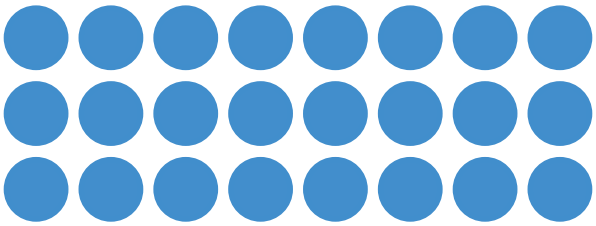
(B) There are 20 students. There are 5 students in each group. How many groups are there?

(C) There are 20 students. There are the same number of students in 6 groups. How many students are in each group?

(D) There are 20 students. There are 4 students in each group. How many groups are there?

Spiral Review

8 Write 2 multiplication equations that represent the array.



_____

_____

For Problems 9–12, determine the value of the expression.

9 2×7 _____

10 6×4 _____

11 5×9 _____

12 10×3 _____

Name _____ Date _____

Number Flexibility to 100 3.OA.2, 3.OA.3, SMP.1, SMP.4, SMP.7, SMP.8

Family Dinner

Let's represent and solve problems involving equal groups.



Warm-Up

eyes on teacher

I am a doer of math.
How do you use math in a market or a store?

Activity 1 Bags of Lemons

Hands-On

You and your partner will be given cubes or counters. Solve each story problem and write a division expression to represent it.

Show your thinking.

1 Mr. Gharbi's mom bought lemons at the market. There are 6 lemons in each bag and 42 lemons in total. How many bags of lemons did she buy?

answer: _____ **expression:** _____

Name _____ Date _____

Bags of Lemons (continued)

Show your thinking.

2 At a different stand, Mr. Gharbi bought 45 lemons. He has 9 bags with the same number of lemons in each bag. How many lemons are in each bag?

answer: _____

expression: _____

Activity 2

Name _____ Date _____

Flowers and Figs

Hands-On

Solve each story problem and write a division equation to represent it.

Show or explain your thinking.

3 Aunt Sarah has 10 flowers. She has 2 vases and wants to put the same number of flowers in each vase. How many flowers will go in each vase?

answer: _____

equation: _____

Name _____ Date _____

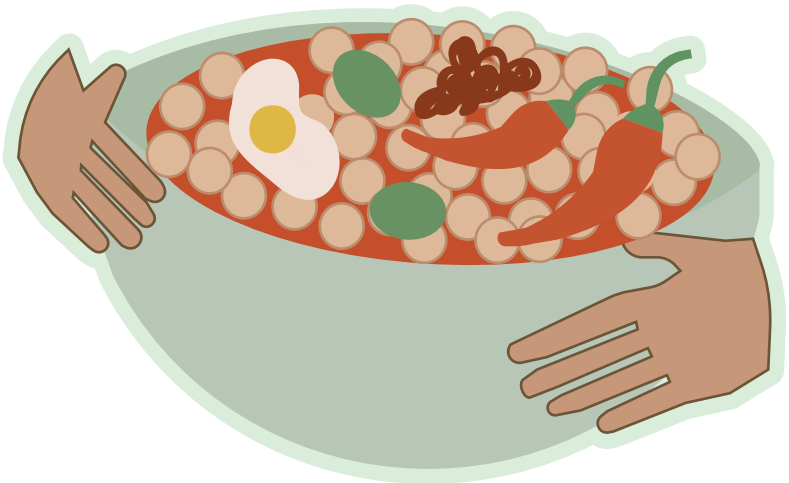
Flowers and Figs (continued)

Show or explain your thinking.

4 There were 24 figs in a bowl. If each person ate 4 figs and all the figs were eaten, how many people ate the figs?

answer: _____

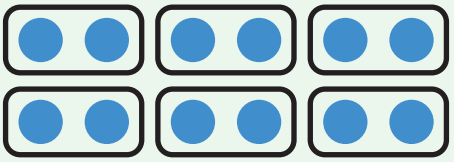
equation: _____



Summary 4.03

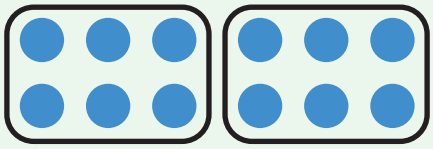
To divide, you make equal groups from a total number of objects to determine the number of equal groups or the number of objects in each group. The result of dividing is called the **quotient**.

How many groups?



$12 \div 2 = 6$

How many in each group?



$12 \div 2 = 6$

quotient The result of dividing 2 numbers.

Practice 4.03

For Problems 1 and 2, solve the story problem and write a division equation to represent it.

1 Jada has 36 beads. She makes 4 bracelets, each with the same number of beads. How many beads are on each bracelet?

Show your thinking.

answer: _____ **equation:** _____

Name _____ Date _____

2 A paleontologist has 30 insect fossils. She places 6 insect fossils in each box. How many boxes of insect fossils does the paleontologist have?

Show your thinking.

answer: _____ **equation:** _____

3 Shawn has 24 pieces of modeling clay. Each student needs 3 pieces of modeling clay. Shawn makes 3 piles and places 1 piece of modeling clay in each pile until the clay is gone. Is Shawn's method correct? Explain your thinking.

Name _____ Date _____

4 Clare has 48 peaches. She makes 8 bags with the same number of peaches in each bag. How many peaches are in each bag?

_____ peaches

5 Han has 28 blocks. He places 7 blocks in each row. How many rows of blocks does Han make?

_____ rows

Spiral Review

For Problems 6–13, determine the value of the expression.

6 5×4 _____

7 10×4 _____

8 4×7 _____

9 3×3 _____

10 2×9 _____

11 3×4 _____

12 6×5 _____

13 4×4 _____

Unit 4
Lesson
4

Name _____ Date _____

Number Flexibility to 100 3.OA.3, 3.OA.2, SMP.1, SMP.2, SMP.7, SMP.8

Representing and Solving

Let's solve problems involving equal groups.



Warm-Up eyes on teacher

I can be all of me in math class.
What collections do you have or would you like to have? How might you display the collection?

Activity 1 Representing Equal-Groups Problems

Represent and solve each story problem using any strategy. Then write a division equation to represent each story problem.

Show or explain your thinking.

1 24 students are in a classroom. The teacher puts the students into groups of 3. How many groups will there be?

answer: _____ **equation:** _____

Activity 1

Name _____ Date _____

Representing Equal-Groups Problems (continued)

Show or explain your thinking.

2 There are 45 library books that need to be sorted equally into bins. There are 5 bins. How many books will be in each bin?

answer: _____

equation: _____

3 A farmer is planting 28 seeds in plant pots. He is putting 4 seeds in each pot. How many pots does the farmer need?

answer: _____

equation: _____

Activity 2

Name _____ Date _____

Determining the Quotient

Determine each quotient.

Show or explain your thinking.

4 24 ÷ 6

answer: _____

5 16 ÷ 2

answer: _____

Activity 2

Name _____ Date _____

Determining the Quotient (continued)

Show or explain your thinking.

6 $27 \div 3$

answer: _____

7 $42 \div 7$

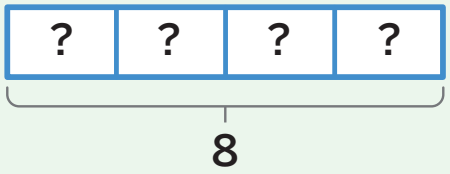
answer: _____

Summary 4.04

There are many representations you can use to solve problems involving equal groups.

Diego has 8 pencils. He puts the pencils equally into 4 cups. How many pencils are in each cup?





$? = 8 \div 4$

Practice 4.04

For Problems 1 and 2, create a drawing to represent the equation.

Draw

1. $27 \div 3 = 9$

2. $40 \div 8 = 5$

Name _____ Date _____

For Problems 3–6, determine the quotient.

Show or explain your thinking.

3 14 ÷ 2 = _____

4 12 ÷ 4 = _____

5 24 ÷ 3 = _____

6 50 ÷ 5 = _____

Name _____ Date _____

7 There were 48 grapes in a bowl. Each person ate 8 grapes. How many people ate the grapes?

_____ people

8 Which division equation represents the story problem?

36 comic books are arranged into 9 equal stacks. How many books are in each stack?

(A) 36 ÷ 4 = 9

(B) 36 ÷ 9 = 4

(C) 36 ÷ 9 = 3

(D) 36 ÷ 6 = 6

Spiral Review

For Problems 9–16, determine the value of the expression.

9 6 × 7 _____

10 5 × 5 _____

11 9 × 2 _____

12 4 × 8 _____

13 10 × 4 _____

14 3 × 6 _____

15 3 × 5 _____

16 3 × 4 _____

Sub-Unit 2

Relating Multiplication and Division

Unit Story: Home Cooking



Rawpixel.com/Shutterstock.com

Mateo and Amy are excited to learn how to make a new dish for Mr. Gharbi's birthday meal.

How do you feel when you are learning something new in math?

Unit 4
Lesson
5

Name _____ Date _____

Number Flexibility to 100 3.OA.6, 3.OA.2, 3.OA.4, SMP.2, SMP.4, SMP.7

It's Chili in Here!

Let's explore how multiplication and division are related.



Warm-Up

1 eyes on teacher

We are a math community.
How does working with others help you as a mathematician?

Activity 1 Chili Ingredients

Hands-On

You will be given a set of cards with story problems and equations.

2 Match the equations with each story problem. Record the letters of the matching cards in the table.

Story problem card	Equation cards
A	
B	
C	

Name _____ Date _____

Chili Ingredients (continued)

2 Explain

How did you choose which cards to match?

3

Shawn and Clare matched different equations to this story problem.

Discuss

Which equation represents this story problem? Why?

Before making his chili, Mateo roasts tomatoes and puts them in jars. 3 tomatoes fit in each jar. How many jars dose Mateo need for 12 tomatoes?

Shawn's equation

$12 \div 3 = ?$

Clare's equation

$? \times 3 = 12$

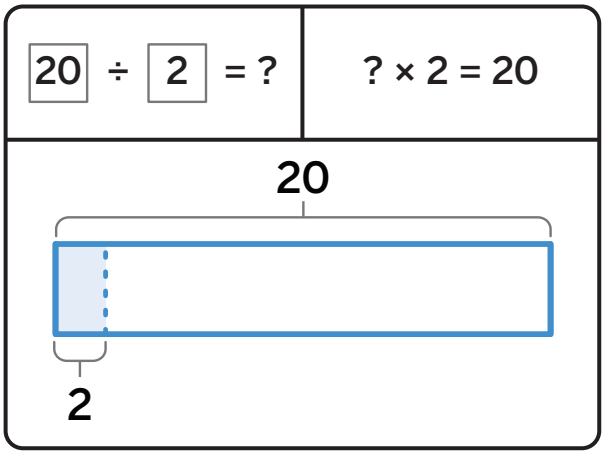
Activity 2

Name _____ Date _____

Ingredients in Groups

4 What do you notice? What do you wonder?

There are 20 peppers in bags. Each bag has 2 peppers. How many bags of peppers are there?



5 The equation 18 ÷ 2 = ? represents the story problem. Circle another equation that represents the story problem.

Mateo stored 18 onions in bags. Each bag has 2 onions. How many bags of onions are there?

? × 2 = 18

? × 18 = 2

Name _____ Date _____

Ingredients in Groups (continued)

6 The equation 32 ÷ 4 = ? represents the story problem. Circle another equation that represents the story problem.

There are 32 tomatoes on 4 plants. Each plant has the same number of tomatoes. How many tomatoes are on each plant?

32 × 4 = ?

4 × ? = 32

7 The equation 6 × ? = 30 represents the story problem. Circle another equation that represents the story problem.

Mateo used 30 bell peppers in 6 pots of chili. He put the same number of bell peppers in each pot. How many bell peppers are in each pot of chili?

30 ÷ 6 = ?

? ÷ 6 = 30

8 **Discuss**

Let's discuss the unknown values in multiplication and division equations.

Summary 4.05

The *quotient* in a division *equation* can also be represented as one of the factors in a related multiplication equation. The quotient can represent the number of groups or the number in each group.

A farmer has 20 apples. He puts them in 4 boxes. Each box has the same number of apples. How many apples are in each box?

factor: number in each group

$4 \times b = 20$

$20 \div 4 = b$

quotient: size of each group

Practice 4.05

1 Write a division equation and a multiplication equation to represent the story problem. Use a letter to represent the unknown value.

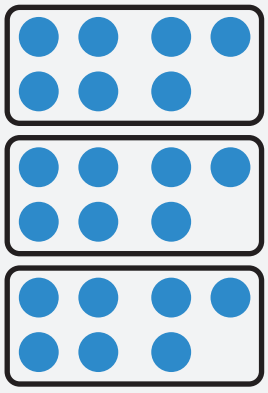
Clare has 50 state flags. She put the same number of flags at each of 5 tables. How many flags did she put at each table?

division equation: _____

multiplication equation: _____

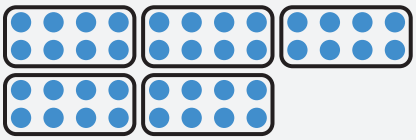
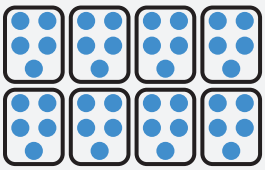
Name _____ Date _____

2 Complete each row of the table. Use a letter to represent the unknown value.

Story problem	Drawing/ diagram	Multiplication equation	Division equation
There are 24 muffins in boxes. Each box has 8 muffins in it. How many boxes of muffins are there?			$24 \div 8 = b$
Clare has 30 pens. They are in 5 packages. There are the same number of pens in each package. How many pens are in each package?		$5 \times p = 30$	
There are 21 flowers in 3 vases. Each vase has the same number of flowers. How many flowers are in each vase?			

Name _____ Date _____

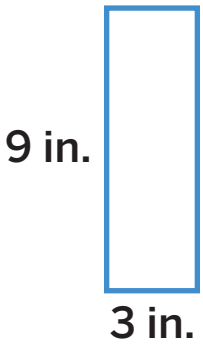
3 There are 40 bagels in bags. Each bag has 8 bagels in it. Select whether each representation matches or does not match the story problem.

	Match	Does not match
$8 \times b = 40$		
$40 \times b = 8$		
$8 \div b = 40$		
$40 \div 8 = b$		
		
		

Spiral Review

4 Determine the area of the rectangle.

_____



For Problems 5–8, determine the value of the expression.

5 7×7 _____

6 5×9 _____

7 3×6 _____

8 7×10 _____

Unit 4
Lesson
6

Name _____ Date _____

Number Flexibility to 100 3.OA.3, 3.NBT.3, 3.OA.2, 3.OA.4, 3.OA.6, SMP.1, SMP.2 SMP.3, SMP.7, SMP.8

Division and Multiplication Equations



Let's make more connections between multiplication and division.

I can be all of me in math class. How do you build confidence when learning new skills in math class?

Warm-Up

eyes on teacher

Activity 1 Problems and Equations

Circle the unknown that you and your partner are assigned.

- total amount
- number of groups
- number in each group

1 Write a problem and 2 equations based on a pepper farm using the unknown you were assigned.

_____

_____

_____

multiplication equation: _____

division equation: _____

Activity 2

Name _____ Date _____

Spicy Wing Challenge

One weekend a year, the café holds a spicy wing challenge, where customers try to eat chicken wings cooked in Mateo's homemade hot sauce.

Write an equation to represent each story problem. Use a letter to represent the unknown value. Then solve each story problem.

Show or explain your thinking.

2 Mateo uses 4 Carolina Reaper peppers for each bottle of hot sauce he makes. He has 36 peppers. How many bottles of hot sauce can he make?

equation: _____

answer: _____

3 On Saturday afternoon, customers arrived at the café to compete in the challenge. There were 42 customers sitting at tables with 6 people at each table. How many tables did they use?

equation: _____

answer: _____

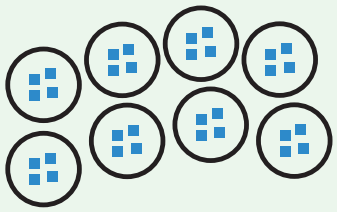
Summary 4.06

You can use multiplication or division equations to represent division problems. Strategies related to each operation can be helpful when determining quotients.

Max bought 32 new stamps for his collection. He put 4 stamps on each page of his book. How many pages did he use?

I can solve using multiplication because I know 8 × 4 = 32.

I can solve 32 ÷ 4 = p by drawing a diagram.



Practice 4.06

1 Write an equation to represent the story problem. Use a letter to represent the unknown value. Then solve the story problem.

A gardener has 48 vegetable plants. He plants the same number of vegetable plants in 6 rows. How many vegetable plants are in each row?

Show or explain your thinking.

equation: _____

answer: _____

Name _____ Date _____

For Problems 2 and 3, write a multiplication equation and a division equation to represent the story problem. Use a letter to represent the unknown value. Then solve the story problem.

2 Jada made 21 stars. She places the same number of stars on 3 windows. How many stars are on each window?

multiplication equation: _____

division equation: _____

answer: _____

3 Diego has 45 photos. He places 5 photos on each page. How many pages does he use?

multiplication equation: _____

division equation: _____

answer: _____

4 An art teacher gives 5 paintbrushes to each of his students. He had 50 paintbrushes. How can you use the multiplication equation $10 \times 5 = 50$ to determine the number of students in the art class?

_____

_____

_____

Name _____ Date _____

5 Han has 63 prize tickets. Each prize costs 9 prize tickets. If Han uses all of his prize tickets, how many prizes can he get? Select *all* the equations that represent the story problem.

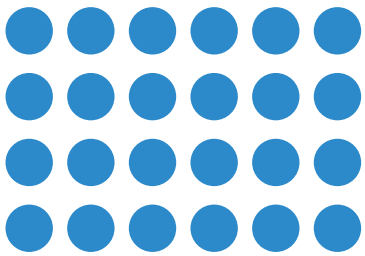
- ☐ **A.** $9 \times 63 = p$
- ☐ **B.** $9 \times p = 63$
- ☐ **C.** $63 \div 9 = p$
- ☐ **D.** $p \div 9 = 63$
- ☐ **E.** $p \div 63 = 9$
- ☐ **F.** $p \times 9 = 63$

6 A classroom has 27 desks. A teacher places an equal number of desks in 3 rows. How many desks are in each row?

_____ desks

Spiral Review

7 Clare says the equation $4 \times 6 = 24$ represents the array. Jada says the equation $6 \times 4 = 24$ represents the array. Who is correct? Explain your thinking.



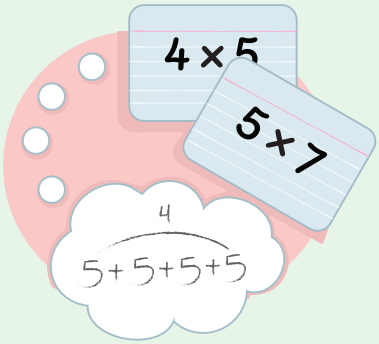
Unit 4
Lesson
7

Name _____ Date _____

Number Flexibility to 100 3.OA.7, 3.OA.6, SMP.7, SMP.8

Relating Quotients to Familiar Products

Let's explore related multiplication and division facts.



Warm-Up

eyes on teacher

I am a doer of math.
What is your favorite way to practice multiplication facts?

Activity 1 Card Sort: Multiplication

1 Hands-On

You and your partner will be given cards with multiplication expressions.

- Shuffle the cards and place them in a stack facedown.
- **Partner A:** Quiz Partner B by showing them 1 expression at a time from the stack.
- **Partner B:** Respond to each expression by:
  - Naming the product from memory,
  - Thinking out loud to determine the product, or
  - Saying, "I need tools to figure it out."
- **Partner A:** For each expression, place the card in one of the columns on the mat:
  - I know the multiplication fact from memory.
  - I can figure out the multiplication fact mentally.
  - I can use tools to figure out the multiplication fact.
- Leave the cards you used on the first mat and set it aside.
- Switch roles and repeat. Start with the next card on the top of the stack. Place the cards on the other mat.

Activity 2

Name _____ Date _____

If I Know, Then I Know . . .

2 Hands-On

You will use the multiplication expression cards from Activity 1.

- Shuffle the cards and place them in a stack facedown.
- Take turns drawing a multiplication expression card.
- Use the multiplication expression to write an equation in the "If I know . . ." column.
- Record related multiplication and division equations in the "Then I know . . ." column.
- Check and compare your equations with your partner.
- Repeat with a new multiplication expression card.

If I know . . .	Then I know . . .

Summary 4.07

Because multiplication and division are related, you can always use multiplication facts to determine division facts and division facts to determine multiplication facts.

$5 \times 7 = 35$

$7 \times 5 = 35$

$35 \div 7 = 5$

$35 \div 5 = 7$

Practice 4.07

For Problems 1 and 2, use the set of numbers to complete the multiplication and division equations.

1 20, 4, 5

____ × ____ = ____

____ × ____ = ____

____ ÷ ____ = ____

____ ÷ ____ = ____

2 7, 6, 42

____ × ____ = ____

____ × ____ = ____

____ ÷ ____ = ____

____ ÷ ____ = ____

Name _____ Date _____

For Problems 3 and 4, use the expression to complete the related multiplication and division equations.

3 9×2

_____ × _____ = _____

_____ × _____ = _____

_____ ÷ _____ = _____

_____ ÷ _____ = _____

4 3×8

_____ × _____ = _____

_____ × _____ = _____

_____ ÷ _____ = _____

_____ ÷ _____ = _____

5 Priya says the number that makes the equation ? ÷ 4 = 4 true is 8. Han says the number is 16. Who is correct? Explain your thinking.

_____

_____

_____

For Problems 6–9, determine the value of the expression.

6 7×3 _____

7 9×6 _____

8 5×4 _____

9 8×8 _____

Name _____ Date _____

10 $3 \times ? = 18$

_____

11 $45 \div ? = 9$

_____

Spiral Review

Han had 198 football cards. He bought 8 more packages of football cards, and each package has 4 football cards. How many football cards does Han have now? Use the story problem for Problems 12 and 13.

12 Write an equation to represent the story problem. Use a letter for the unknown value.

_____

13 Determine how many football cards Han has now.

Show or explain your thinking.

answer: _____

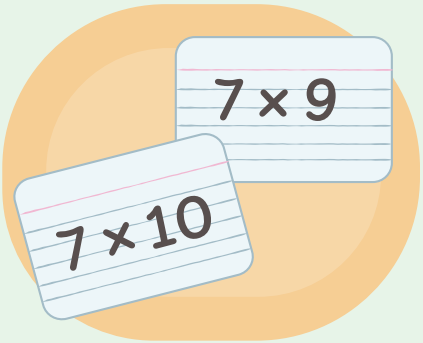
Unit 4
Lesson
8

Name _____ Date _____

Number Flexibility to 100 3.OA.9, 3.OA.7, SMP.7

Patterns in Multiplication

Let's explore multiplication patterns using multiplication tables.



Warm-Up

eyes on teacher

I am a doer of math.
Where have you seen patterns in real life? How are they helpful?

Activity 1 Patterns in the Multiplication Table

1 Determine the products that belong in the shaded boxes.

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8		12	14	16	18	
3	3	6								
4	4	8								
5	5	10								50
6	6	12								
7	7	14								
8	8	16								
9	9	18								
10	10	20								

2 Discuss

What patterns do you notice? Why do you think they occur?

Activity 2

Name _____ Date _____

Even and Odd Products

Use the multiplication table for Problems 3 and 4.

×	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18
4	4	8	12	16	20	24
5	5	10	15	20	25	30
6	6	12	18	24	30	36

3 Color all the even products.

4 **Discuss**

What patterns do you notice? Why do you think they occur?

Summary 4.08

The multiplication table is a tool that can help you visualize patterns in multiplication facts. Understanding patterns in multiplication can help you determine unknown products and explain why the patterns occur.

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16		20
3	3	6	9	12	15	18	21	24		30
4	4	8	12	16	20	24	28	32		40
5	5	10	15	20	25	30	35	40		50
6	6	12	18	24	30	36	42	48		60
7	7	14	21	28	35	42	49	56		70
8	8	16	24	32	40	48	56	64		80
9	9									90
10	10	20	30	40	50	60	70	80	90	100

Practice 4.08

1 Based on the pattern shown in the table, is the unknown number represented by the ? *odd* or *even*?

odd even

Explain your thinking.

×	1	2	3	4	5
1			3		
2			6		
3	3	6	?	12	15
4			12		
5			15		

Name _____ Date _____

2 What is the missing number represented by the question mark? Explain your thinking.

×	1	2	3	4	5	6
1			3			6
2			6			12
3			9			?
4			12			24
5			15			30
6			18			36

3 Identify whether each of the following statements are true or false.

×	1	2	3	4	5
1					5
2					10
3					15
4					20
5	5	10	15	20	?

	True	False
The missing number is even.		
The missing number is odd.		
The missing number ends in 0 or 5.		
The missing number ends in 0 or 2.		
The missing number is 25.		
The missing number is 30.		

Name _____ Date _____

4 There are 10 bracelets in each package. Clare bought 4 packages. Determine how many bracelets she bought. Then write an equation to represent the situation.

Show or explain your thinking.

answer: _____ **equation:** _____

Spiral Review

For Problems 5–12, determine the value of the expression.

5 3×4 _____

6 6×4 _____

7 10×4 _____

8 9×4 _____

9 10×6 _____

10 9×6 _____

11 7×5 _____

12 7×10 _____

Notes:

Sub-Unit

3

Multiplying Greater Numbers

Unit Story: Home Cooking



Art4Picture/Shutterstock.com

Mateo and Amy drove for hours to different farms to find the freshest ingredients.

When is a time you persevered through a challenge in math class for longer than you thought it would take?

Unit 4
Lesson
9

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.7.c, 3.OA.5, 3.OA.7, SMP.1, SMP.2, SMP.8

Composing Rectangles

Let's explore the relationship between rectangles and products.



I can be all of me in math class. What do you already know about multiplication? What questions do you have?

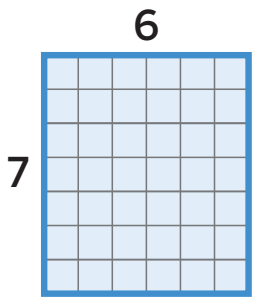
Warm-Up

1 eyes on teacher

Activity 1

How Do You See It?

2 Draw 2 rectangles that compose a 7 × 6 rectangle. Label the side lengths. Find as many ways as you can.



Draw

Name _____ Date _____

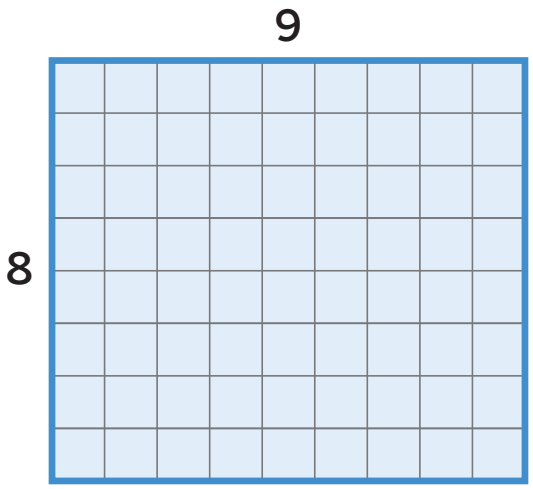
How Do You See It? (continued)

3 Compare

Let's look at some ways to compose a 7 × 6 rectangle using 2 rectangles. What is similar? What is different?

4

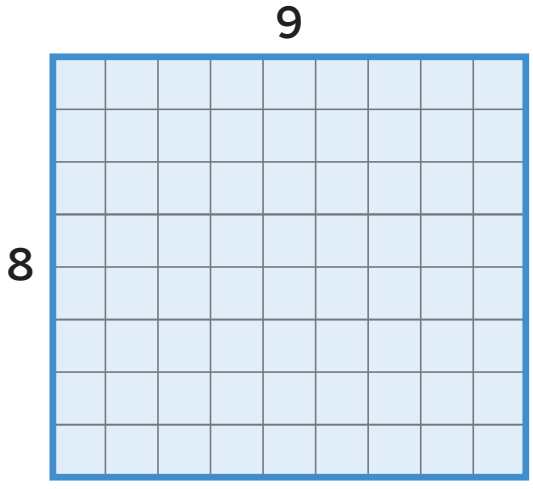
Complete the equation to decompose the 8 × 9 rectangle.



8 × 9 = 8 × (_____ + _____)

5

Complete the equation to create 2 rectangles that compose an 8 × 9 rectangle.



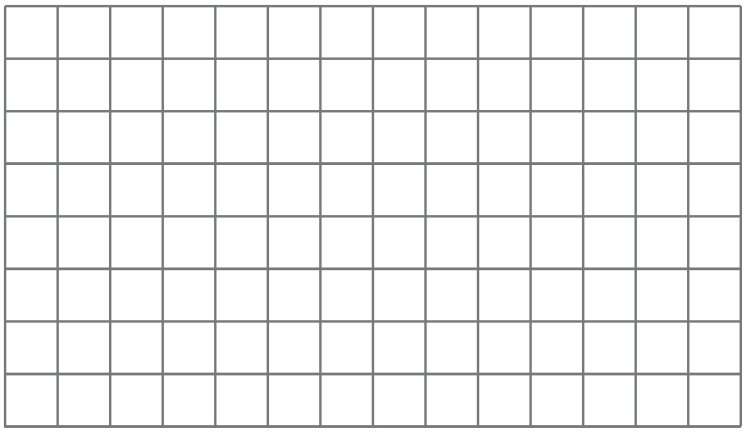
8 × 9 = 8 × _____ + 8 × _____

Activity 2

Name _____ Date _____

From Rectangles to Equations

6 Draw a rectangle on the grid.



7 Complete the equation to create 2 rectangles that compose your rectangle.

_____ × _____ = _____ × _____ + _____ × _____

8 Complete the equation to decompose your rectangle.

_____ × _____ = _____ × (_____ + _____)

9 **Discuss** How do you know each equation is true?

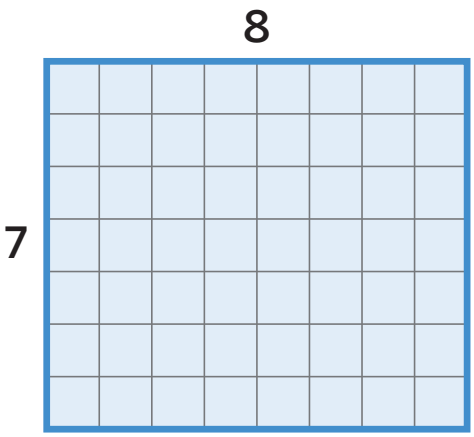
Name _____ Date _____

From Rectangles to Equations (continued)

10 Think-Pair-Share

Diego says that he does not know 7 × 8 from memory, but he can use this equation to help him determine the product. Is Diego correct? Justify your thinking.

$7 \times 8 = 2 \times 8 + 5 \times 8$



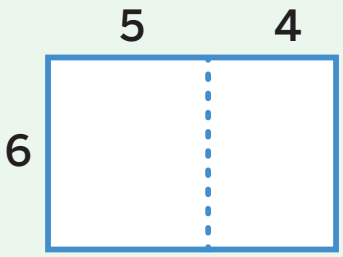
Summary 4.09

To determine unknown products, you can rewrite 1 factor as a sum and then multiply each of the addends by the other factor.

6×9

$6 \times (5 + 4)$

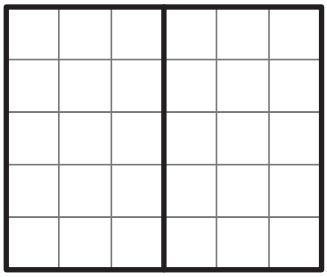
$6 \times 5 + 6 \times 4$



Distributive Property You can rewrite 1 factor in a multiplication expression as a sum, and then multiply each of the addends by the other factor. The result will always be the same as the product of the 2 original factors.

Practice 4.09

1 Jade decomposed the rectangle shown. Write an expression to represent her work. Then determine the area of the rectangle.

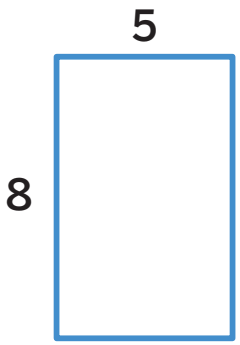


expression: _____

area: _____ square units

Name _____ Date _____

For Problems 2–4, refer to the rectangle.



2 Decompose the rectangle shown to determine its area.

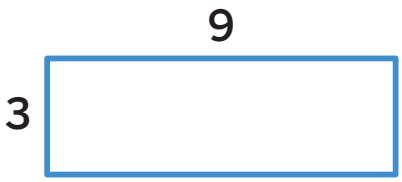
3 Write 1 or more expressions to represent the decomposed rectangle.

_____

4 Complete the equation representing the area of the original rectangle in square units.

$8 \times 5 =$ _____

For Problems 5–7, refer to the rectangle.



5 Decompose the rectangle shown to determine its area.

6 Write 1 or more expressions to represent the decomposed rectangle.

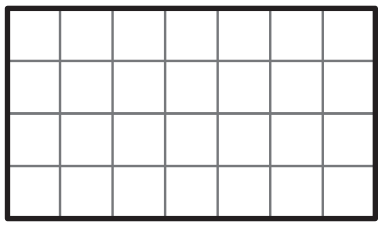
_____

7 Complete the equation representing the area of the original rectangle in square units.

$3 \times 9 =$ _____

Name _____ Date _____

8 Identify whether each of the following expressions could be used to determine the area of the rectangle.



	Yes	No
$2 \times (2 \times 7)$		
$4 \times (5 + 2)$		
$4 \times (5 \times 2)$		
4×7		

Spiral Review

The table shows the typical number of inches of rain Everglade City, Florida receives. Use the information for Problems 9 and 10.

Month	Inches of rain
March	2
April	3
May	4.5

9 June typically receives 5 times as much rain as March. Write a multiplication expression to represent the typical amount of rain in June.

_____

10 How much rain typically falls in June?

_____

For Problems 11 and 12, determine the value of the expression.

11 9×9 _____

12 2×6 _____

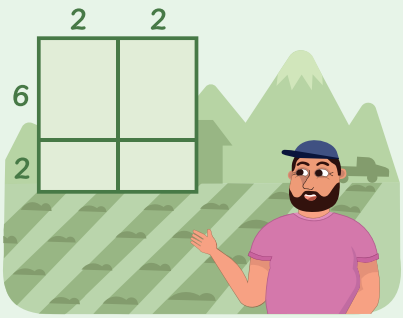
Unit 4
Lesson
10

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.MD.7.c, 3.OA.7, SMP.2, SMP.3, SMP.6, SMP.7

How Do You Split It?

Let's decompose rectangles and expressions in different ways to determine their areas or products.



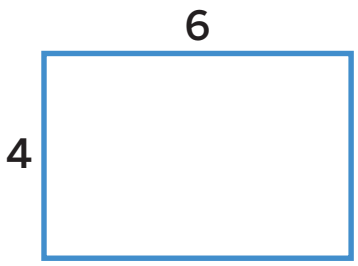
Warm-Up

eyes on teacher

I can be all of me in math class.
What strategy do you use when starting a new math problem?

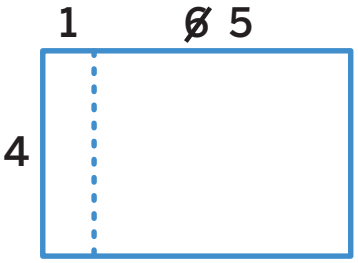
Activity 1 More Rectangles and Expressions

Han and Priya are determining the area of this rectangle.



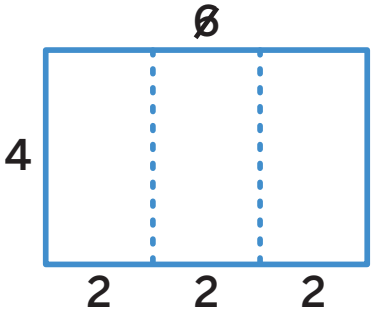
Han decomposes the rectangle like this:

Then he writes (4 × 1) + (4 × 5).



Priya decomposes the rectangle like this:

Then she writes (4 × 2) + (4 × 2) + (4 × 2).



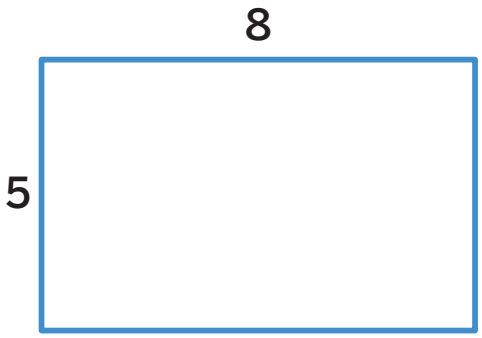
Name _____ Date _____

More Rectangles and Expressions (continued)

1 How are the expressions related to Han's rectangle and Priya's rectangle?

Here is another rectangle.

2 Decompose the rectangle in a way that will help you determine its area.



3 Write 1 or more expressions that represent your decomposition of the diagram.

Activity 2

Name _____ Date _____

Card Sort: Different Expressions, Same Rectangle

Hands-On

You and your partner will be given a set of cards with expressions.

4 Sort

Find the cards that have the same product. Record your matches. Be prepared to explain your reasoning. Draw rectangles if it is helpful.

Matches:

5

Choose one of the decomposed expressions and determine the product.

Show your thinking.

answer: _____

Summary 4.10

You can determine the product of an expression by decomposing the factors to create known facts.

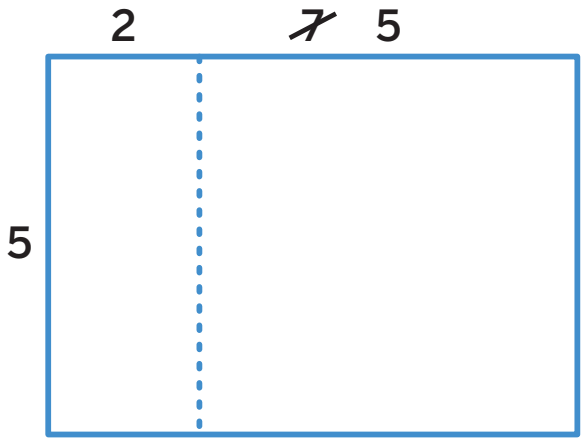
$$6 \times 9$$

$(6 \times 5) + (6 \times 4)$

$2 \times (3 \times 9)$

Practice 4.10

1 Clare decomposed the rectangle to show a strategy for determining its area. Complete the expressions to represent how she decomposed the rectangle and determined the area.



$5 \times (2 + _____)$

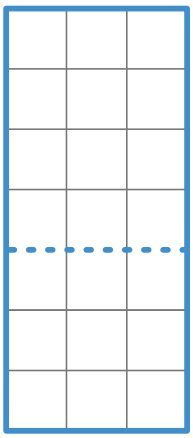
$(5 \times 2) + (5 \times _____)$

_____ + _____

area: _____

Name _____ Date _____

2 Han decomposed the rectangle to determine the area. Complete the expressions to represent how he decomposed the rectangle and determined the area.



$(4 + 3) \times 3$

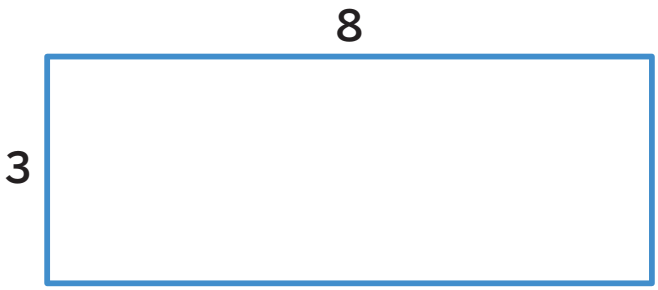
$(____ \times 3) + (____ \times 3)$

$____ + 9 = ____$

$7 \times 3 = ____$

area: _____

3 Identify whether each of the following expressions could be used to determine the area of the rectangle.



	Yes	No
3×8		
$2 \times (5 \times 3)$		
$2 \times (8 \times 2)$		
$3 \times (5 + 3)$		

Name _____ Date _____

Spiral Review

4 There are 180 crayons in a tub. 10 students each take 5 crayons from the tub. How many crayons are left in the tub?

Show or explain your thinking.

answer: _____

For Problems 5–14, determine the value of the expression.

5 2×7 _____

6 8×2 _____

7 8×7 _____

8 3×10 _____

9 2×8 _____

10 7×7 _____

11 5×5 _____

12 9×8 _____

13 3×4 _____

14 5×9 _____

Unit 4
Lesson
11

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.NBT.3, 3.OA.5, SMP.5, SMP.7

Groups of Groups of 10

Let's multiply groups of 10 by one-digit numbers.



Warm-Up eyes on teacher

I am a doer of math.
What does the number 0 mean to you?

Activity
1

Making Total Dollar Amounts

Hands-On

6 friends are playing a board game that uses play money. The paper bills come in $5, $10, $20, and $50.

1 The table shows the bills each player had at one point during the game. Write a multiplication expression to represent the bills and the amount in dollars.

Bills	Expression	Amount (dollars)
9 $10 bills		
4 $20 bills		
8 $20 bills		
9 $50 bills		
20 $5 bills		
6 $50 bills		

Activity 2

Name _____ Date _____

2 Strategies for Tens

Hands-On

2 students used base-ten blocks to evaluate 8 × 30.



Clare counted 30, 60, 90, 120, 150, 180, 210, 240 and determined the number of blocks is 240.

Diego wrote (8 × 3) × 10 and said he knew 8 × 3 is 24 and then multiplied 24 × 10 to get 240 blocks.

2 Discuss

How are Clare's strategy and Diego's strategy similar? How are they different?

Name _____ Date _____

2 Strategies for Tens (continued)

Determine the product of each expression.

Show or explain your thinking.

3 8×50

answer: _____

4 7×40

answer: _____

5 9×20

answer: _____

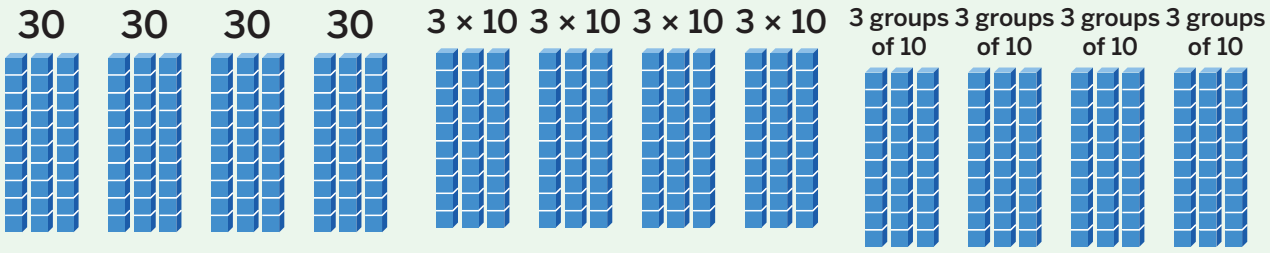
6 4×80

answer: _____

Summary 4.11

You can decompose a multiple of 10 into groups of 10. Because of the **Associative Property of Multiplication**, you can then multiply in any order and get the same product.

4×30	$4 \times 3 \times 10$	$3 \times 10 \times 4$
4 groups of 30	4 groups of 3 groups of 10	3 groups of 10, 4 times



Associative Property of Multiplication The product of 3 or more numbers remains the same regardless of how the numbers are grouped.

Practice 4.11

1 Diego is evaluating the expression 6×40. He says 40 is 4 tens and 6×4 is 24, so 24 tens is equal to 240. So, $6 \times 40 = 240$. Do you agree with Diego? Explain your thinking.

Name _____ Date _____

For Problems 2–5, determine the product of the expression.

Show or explain your thinking.

2 4×50

answer: _____

3 5×70

answer: _____

4 7×30

answer: _____

5 6×90

answer: _____

6 Diego has only $20 bills. He has a total of $120. How many $20 bills does he have? Explain your thinking.

Name _____ Date _____

7 What is the value of 7 × 90?

_____

8 Han has 20 $5 bills. How much money does Han have?

_____ dollars

Spiral Review

9 A cuttlefish has 3 brains. There are 7 cuttlefish in an aquarium. Write 2 equations that represent the total number of cuttlefish brains in the aquarium.

equation 1: _____

equation 2: _____

For Problems 10–13, determine the value of the expression.

10 10 × 8 _____

11 2 × 5 _____

12 6 × 9 _____

13 4 × 4 _____

Unit 4
Lesson
12

Name _____ Date _____

Number Flexibility to 100 3.OA.5, 3.MD.7.c, 3.OA.3, SMP.2, SMP.3, SMP.7

Multiplying Teen Numbers

Let's multiply with teen numbers.



Warm-Up

eyes on teacher

I can be all of me in math class.
How have you been able to share your math ideas with others?

Activity 1 Teen Factors

Hands-On

You and your partner will be given base-ten blocks and grid paper to use if they are helpful.

Show or explain your thinking.

1 Mateo is organizing his kitchen utensils by hanging them on hooks. One kitchen wall has 3 rows of hooks with 14 hooks in each row. How many hooks are on the wall?

Write an expression that represents the problem. Then solve using any strategy.

expression: _____ **answer:** _____

Name _____ Date _____

Teen Factors (continued)

Evaluate each expression.

Show or explain your thinking.

2 4×17

answer: _____

3 13×6

answer: _____

4 5×12

answer: _____

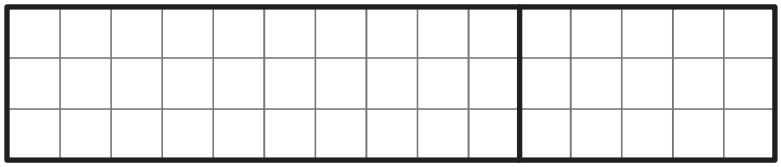
Activity 2

Name _____ Date _____

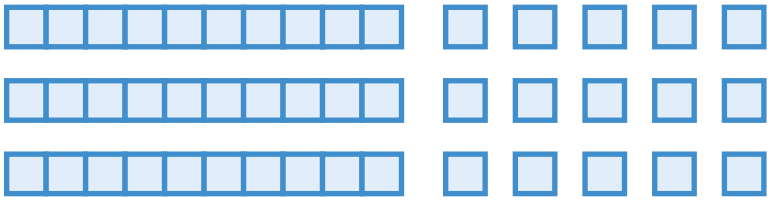
Ways to Represent

Han, Jada, Priya, and Mateo represented the same expression. Here are their representations.

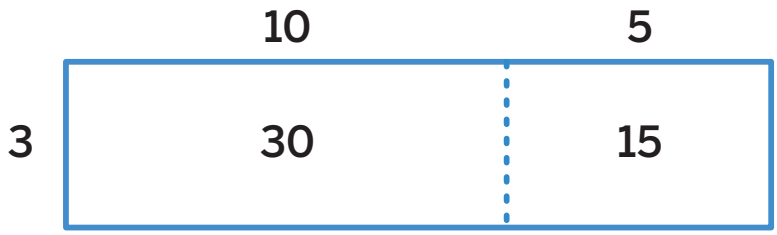
Han



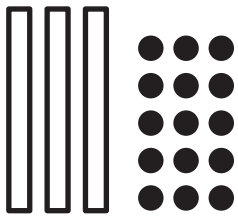
Jada



Priya



Mateo



Name _____ Date _____

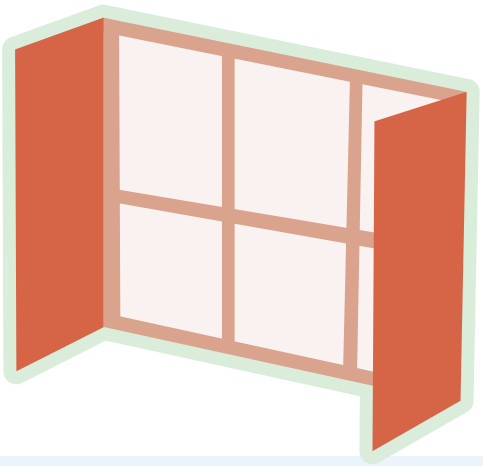
Ways to Represent (continued)

5 Discuss

Where do you see the factors in each representation?

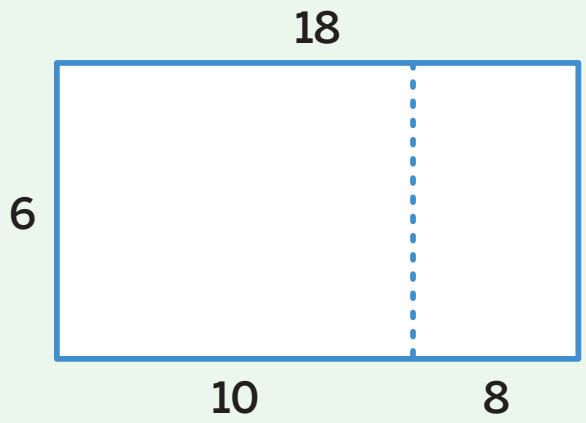
6 Discuss

Where do you see the product in each representation?



Summary 4.12

When multiplying a teen number and a one-digit factor, you can decompose the teen number into a ten and ones.

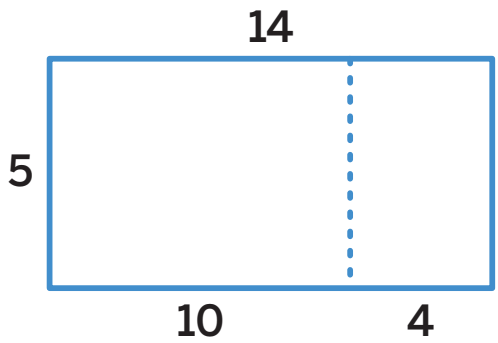


6×18
$6 \times (10 + 8)$
$(6 \times 10) + (6 \times 8)$

Practice 4.12

1 Priya was evaluating 5×14. Use her diagram to determine the product.

Show or explain your thinking.



answer: _____

Name _____ Date _____

For Problems 2 and 3, evaluate the expression using any strategy.

Show your thinking.

2 3×13

answer: _____

3 5×18

answer: _____

4 Jada writes $4 \times 14 = 4 \times (10 \times 4)$. Do you agree with her statement? Explain your thinking.

Name _____ Date _____

5 Identify whether each of the following expressions is equal to 13 × 5.

	Yes	No
5 × (10 × 3)		
5 × (10 + 3)		
3 × (10 + 5)		
5 × (3 + 10)		

6 What is the value of 6 × 15?

_____

Spiral Review

Use the story problem for Problems 7 and 8.

Clare has 125 stickers. She gives 9 friends 5 stickers each. How many stickers does Clare have left?

7 Write an equation to represent the story problem. Use a letter for the unknown value.

_____

8 Determine the number of stickers Clare has left.

Show or explain your thinking.

answer: _____

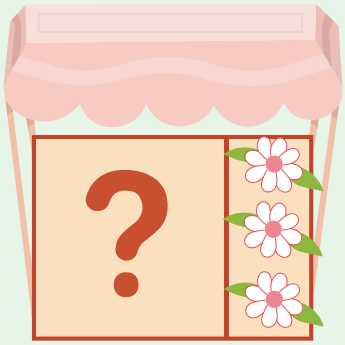
Unit 4
Lesson
13

Name _____ Date _____

Number Flexibility to 100 | Square Tiles | 3.OA.3, 3.MD.7.c, 3.OA.5, SMP.1, SMP.2, SMP.3, SMP.6

Problems Around the Farm

Let's solve problems involving teen numbers.



Warm-Up

eyes on teacher

I can be all of me in math class.
Why is it important to share your work with other mathematicians?

Activity 1 At the Farm

Hands-On

You and your partner will be given base-ten blocks.

Mateo and Amy stopped at another one of their favorite local farms on their way back to the restaurant. Solve each problem and write an expression or expressions to represent your work.

Show or explain your thinking.

1 The farm shop sells local goods. The section of the shop with freshly picked flowers measures 15 feet by 4 feet. What is the area of the flower section?

expression(s): _____

answer: _____

Name _____ Date _____

At the Farm (continued)

Show or explain your thinking.

2 The farm has a U-pick orchard where customers can pick their own lemons. The lemon trees are arranged in 12 rows with 8 trees in each row. How many lemon trees are there?

expression(s): _____

answer: _____

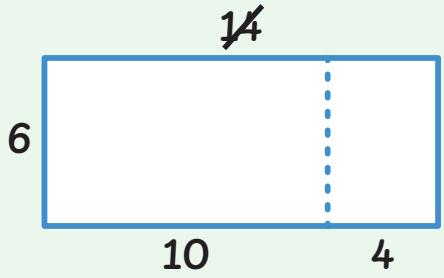
3 Mateo sees packs of handmade cards with art drawn by local artists. He bought 16 packs of cards, and each pack has 5 cards. How many cards did Mateo purchase?

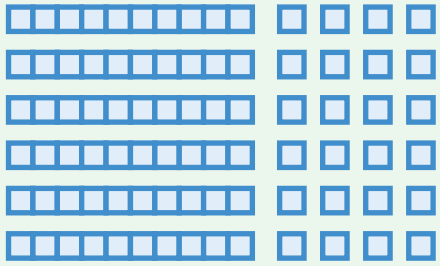
expression(s): _____

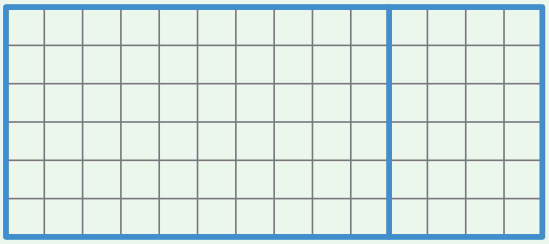
answer: _____

Summary 4.13

Any representation or diagram can be used to solve a problem, regardless of context.

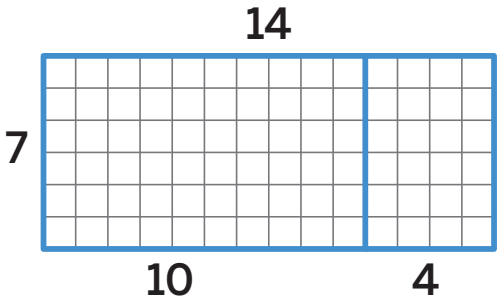






Practice 4.13

1 Jada's father wants to install a garden that measures 14 feet by 7 feet. He asks Jada to determine the area of the garden. Complete her work.



Jada's work:

7 × 14

7 × (_____ + 4)

(7 × _____) + (7 × 4)

_____ + _____ = _____

The area of the garden is _____.

Name _____ Date _____

For Problems 2 and 3, solve the story problem and write an expression or expressions to represent your work.

Show or explain your thinking

2 Han buys 3 sheets of postage stamps featuring U.S. railroad stations. Each sheet has 18 postage stamps. How many postage stamps did Han purchase?

expression(s): _____

answer: _____

3 A music teacher arranged 6 rows of chairs with 14 chairs in each row. How many chairs did the teacher arrange?

expression(s): _____

answer: _____

Name _____ Date _____

4 A teacher buys 8 packages of gel pens. Each package contains 12 gel pens. How many gel pens did the teacher buy?

_____ gel pens

5 Jada places a rug in her bedroom. The rug measures 11 feet by 7 feet. What is the area of the rug?

_____ square feet

Spiral Review

For Problems 6–13, determine the value of the expression.

6 5 × 8 _____

7 2 × 4 _____

8 6 × 4 _____

9 7 × 3 _____

10 3 × 9 _____

11 9 × 10 _____

12 4 × 5 _____

13 8 × 4 _____

Unit 4
Lesson
14

Name _____ Date _____

Number Flexibility to 100 3.OA.5, SMP.7, SMP.8

Multiplying Numbers Greater Than 20

Let's multiply within 100 when 1 factor is greater than 20.



Warm-Up

eyes on teacher

I am a doer of math.
What number patterns do you see around you?

Activity 1 A Factor Greater Than 20

To determine the value of 2 × 37, Jada started by writing this equation.

$$2 \times 30 = 60$$

1 Describe or show what Jada could do to finish determining the value of 2 × 37.

Show or explain your thinking.

Name _____ Date _____

A Factor Greater Than 20 (continued)

Determine each product.

Show your thinking.

2 3 × 29

answer: _____

3 3 × 32

answer: _____

4 4 × 22

answer: _____

Activity 2

Name _____ Date _____

Introducing the Center, Compare

Stage 4

2 6

Pairs Let's compare products.

You'll need: Multiplication Cards

Set Up Divide the Multiplication Cards between both players. Place your cards facedown in a pile.

How to Play

1. Each player flips over a card. Compare the products.
2. The player with the greater product keeps both cards. Place the cards you win faceup in another pile.
3. If the products are equivalent, each player flips over 1 more card. The player with the greater product keeps all 4 cards.
4. Play until you run out of facedown cards.

How to Win The player with more cards at the end of the game wins.

Summary 4.14

When multiplying a factor and a number greater than 20, you can decompose the greater factor to help you work with facts you know or facts you can figure out.

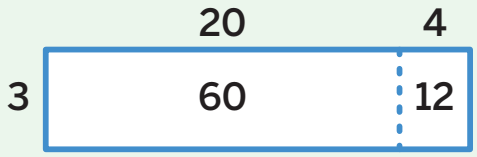
3×24

$3 \times 20 = 60$

$3 \times 4 = 12$

$60 + 12 = 72$

$3 \times 24 = 72$



$60 + 12 = 72$

$3 \times 24 = 72$

Practice 4.14

1 Clare is evaluating 3×27. Complete her work.

Clare's work:

3×27

$3 \times (20 + _____)$

$(3 \times 20) + (3 \times _____)$

_____ + _____ = _____

So, 3×27 is _____.

Name _____ Date _____

For Problems 2 and 3, determine the product.

Show your thinking.

2 2×42

answer: _____

3 4×21

answer: _____

4 Priya is evaluating 4×19. She says $4 \times 1 = 4$ and $4 \times 9 = 36$. $4 + 36 = 40$, so $4 \times 19 = 40$. Do you agree with Priya? Explain your thinking.

Name _____ Date _____

5 Which expression could *not* be used to evaluate 3 × 25?

(A) 3 × (20 + 5)

(B) 3 × (20 × 5)

(C) 25 + 25 + 25

(D) (3 × 20) + (3 × 5)

6 What is the value of 2 × 34 ? _____

Spiral Review

Use the story problem for Problems 7 and 8.

Jada has 96 mini erasers. She buys 4 packages of mini erasers. Each package has 10 erasers. How many mini erasers does Jada have now?

7 Write an equation to represent the story problem. Use a letter for the unknown value.

_____

8 Determine the number of mini erasers Jada has now.

Show or explain your thinking.

answer: _____

Unit 4
Lesson
15

Name _____ Date _____

Number Flexibility to 100 | Addition and Subtraction Patterns | 3.OA.8, 3.NBT.3, 3.OA.5, SMP.1, SMP.2, SMP.3, SMP.7

Planting Pepper Seeds

Let's represent and solve problems with more than 1 step.



Warm-Up

eyes on teacher

I can be all of me in math class.
How have you shared your math ideas with others?

Activity
1

Saving Seeds

1 Represent and solve the story problem in any way that makes sense to you.

The farmer cut open 10 Baklouti peppers and collected 250 seeds. He filled 4 seed packets by placing 21 seeds in each packet. He planted the rest of the seeds in 2 neat rows. How many seeds did the farmer plant?

Show your thinking.

answer: _____

Activity 2

Name _____ Date _____

A Pepper Plant Problem

2 Represent and solve the story problem using any strategy. Then represent the story problem with an equation, using a letter for the unknown value.

In the spring, the farmer planted 472 jalapeño pepper plants. During the summer, a flood destroyed some of the plants. After the flood, the farmer collected 7 peppers from each of the plants that survived. He determined that 459 plants were destroyed. How many peppers did the farmer collect?

Show your thinking.

answer: _____

equation: _____

Summary 4.15

The information you are given and not given can help you solve problems requiring more than 1 operation.

The farmer cut open 10 Baklouti peppers and collected 250 seeds. He filled 4 seed packets by placing 21 seeds in each packet. He planted the rest of the seeds in 2 neat rows.

How many seeds did the farmer plant?

$$250 - (4 \times 21) = s$$

Practice 4.15

For Problems 1–3, solve the story problem and represent it with an equation, using a letter for the unknown value.

Show your thinking.

1 Diego has 125 baseball cards. His mother buys him 3 more packages of baseball cards. Each package contains 18 baseball cards. How many baseball cards does Diego have now?

answer: _____

equation: _____

Name _____ Date _____

Show or explain your thinking.

2 Clare's puzzle book has 120 puzzles. She plans to solve 14 puzzles each day for the next 6 days. How many puzzles will she have left to solve to finish the puzzle book?

answer: _____

equation: _____

3 Han has collected 270 canned goods. He buys 4 boxes of canned goods. Each box contains 12 canned goods. How many canned goods does Han have now?

answer: _____

equation: _____

Name _____ Date _____

4 Jada's score in a trivia game is 225 points. She answers her next 5 questions correctly. Each question is worth 15 points. How many points does Jada have now? Decide whether each equation represents the problem.

	Yes	No
A. $225 + (5 \times 15) = p$		
B. $225 \times (5 \times 15) = p$		
C. $225 - (5 + 15) = p$		
D. $225 + (15 \times 5) = p$		
E. $(5 \times 15) + 225 = p$		
F. $(5 \times 15) - 250 = p$		

5 Priya has 155 credits on her game card. Each game she plays costs 11 credits. Priya plays 7 games. How many credits remain on her game card?

(A) 77 credits

(B) 78 credits

(C) 98 credits

(D) 144 credits

Spiral Review

6 What is the area of the California state flag?

_____



3 ft

5 ft

For Problems 7–10, determine the value of the expression.

7 5×7 _____

8 2×8 _____

9 4×9 _____

10 6×8 _____

Notes:

Sub-Unit

4

Dividing Greater Numbers

Unit Story: Home Cooking



dreamstory/Shutterstock.com

Amy was busy doing many things to prepare for Mr. Gharbi's party.

What math might Amy have been using to set up for the birthday party?

Unit 4
Lesson
16

Name _____ Date _____

Number Flexibility to 100 3.OA.3, 3.OA.2, SMP.1, SMP.5

Setting Up the Birthday Party

Let's divide with greater numbers.



Warm-Up

eyes on teacher

I can be all of me in math class.
How might you use division when planning a class party?

Activity 1 Balloon Decorations

Amy and Mateo got 48 balloons to decorate for Mr. Gharbi's birthday party. Amy tied the balloons to chairs to keep the balloons from floating away. She tied 4 balloons to each chair. How many chairs were decorated with balloons?

1 Solve the story problem and write an equation to represent it.

Show or explain your thinking.

answer: _____

equation: _____

2 **Discuss**

Share your strategy with your partner. How are your strategies similar? How are they different?

Activity 2

Name _____ Date _____

Arranging Tables

Hands-On

Amy and Mateo need to arrange tables for Mr. Gharbi's birthday party. They know 72 people will attend.

Solve each story problem and write an equation to represent your thinking.

Show or explain your thinking.

3 Mateo thinks they should use 3 rectangular tables with the same number of guests at each table. How many guests would sit at each table?

answer: _____

equation: _____

Name _____ Date _____

Arranging Tables (continued)

Show or explain your thinking.

4 Amy thinks they should use round tables that can fit 12 guests at each table. How many round tables would they need?

answer: _____

equation: _____

5 Discuss

Compare your strategy for Problem 3 with your strategy for Problem 4. How are they the same? How are they different?

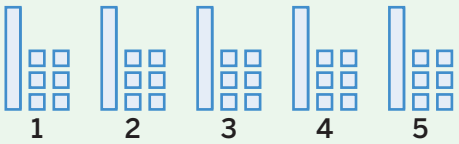
Summary 4.16

You can use the same division strategies you already know to solve division problems with greater numbers.

For Mr. Gharbi's birthday party, Mateo set out stacks of plates on a table next to the food. He set out 80 plates with 16 plates in each stack. How many stacks of plates are on the table?

$$\overset{1}{16} + \overset{2}{16} + \overset{3}{16} + \overset{4}{16} + \overset{5}{16} = 80$$

5 stacks of plates

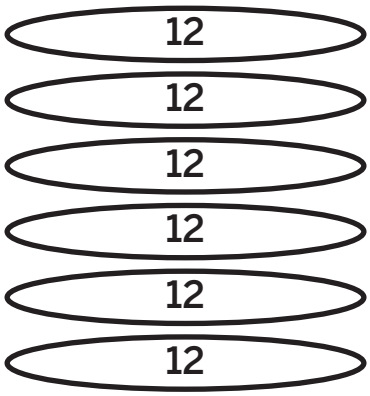


5 stacks of plates

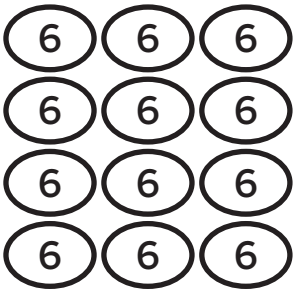
Practice 4.16

For Problems 1 and 2, match the diagram with the story problem it represents.

A



B



1 A florist has 72 roses. He places 6 roses in each vase.

How many vases does the florist need? _____

2 A florist has 72 roses. He places the same number of roses in 6 vases. How many roses are in each vase? _____

Name _____ Date _____

For Problems 3 and 4, write an equation to represent the story problem, using a letter for the unknown value. Then solve the story problem.

Show your thinking.

3 There are 78 chairs in the gym arranged in 6 rows with the same number of chairs in each row. How many chairs are in each row?

equation: _____

answer: _____

4 An art teacher has 51 clay pots to display. She puts 3 clay pots on each shelf. How many shelves does she need?

equation: _____

answer: _____

Name _____ Date _____

5 A teacher had 98 bottles of paint. She put the same number of bottles of paint at 7 tables. How many bottles of paint did she put at each table?

(A) 7 (B) 13 (C) 14 (D) 91

Spiral Review

Clare has 260 beads. She makes 7 necklaces for friends. She uses 9 beads for each necklace. How many beads does Clare have left? Use the story problem for Problems 6 and 7.

6 Write an equation to represent the story problem. Use a letter for the unknown value.

_____

7 How many beads does Clare have left?

Show or explain your thinking.

answer: _____

For Problems 8–11, determine the value of the expression.

8 4×7 _____

9 5×5 _____

10 3×8 _____

11 9×8 _____

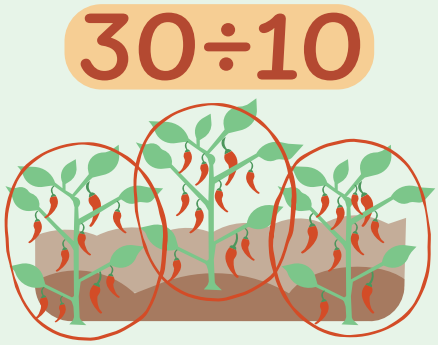
Unit 4
Lesson
17

Name _____ Date _____

Number Flexibility to 100 3.OA.5, 3.OA.3, SMP.1, SMP.2, SMP.4, SMP.7, SMP.8

Looking at the Numbers

Let's think about different ways to divide numbers.



I can be all of me in math class.
Has there been a time in math class when a strategy that used to work did not work anymore? Why did it not work?

Warm-Up

eyes on teacher

Activity 1 Base-Ten Blocks to Divide

Hands-On

You and your partner will be given base-ten blocks.

Use base-ten blocks to determine the value of each expression. Be prepared to explain your thinking.

Show or explain your thinking.

1 $55 \div 5$

answer: _____

Name _____ Date _____

Base-Ten Blocks to Divide (continued)

Show or explain your thinking.

2 45 ÷ 3

answer: _____

3 72 ÷ 12

answer: _____

Activity 2

Name _____ Date _____

How to Divide?

Hands-On

Determine the value of each expression. Be prepared to explain your thinking.

Show or explain your thinking.

4 90 ÷ 15

answer: _____

5 80 ÷ 5

answer: _____

Name _____ Date _____

How to Divide? (continued)

Show or explain your thinking.

6 $66 \div 3$

answer: _____

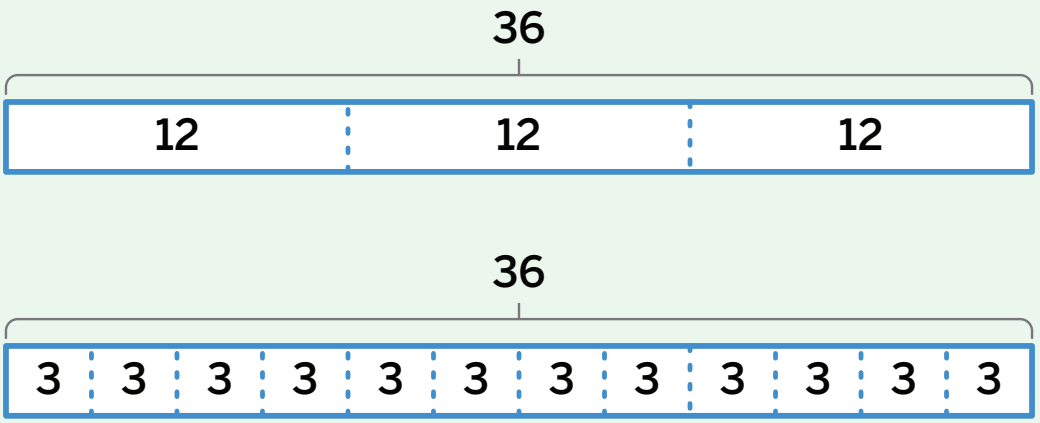
7 $84 \div 21$

answer: _____

Summary 4.17

When determining the value of a division expression, you can choose whether to think of the divisor as the number of groups or the number in each group to strategically divide.

$$36 \div 3$$



Practice 4.17

The work of determining the quotient 60 ÷ 15 is partially complete. Use the work for Problems 1 and 2.

$? \times 15 = 60$

$2 \times 15 = 30$

$\square \times 15 = 60$

1 What number belongs in the box for the quotient 60 ÷ 15?

2 Explain how this strategy works to calculate 60 ÷ 15.

Name _____ Date _____

For Problems 3 and 4, determine the value of the expression using any strategy.

Show or explain your thinking.

3 68 ÷ 4

answer: _____

4 45 ÷ 15

answer: _____

5 Determine the missing divisor in the equation 90 ÷ ? = 30.

Show or explain your thinking.

answer: _____

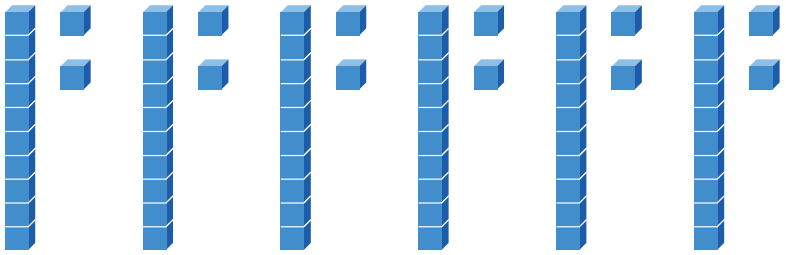
Name _____ Date _____

6 What is the quotient of the expression 80 ÷ 5?

Show or explain your thinking.

answer: _____

7 Select *all* the division expressions this model represents.



	Yes	No
A. 84 ÷ 6		
B. 72 ÷ 6		
C. 72 ÷ 12		
D. 12 ÷ 72		
E. 84 ÷ 12		

Spiral Review

For Problems 8–15, determine the value of the expression.

8 14 ÷ 2 _____

9 4 × 4 _____

10 6 × 5 _____

11 21 ÷ 7 _____

12 15 ÷ 3 _____

13 4 × 8 _____

14 9 ÷ 3 _____

15 3 × 2 _____

Unit 4
Lesson
18

Name _____ Date _____

Number Flexibility to 100 | 3.OA.5, 3.MD.7.c, 3.NBT.3, 3.OA.2, SMP.1, SMP.3, SMP.7

Lots and Lots of Groups

Let's look at different ways to represent division.



Warm-Up

eyes on teacher

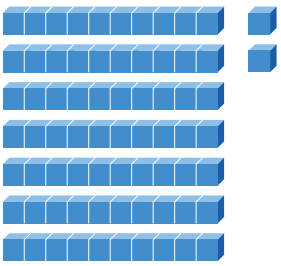
I can be all of me in math class.
Have you ever tried a new strategy in math class? How did it compare to your first strategy?

Activity
1

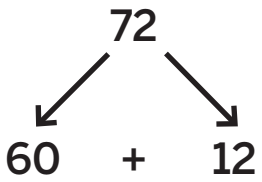
What Were They Thinking?

Three students were discussing how to determine the quotient 72 ÷ 6.

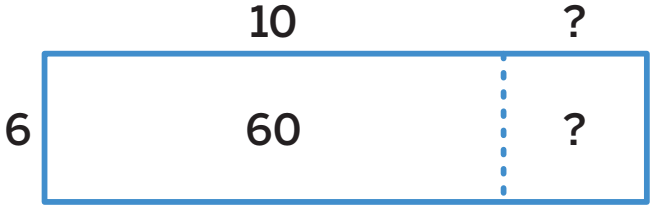
Han said, "I started by showing 72 with base-ten blocks. Then I thought about how to split them into 6 equal groups."



Diego said, "I started by breaking up 72 into 60 and 12. Then I thought about dividing each of those numbers by 6."



Clare said, "I thought about multiplication, and I know that 6 × 10 = 60."



Name _____ Date _____

What Were They Thinking? (continued)

1 Discuss

How could each student complete their work to determine the quotient?

2

Select one of the strategies and determine the quotient $72 \div 6$.

Show or explain your thinking.

answer: _____

Activity 2

Name _____ Date _____

Setting the Tables

Amy and Mateo ordered 84 flowers. They want to put 4 flowers in each vase. How many vases do they need?

Show or explain your thinking.

3 Use the rectangle to show how you could decompose 84 to determine the quotient 84 ÷ 4.



4 Determine the number of vases Amy and Mateo need by using your decomposition from Problem 3 to determine the quotient 84 ÷ 4.

answer: _____

Name _____ Date _____

Setting the Tables (continued)

5 Amy and Mateo also ordered 96 balloons. They want to put the same number of balloons at each table. There are 8 tables. How many balloons will be at each table? Use the rectangle if it is helpful.

Show or explain your thinking.



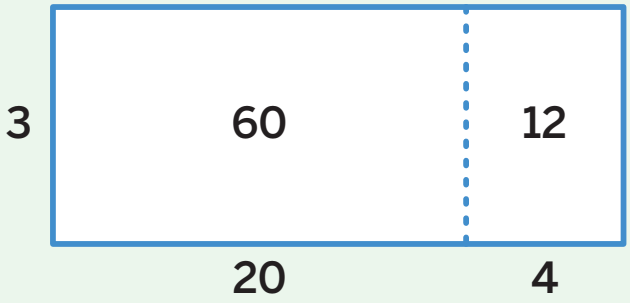
answer: _____



Summary 4.18

When working with greater dividends, you can decompose the dividend and use facts you know to determine the quotient.

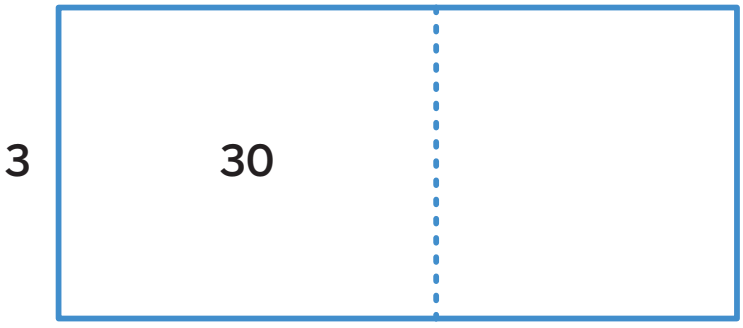
$$72 \div 3$$



$72 = 60 + 12$
$3 \times 20 = 60$
$3 \times 4 = 12$
$20 + 4 = 24$

Practice 4.18

1 Complete the model to determine the quotient $54 \div 3$.



Name _____ Date _____

For Problems 2 and 3, solve the story problem.

Show or explain your thinking.

2 A teacher places 76 books equally in 4 boxes. How many books did the teacher place in each box?

answer: _____

3 A music teacher has 78 maracas. He places 6 maracas in each bin. How many bins did the music teacher use?

answer: _____

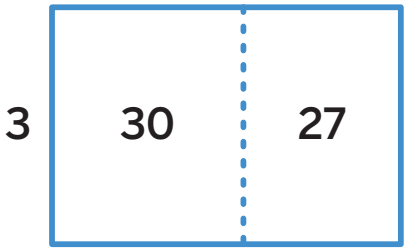
4 To determine the quotient 75 ÷ 5, Diego said, "I can break up 75 into 25, 25, and 25. Then I can divide each number by 5 and add the 3 quotients." Is Diego's method correct? Explain your thinking.

Name _____ Date _____

5 A teacher had 85 magazines. He placed the same number of magazines at 5 tables. How many magazines did the teacher place at each table?

answer: _____

6 Which division expression represents the model?



(A) 57 ÷ 3 (B) 3 ÷ 57

(C) 30 ÷ 3 (D) 27 ÷ 3

Spiral Review

For Problems 7–14, determine the value of the expression.

7 8 ÷ 4 _____

8 2 × 2 _____

9 6 × 6 _____

10 12 ÷ 3 _____

11 16 ÷ 4 _____

12 5 × 4 _____

13 10 ÷ 5 _____

14 3 × 9 _____

Unit 4
Lesson
19

Name _____ Date _____

Number Flexibility to 100 3.OA.5, 3.OA.3, SMP.1, SMP.7, SMP.8

Be Flexible!

Let's flexibly use strategies to make dividing more efficient.



Warm-Up

eyes on teacher

I can be all of me in math class.
What does it mean to be flexible in math class?

Activity 1 Same Strategy or Different?

Divide using any strategy.

Show your thinking.

1 Mateo's menus are printed on cardstock paper. A box of cardstock comes with 14 packs for a total of 84 sheets of cardstock. How many sheets of cardstock come in each pack?

answer: _____

Name _____ Date _____

Same Strategy or Different? (continued)

Show your thinking.

2 Rolls of napkins with silverware in them have been laid out on a table. There are 96 napkins arranged in 6 columns, with the same number of napkins in each column. How many rows of napkins are there?

answer: _____

3 The area of the buffet table in Mateo's restaurant is 64 square feet. The table is 4 feet wide. How long is the table?

answer: _____

4 Discuss

Did you use the same strategy or different strategies for Problems 1–3? Be prepared to explain why you chose each strategy.

Activity 2

Name _____ Date _____

Introducing the Center, Let's Play Compare

Stage 5

Pairs Let's compare quotients.

You'll need: One-Digit Divisor Cards

Set Up Divide the cards between both players. Place your cards facedown in a pile.

How to Play

1. Each player flips over a card. Compare the quotients.
2. The player with the greater quotient keeps both cards. Place the cards you win faceup in another pile.
3. If the quotients are equivalent, each p layer flips over 1 more card. The player with the greater quotient keeps all 4 cards.
4. Play until you run out of facedown cards.

How to Win The player with more cards at the end of the game wins.

Summary 4.19

Sometimes, a particular division strategy makes more sense to use based on the context, values, or facts you know. When comparing quotients, you can use what you know to estimate and compare without evaluating.

$84 \div 6$ $52 \div 2$

The quotient of 84 divided by 6 will only have 1 ten. The quotient of 52 divided by 2 will have 2 tens. So, I know that the second quotient is greater.

Practice 4.19

1 The area of a garden is 90 square feet. The width of the garden is 6 feet. Complete the model. How long is the garden?



_____

Name _____ Date _____

For Problems 2 and 3, solve the story problem using any strategy.

Show or explain your thinking.

2 Clare has 75 watermelons. She places 5 watermelons in each crate. How many crates did she use?

answer: _____

3 Diego ordered a box of football cards. The box contained 12 packages with a total of 60 football cards. How many football cards were in each package?

answer: _____

For Problems 4–7, determine the value of the expression.

4 $6 \div 3$ _____

5 9×4 _____

6 4×3 _____

7 $12 \div 6$ _____

Name _____ Date _____

8 A rectangular rug has a length of 7 feet. The area of the rug is 98 square feet. How wide is the rug?

answer: _____

9 A teacher has 12 tables. She places 96 pens equally among the tables. How many pens did she place at each table?

answer: _____

Spiral Review

A farmer sells 173 tomatoes in mini baskets. Each mini basket has 7 tomatoes. By noon, he sells 10 mini baskets. How many tomatoes does the farmer have left? Use the story problem for Problems 10 and 11.

10 Write an equation to represent the story problem. Use a letter for the unknown value.

_____

11 How many tomatoes does the farmer have left?

Show or explain your thinking.

answer: _____

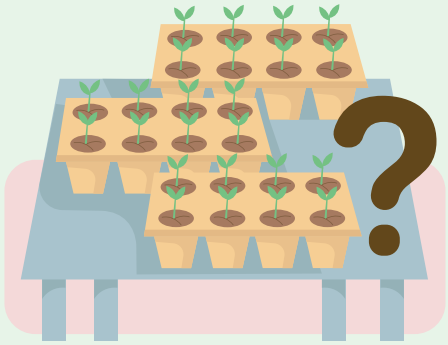
Unit 4
Lesson
20

Name _____ Date _____

Number Flexibility to 100 | Addition and Subtraction Patterns | 3.OA.8, SMP.1, SMP.2

Peppers and Apples, Oh My!

Let's represent and solve problems.



Warm-Up eyes on teacher

I can be all of me in math class.
How do you use math language in and outside of math class?

Activity 1 Apple Orchard Adventure

Solve each story problem using any strategy.

1 Clare is stacking apples to sell at the orchard. There are 235 apples. She has already stacked 5 rows of 9 apples. How many apples are left to stack?

Show your thinking.

answer: _____

2 **Discuss**

What strategy did you use to solve Problem 1? Will that strategy always work for solving two-step problems?

Name _____ Date _____

Apple Orchard Adventure (continued)

3 Jada, Clare, and Han are selling baked goods at the event. They sell 18 apple muffins that cost $4 each. They split the money they made equally. How much money did each friend get from selling baked goods?

Show your thinking.

answer: _____

4 The market at the orchard had 200 jars of applesauce for sale. At the end of the event, 184 jars had been sold. The rest of the jars were shared equally among 4 people who work there. How many jars of applesauce did each person get?

Show your thinking.

answer: _____

Activity 2

Name _____ Date _____

Pepper Party Favors

Solve each story problem and write 1 equation that represents it. Use a letter for the unknown value.

5 Amy and Mateo have 48 trays of Baklouti seedlings. They put the same number of trays on 4 tables. There are 8 seedlings in each tray.

How many seedlings are on each table?

Show your thinking.

answer: _____

equation: _____

Name _____ Date _____

Pepper Party Favors (continued)

6 On the day of Mr. Gharbi's birthday, Amy and Mateo had a total of 300 seedlings to give away to the guests at the party. They gave away 228 seedlings. The rest of the seedlings were shared equally among the 6 workers at the café.

How many seedlings did each worker get?

Show your thinking.

answer: _____

equation: _____

Summary 4.20

Equations with more than 1 operation and a letter representing the unknown value can be used to represent and solve a problem with more than 1 step.

First, I did this:

$150 - 128 = 22$

Then, I did this:

$22 \div 2 = 11$

Which is the same as this: $(150 - 128) \div 2 = s$

Practice 4.20

For Problems 1 and 2, match the story problem with the equation that represents it.

$(120 - 20) \div 4 = n$	$(120 \div 4) - 20 = n$
$(120 \div 4) + 20 = n$	$(120 + 20) \div 4 = n$

1 Shawn had 120 stickers. After using 20 stickers, Shawn gave the rest to 4 friends. Each friend received the same number of stickers. How many stickers did each friend receive?

2 Diego had 120 marbles. His mother gave him 20 more marbles. Then he put the marbles equally in 4 bins. How many marbles did Diego put in each bin?

Name _____ Date _____

For Problems 3 and 4, solve the story problem and write an equation that represents it. Use a letter for the unknown value.

Show or explain your thinking.

3 The principal had 56 boxes of crayons. There were 6 crayons in each box. She gave the same number of boxes of crayons to 4 teachers. How many crayons did each teacher receive?

answer: _____ **equation:** _____

4 A florist had 36 carnations. He used 8 carnations to make a bouquet. He received a delivery of 44 more carnations. If he used all the carnations, how many bouquets did the florist make?

answer: _____ **equation:** _____

5 Write a story problem that can be represented by the equation $(80 + 20) \div 5 = n$.

Name _____ Date _____

6 Jada had $126. She spent $48 on a book bag. Then she spent the remaining money on 3 pairs of jeans that each cost the same amount. What was the cost of each pair of jeans?

(A) $25

(B) $26

(C) $39

(D) $78

7 A teacher has 48 packets of flower seeds. There are 20 seeds in each packet. She gives the same number of packets to 12 students. How many flower seeds does each student receive? Select the equation that represents the situation.

(A) (48 ÷ 12) × 20

(B) (48 + 12) × 20

(C) (48 ÷ 20) × 12

(D) (48 × 12) ÷ 20

Spiral Review

For Problems 8–15, determine the value of the expression.

8 10 ÷ 5 _____

9 6 × 4 _____

10 5 × 10 _____

11 8 ÷ 4 _____

12 16 ÷ 2 _____

13 7 × 8 _____

14 15 ÷ 5 _____

15 2 × 5 _____

Notes:

Math at Work

One batch of a recipe for mini fruit tarts makes 18 fruit tarts. How many batches do you need to make 90 mini fruit tarts for a large party?

Chefs plan and prepare delicious meals. They might multiply to determine the number of food items they need to purchase. They might divide to determine individual serving sizes.



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Math in the World

Basbousa is an Egyptian cake made with yogurt, coconut, and honey. If a large Basbousa cake has 24 servings, how many cakes are needed for 72 servings?



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Math Mindset

Other than in cooking or baking, how might division be helpful to solve problems in everyday life?